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the deliberations of the Board prior to the issuance of the recommendations of the Board under §83.15. The panel shall consider whether HHS substantially complied with the procedures of this part, the factual accuracy of the information supporting the final decision, and the principal findings and recommendations of NIOSH and those of the Board issued under §83.15.

(c) The Secretary will decide whether or not to revise a final decision contested by the petitioner(s) under this section after considering information and recommendations provided to the Secretary by the Director of NIOSH, the Board, and from the HHS administrative review conducted under paragraph (b) of this section. HHS will transmit a report of the decision to the petitioner(s).

(d) If the Secretary decides under paragraph (c) of this section to change a designation under §83.17(a) of this part or a determination under §83.16(c) of this part, the Secretary will transmit to Congress a report providing such change to the designation or determination, including an iteration of the relevant criteria, as specified under §83.13(c), and a summary of the information and findings on which the decision is based. HHS will also publish a notice summarizing the decision in the FEDERAL REGISTER.

(e) A new designation of the Secretary under this section will take effect 30 calendar days after the date on which the report of the Secretary under paragraph (d) of this section is submitted to Congress, unless Congress takes an action that reverses or expedites the designation. Such new designations and related congressional actions will be further reported by the Secretary pursuant to paragraphs (d) and (e) of §83.17.

[70 FR 75953, Dec. 22, 2005]

§83.19 How can the Secretary cancel or modify a final decision to add a class of employees to the Cohort?

(a) The Secretary can cancel a final decision to add a class to the Cohort, or can modify a final decision to reduce the scope of a class added by the Secretary, if HHS obtains records relevant to radiation exposures of members of the class that enable NIOSH to estimate the radiation doses incurred by individual members of the class through dose reconstructions conducted under the requirements of 42 CFR part 82.

(b) Before canceling a final decision to add a class or modifying a final decision to reduce the scope of a class, the Secretary intends to follow evaluation procedures that are substantially similar to those described in this part for adding a class of employees to the Cohort. The procedures will include the following:

(1) Publication of a notice in the FEDERAL REGISTER informing the public of the intent of the Secretary to review the final decision on the basis of new information and describing procedures for this review;

(2) An analysis by NIOSH of the utility of the new information for conducting dose reconstructions under 42 CFR part 82; the analysis will be performed consistently with the requirements for analysis of a petition by NIOSH under §§83.13(c)(1) and (2), and 83.13(c)(2) and (3);

(3) A recommendation by the Board to the Secretary as to whether or not the Secretary should cancel or modify his final decision that added the class to the Cohort, based upon a review by the Board of the NIOSH analysis under paragraph (b)(2) of this section and any other relevant information considered by the Board;

(4) An opportunity for members of the class to contest a proposed decision to cancel or modify the prior final decision that added the class to the Cohort, including a reasonable and timely effort by the Secretary to notify members of the class of this opportunity; and

(5) Publication in the FEDERAL REGISTER of a final decision to cancel or modify the prior final decision that added the class to the Cohort.

[69 FR 30780, May 28, 2004. Redesignated at 70 FR 75953, Dec. 22, 2005]

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APPENDIX A TO PART 84—ANNUAL (FIXED) RESPIRATOR CERTIFICATION FEES
APPENDIX B TO PART 84—APPLICATION-BASED RESPIRATOR CERTIFICATION FEES

AUTHORITY: 29 U.S.C. 651 *et seq.;* 30 U.S.C. 3, 5, 7, 811, 842(h), 844.

SOURCE: 60 FR 30355, June 8, 1995, unless otherwise noted.

EDITORIAL NOTE: Nomenclature changes to part 84 appear at 69 FR 18803, Apr. 9, 2004.

Subpart A—General Provisions

§ 84.1 Purpose.

The purpose of the regulations contained in this part 84 is:

(a) To establish procedures and prescribe requirements which must be met in filing applications for approval by

the National Institute for Occupational Safety and Health of respirators or changes or modifications of approved respirators;

(b) To establish a schedule of fees to be charged each applicant for the inspections, examinations, and testing conducted by the Institute under the provisions of this part;

(c) To provide for the issuance of certificates of approval or modifications of certificates of approval for respirators which have met the applicable construction, performance, and respiratory protection requirements set forth in this part; and

(d) To specify minimum requirements and to prescribe methods to be employed by the Institute and by the applicant in conducting inspections, examinations, and tests to determine the effectiveness of respirators used during entry into or escape from hazardous atmospheres.

§ 84.2 Definitions.

As used in this part—

Applicant means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, assembles, or controls the assembly of a respirator and who seeks to obtain a certificate of approval for such respirator.

Approval means a certificate or formal document issued by the Institute stating that an individual respirator or combination of respirators has met the minimum requirements of this part, and that the applicant is authorized to use and attach an approval label to any respirator, respirator container, or instruction card for any respirator manufactured or assembled in conformance with the plans and specifications upon which the approval was based, as evidence of such approval.

Approved means conforming to the minimum requirements of this part.

Auxiliary equipment means a self-contained breathing apparatus, the use of which is limited in underground mine rescue and recovery operations to situations where the wearer has ready access to fresh air and at least one crew equipped with approved self-contained breathing apparatus of 2 hours or longer rating, is in reserve at a fresh-air base.

Compressed-breathing gas means oxygen or air stored in a compressed state and supplied to the wearer in gaseous form.

dBA means sound pressure levels in decibels, as measured with the A-weighted network of a standard sound level meter using slow response.

Dust means a solid mechanically produced particle with a size ranging from submicroscopic to macroscopic.

A *facepiece* or *mouthpiece* is a respirator component designed to provide a gas-tight or dust-tight fit with the face and may include headbands, valves, and connections for canisters, cartridges, filters, or respirable gas source.

Final inspection means that activity carried out on a product after all manufacturing and assembly operations are completed to insure completeness and adherence to performance or other specifications, including satisfactory appearance.

Fume means a solid condensation particle, generally less than 1 micrometer in diameter.

Gas means an aeriform fluid which is in a gaseous state at ordinary temperature and pressure.

Hazardous atmosphere means:

(1) Any atmosphere containing a toxic or disease producing gas, vapor, dust, fume, mist, or pesticide, either immediately or not immediately dangerous to life or health; or

(2) Any oxygen-deficient atmosphere.

A *hood* or *helmet* is a respirator component which covers the wearer's head and neck, or head, neck, and shoulders, and is supplied with incoming respirable air for the wearer to breathe. It may include a headharness and connection for a breathing tube.

Immediately dangerous to life or health means conditions that pose an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health.

Incoming inspection means the activity of receiving, examining, and accepting only those materials and parts whose quality conforms to specification requirements.

In-process inspection means the control of products at the source of production and at each step of the manufacturing process, so that departures from specifications can be corrected before defective components or materials are assembled into the finished product.

Institute or NIOSH means the National Institute for Occupational Safety and Health, Department of Health and Human Services.

Liquefied-breathing gas means oxygen or air stored in liquid form and supplied to the wearer in a gaseous form.

Loose fitting means respiratory inlet covering that covers the wearer's head and neck, or head, neck, and shoulders, or whole body (when integral to the design).

Mist means a liquid condensation particle with a size ranging from submicroscopic to macroscopic.

MSHA means the Mine Safety and Health Administration, U.S. Department of Labor.

National Personal Protective Technology Laboratory (NPPTL) means the National Personal Protective Technology Laboratory, National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention, Department of Health and Human Services, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236. NPPTL administers the NIOSH conformity assessment program for respiratory protective devices, replacing the former Certification and Quality Assurance Branch within the Division of Safety Research, Appalachian Laboratory for Occupational Safety and Health, NIOSH.

Not immediately dangerous to life or health means any hazardous atmosphere which may produce physical discomfort immediately, chronic poisoning after repeated exposure, or acute adverse physiological symptoms after prolonged exposure.

Oxygen-deficient atmosphere means an atmosphere which contains an oxygen partial pressure of less than 148 millimeters of mercury (19.5 percent by volume at sea level).

Powered air-purifying respirator means a device equipped with a facepiece, hood, or helmet, breathing tube, canister, cartridge, filter, canister with filter, or cartridge with filter, and a blower.

Respirator means any device designed to provide the wearer with respiratory protection against inhalation of a hazardous atmosphere.

Respirators for entry into and escape from means respiratory devices providing protection during entry into and escape from hazardous atmospheres.

Respirators for escape only means respiratory devices providing protection only during escape from hazardous atmospheres.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both.

(*Single-use respirator* means a respirator that is entirely discarded after excessive resistance, sorbent exhaustion, or physical damage renders it unsuitable for further use.

Tight fitting means a respiratory inlet covering that forms a complete gas tight or dust tight seal with the face or neck.

Vapor means the gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

Warning device is a component of a respiratory protective device that informs the wearer to take some action.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3906, Jan. 26, 2015; 85 FR 20607, Apr. 14, 2020]

§ 84.3 Respirators for mine rescue or other emergency use in mines.

(a)(1) NIOSH and the Mine Safety and Health Administration (MSHA), U.S. Department of Labor, shall jointly review and issue certifications for respirators used for mine emergencies and mine rescue, including any associated service-life plans, users' manuals and other supporting documentation.

(2) Each certification for a respirator designed for mine rescue or other emergency use in mines shall include, as a condition of approval, any use limitations related to mine safety and health.

(b) NIOSH and MSHA shall jointly determine appropriate recall and retrofit remedies for field complaints or identified deficiencies involving any

respirators used in the mining environment.

Subpart B—Application for Approval

§ 84.10 Application procedures.

(a) Inspection, examination, and testing leading to the approval of the types of respirators classified in subpart F of this part shall be undertaken by the Institute only pursuant to written applications which meet the minimum requirements set forth in this subpart B.

(b) Applications must be submitted in accordance with the *Standard Application Procedure for the Certification of Respirators under 42 CFR 84*, (*Standard Application Procedure*) available on the NPPTL Web site, to Records Room, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

(c) Except as provided in § 84.64, the examination, inspection, and testing of all respirators will be conducted or caused to be conducted by the National Personal Protective Technology Laboratory.

(d) Applicants, manufacturers, or their representatives may visit or communicate with the National Personal Protective Technology Laboratory in order to discuss the requirements for approval of any respirator or the proposed designs thereof. No charge will be made for such consultation and no written report will be issued to applicants, manufacturers, or their representatives by the Institute as a result of such consultation.

(e) Respirators having electrical or electronic components that are required to be permissible under chapter I of title 30 shall be tested in accordance with 30 CFR part 18. Applications for approval of such respirators by MSHA shall be submitted in writing to: MSHA, Approval and Certification Center, Box 251, Industrial Park Road, Triadelphia, West Virginia 26059.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3906, Jan. 26, 2015]

§ 84.11 Contents of application.

(a) Each application for approval shall contain a complete written description of the respirator for which approval is requested together with drawings and specifications (and lists thereof) showing full details of construction of the respirator and of the materials used.

(b) Drawings shall be titled, numbered, and dated; any revision dates shall be shown on the drawings, and the purpose of each revision being sought shall be shown on the drawing or described on an attachment to the drawing to which it applies.

(c) Each application for approval shall contain a proposed plan for quality control which meets the minimum requirements set forth in subpart E of this part.

(d) Each application shall contain a statement that the respirator has been pretested by the applicant as prescribed in § 84.64, and shall include the results of such tests.

(e) Each application for approval shall contain a statement that the respirator and component parts submitted for approval are either prototypes, or made on regular production tooling, with no operation included which will not be incorporated in regular production processing.

(The information collections contained in this section are approved under OMB control number 0920–0109)

§ 84.12 Delivery of respirators and components by applicant; requirements.

(a) Each applicant shall, when an application is filed pursuant to § 84.10, be advised by the Institute of the total number of respirators and component parts required for testing.

(b) The applicant will deliver, at his or her own expense, the number of completely assembled respirators and component parts required for their examination, inspection, and testing, to the National Personal Protective Technology Laboratory.

(c) Respirators and component parts submitted for approval must be made from materials specified in the application.

(d) One completely assembled respirator approved under the provisions of this part may be retained by the Institute as a laboratory exhibit, the remaining respirators may be returned to the applicant at his own expense, upon

written request within 30 days after notice of approval. If no such request is made, the respirators will be disposed of by the Institute in such manner as it deems appropriate.

(e) Where a respirator fails to meet the requirements for approval set forth in this part, all respirators and components delivered in accordance with this section may be returned to the applicant at his own expense, upon written request within 30 days after notice of disapproval. If no such request is made, the respirators will be disposed of by the Institute in such manner as it deems appropriate.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3906, Jan. 26, 2015]

Subpart C—Fees

SOURCE: 80 FR 3906, Jan. 26, 2015, unless otherwise noted.

§ 84.20 Establishment of fees.

(a) This section establishes a system under which NIOSH charges a fee for services provided to applicants for conformity assessment activities conducted by NIOSH for respiratory protective devices under 42 CFR part 84. This section specifies the purposes for which fees will be assessed and the cost factors for such assessments.

(b) Fees will be charged for:

(1) *Respirator certification application, approval, approval modification, records maintenance, and testing.* Application processing under this Part by engineers, technicians and other specialists, including administrative review of applications, analysis of drawings, technical evaluation, testing, test set up and tear down, and consultation on applications, clerical services, computer tracking and status reporting, records control and security, and document preparation directly supporting application processing. This fee also contributes to a proportionate share of management, administration and operation of the NIOSH National Personal Protective Technology Laboratory;

(2) *Maintenance of testing and approval facilities and test equipment.* Amortization of facility improvements and depreciation of buildings and equipment used for testing and evaluation or otherwise directly associated with application processing;

(3) *Site qualification.* Initial review and approval, as specified under 42 CFR part 84 subpart E—Quality Control, of manufacturing facilities that may be used to manufacture respirators, principal components, and/or subassemblies;

(4) *Quality assurance maintenance.* Quality site audits to verify conformance to the requirements of §§ 84.33, 84.40, 84.41, 84.42, 84.43; and

(5) *Maintenance of product performance.* Product audits to verify the performance of commercially available respirators which have been granted a NIOSH certificate of approval.

(c) Fees will not be charged for:

(1) Technical assistance not related to application processing;

(2) Technical programs including development of new technology programs;

(3) Participation in research; and

(4) Regulatory review activities, including participation in the development of health and safety standards, regulations, and legislation.

§ 84.21 Fee calculation.

(a) This section explains the process NIOSH uses to calculate estimates of the direct and indirect costs of services provided in the course of application processing.

(b) Upon completion of an initial administrative review of the application, NIOSH will calculate a fee estimate for each application, including the maximum cost of conducting additional tests under § 84.24, and will provide that estimate, with payment details, to the applicant. The fee estimate will be derived using the current schedules of fees published by NIOSH in Part 84. NIOSH will begin the technical evaluation once the applicant accepts the terms of the fee estimate and authorizes payment.

(c) If NIOSH determines that actual costs for application processing and related testing will exceed the fee estimate provided to the applicant, NIOSH will provide a revised fee estimate for completing the application review before exceeding the previously-authorized fees. The applicant will have the

option of either withdrawing the application and paying for services already performed or authorizing payment of the revised estimate, in which case NIOSH will continue the application review and testing.

(d) If the actual cost of processing the application is less than the fee estimate NIOSH provided to the applicant, NIOSH will charge the actual cost.

(e) If the applicant withdraws an application, the applicant will be invoiced for services already performed by NIOSH. Withdrawal of an application will be effective on the first business day following the date NIOSH receives a withdrawal notice from the applicant in writing. Withdrawal notices will be submitted to NIOSH in accordance with the *Standard Application Procedure* using the address specified in § 84.10.

§ 84.22 Fee administration.

(a) Applicants will be invoiced for all fees incurred in the processing of an application when all required reviews, analyses, evaluations, and tests are completed or the application is withdrawn. Invoices will contain specific payment instructions and identify authorized methods of payment.

(b) Applicants who hold active and/or obsolete certificates of approval will be invoiced by NIOSH annually for applicable maintenance fees, in accordance with the fee schedule published in Appendix A of this part.

(c) NIOSH reserves the right to impose sanctions for any missed payment, and will administer such penalties after assessing the circumstances of the manufacturer and the needs of other stakeholders. Sanctions may include but are not limited to:

(1) Refusal to accept future applications for approval;

(2) Stop-sale of all approved product; and

(3) Engaging appropriate government authorities to initiate debt collection procedures for the unpaid fees.

§ 84.23 Fee revision.

(a) Each fee schedule will remain in effect for at least 2 years and will be revised as needed to reflect cost increases identified in biennial reviews.

(b) Fee schedule updates will be proposed in a notice of proposed rulemaking published in the FEDERAL REGISTER.

(c) The current fee schedules will be published in Appendix A and Appendix B of this part and will remain in effect until the effective date of the new fee schedules published in the FEDERAL REGISTER.

§ 84.24 Authorization for additional examinations, inspections, tests, and fees.

NIOSH will conduct or cause to be conducted any additional examinations, inspections, or tests it deems necessary to determine the quality and effectiveness of any respirator submitted to NIOSH for the purposes of seeking a certificate of approval. The costs of such examinations, inspections, or tests will be paid by the applicant prior to issuance of a certificate of approval for the subject respirator.

Subpart D—Approval and Disapproval

§ 84.30 Certificates of approval; scope of approval.

(a) The Institute shall issue certificates of approval pursuant to the provisions of this subpart only for individual, completely assembled respirators which have been examined, inspected, and tested, and which meet the minimum requirements set forth in subparts H through L of this part, as applicable.

(b) The Institute will not issue certificates of approval for any respirator component or for any respirator subassembly.

(c) The Institute shall not issue an informal notification of approval. However, if the application for approval, submitted in accordance with § 84.11, states that the submitted respirator and component parts are only prototypes, the Institute will examine, inspect, and test such respirator and component parts in accordance with the provisions of this part. If, upon completion of such examinations, inspections and tests, it is found that the

prototype meets the minimum requirements set forth in this part, the Institute may inform the applicant, in writing, of the results of the examinations, inspections, and tests, and may require him to resubmit respirators and component parts made on regular production tooling, with no operations included which will not be incorporated in regular production processing, for further examination, inspection, and testing, prior to issuance of the certificate of approval.

(d) Applicants required to resubmit respirators and component parts made on regular production tooling, with no operation included which will not be incorporated in regular production processing, shall be charged fees in accordance with subpart C of this part.

§ 84.31 Certificates of approval; contents.

(a) The certificate of approval shall contain a classification and a description of the respirator or combination of respirators for which it is issued, as provided in this part.

(b) The certificate of approval shall specifically set forth any restrictions or limitations on the respirator's use in hazardous atmospheres.

(c) Each certificate of approval shall be accompanied by the drawings and specifications (and lists thereof) submitted by the applicant in accordance with §84.11. These drawings and specifications shall be referenced in the certificate of approval, and shall be maintained by the applicant. The drawings and specifications listed in each certificate of approval shall set forth in detail the design and construction requirements which shall be met by the applicant during commercial production of the respirator.

(d) Each certificate of approval shall be accompanied by a reproduction of the approval label design to be employed by the applicant with each approved respirator, as provided in §84.33.

(e) No test data or specific laboratory findings will accompany any certificate of approval, however, the Institute will release pertinent test data and specific findings upon written request by the applicant, or as required by statute or regulation.

(f) Each certificate of approval shall also contain the approved quality control plan as specified in §84.42.

§ 84.32 Notice of disapproval.

(a) If, upon the completion of the examinations, inspections, and tests required to be conducted in accordance with the provisions of this part, it is found that the respirator does not meet the minimum requirements set forth in this part, the Institute shall issue a written notice of disapproval to the applicant.

(b) Each notice of disapproval shall be accompanied by all pertinent data or findings with respect to the defects of the respirator for which approval was sought with a view to the possible correction of any such defects.

(c) The Institute shall not disclose, except to the applicant or as required by statute or regulation, any data, findings, or other information with respect to any respirator for which a notice of disapproval is issued.

§ 84.33 Approval labels and markings; approval of contents; use.

(a) Full-scale reproductions of approval labels and markings, and a sketch or description of the method of application and position on the harness, container, canister, cartridge, filter, or other component, together with instructions for the use and maintenance of the respirator shall be submitted to the Institute for approval.

(b) Approval labels shall bear the emblem of the National Institute for Occupational Safety and Health and the seal of the Department of Health and Human Services, the applicant's name and address, an approval number assigned by the Institute and, where appropriate, restrictions or limitations placed upon the use of the respirator by the Institute. The approval number assigned by the Institute shall be designated by the prefix TC and a serial number.

(c) The Institute shall, where necessary, notify the applicant when additional labels, markings, or instructions will be required.

(d) Approval labels and markings shall only be used by the applicant to whom they were issued.

(e) Legible reproductions or abbreviated forms of the label approved by the Institute for use on each respirator shall be attached to or printed at the following locations:

Respirator type	Label type	Location
Self-contained breathing apparatus.	Entire	Harness assembly and canister (where applicable).
Gas mask	Entire	Mask container and canister.
Supplied air respirator	.....do	Respirator container or instruction card.
Particulate respirator	.....do	Respirator container and filter container.
	Abbreviated	Filters.
Chemical-cartridge respirator	Entire	Respirator container, cartridge container, and filter containers (where applicable).
	Abbreviated	Cartridges and filters and filter containers.

(f) The use of any Institute approval label obligates the applicant to whom it is issued to maintain or cause to be maintained the approved quality control sampling schedule and the acceptable quality level for each characteristic tested, and to assure that it is manufactured according to the drawings and specifications upon which the certificate of approval is based.

(g) Each respirator, respirator component, and respirator container shall, as required by the Institute to assure quality control and proper use of the respirator, be labeled distinctly to show the name of the applicant, and the name and letters or numbers by which the respirator or respirator component is designated for trade purposes, and the lot number, serial number, or approximate date of manufacture.

§ 84.34 Revocation of certificates of approval.

The Institute reserves the right to revoke, for cause, any certificate of approval issued pursuant to the provisions of this part. Such causes include, but are not limited to, misuse of approval labels and markings, misleading advertising, and failure to maintain or cause to be maintained the quality control requirements of the certificate of approval.

§ 84.35 Changes or modifications of approved respirators; issuance of modification of certificate of approval.

(a) Each applicant may, if he desires to change any feature of an approved respirator, request a modification of the original certificate of approval issued by the Institute for such respirator by filing an application for such modification in accordance with the provisions of this section.

(b) Applications shall be submitted as for an original certificate of approval, with a request for a modification of the existing certificate to cover any proposed change.

(c) The application shall be accompanied by appropriate drawings and specifications, and by a proposed quality control plan which meets the requirements of subpart E of this part.

(d) The application for modification, together with the accompanying material, shall be examined by the Institute to determine whether testing will be required.

(e) The Institute shall inform the applicant of the fee required for any additional testing and the applicant will be charged for the actual cost of any examination, inspection, or test required, and such fees shall be submitted in accordance with the provisions of subpart C of this part.

(f) If the proposed change or modification meets the requirements of this part, a formal certificate of modification will be issued, accompanied, where necessary, by a list of new and revised drawings and specifications covering the change(s) and reproductions of revised approval labels.

(The information collections contained in this section are approved under OMB control number 0920–0109)

§ 84.36 Delivery of changed or modified approved respirator.

An approved respirator for which a formal certificate of modification has been issued shall be delivered, with proper markings and containers, by the

applicant to the National Personal Protective Technology Laboratory, as soon as it is commercially produced.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

Subpart E—Quality Control

§ 84.40 Quality control plans; filing requirements.

As a part of each application for approval or modification of approval submitted pursuant to this part, each applicant shall file with the Institute a proposed quality control plan which shall be designed to assure the quality of respiratory protection provided by the respirator for which approval is sought.

§ 84.41 Quality control plans; contents.

(a) Each quality control plan shall contain provisions for the management of quality, including:

(1) Requirements for the production of quality data and the use of quality control records;

(2) Control of engineering drawings, documentations, and changes;

(3) Control and calibration of measuring and test equipment;

(4) Control of purchased material to include incoming inspection;

(5) Lot identification, control of processes, manufacturing, fabrication, and assembly work conducted in the applicant's plant;

(6) Audit of final inspection of the completed product; and

(7) The organizational structure necessary to carry out these provisions.

(b) Each provision for incoming and final inspection in the quality control plan shall include a procedure for the selection of a sample of respirators and the components thereof for testing, in accordance with procedures set forth in Military Standard MIL-STD-414, 11 June 1957, including Change Notice No. 1, ''Sampling Procedures and Tables for Inspection by Variables for Percent Defective,'' or an approved equivalent sampling procedure, or an approved combination of sampling procedures. The procedure of Military Standard MIL-STD-105D, 29 April 1963, ''Sampling Procedures and Tables for Inspection by Attributes,'' is an example of an equivalent sampling procedure. MIL-STD-414 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from DODSSP, Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111–5094. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*. Copies of MIL-STD-105D may be inspected or obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236. Incoming bulk raw material inspection or verification of specification, and in-process inspection shall be sufficient to ensure control of product quality through the manufacturing cycle.

(c) The sampling procedure shall include a list of the characteristics to be tested by the applicant or his agent.

(d) The characteristics listed in accordance with paragraph (c) of this section shall be classified according to the potential effect of such defect and grouped into the following classes:

(1) *Critical.* A defect that judgment and experience indicate is likely to result in a condition immediately hazardous to life or health for individuals using or depending upon the respirator;

(2) *Major A.* A defect, other than critical, that is likely to result in failure to the degree that the respirator does not provide any respiratory protection, or a defect that reduces protection and is not detectable by the user;

(3) *Major B.* A defect, other than Major A or critical, that is likely to result in reduced respiratory protection, and is detectable by the user; and

(4) *Minor.* A defect that is not likely to materially reduce the usability of the respirator for its intended purpose, or a defect that is a departure from established standards and has little bearing on the effective use or operation of the respirator.

(e) The quality control inspection test method to be used by the applicant or his agent for each characteristic required to be tested shall be described in detail.

(f) Each item manufactured shall be 100 percent inspected for defects in all critical characteristics and all defective items shall be rejected.

(g) The Acceptable Quality Level (AQL) for each major or minor defect so classified by the applicant shall be:

(1) *Major A.* 1.0 percent;

(2) *Major B.* 2.5 percent; and

(3) *Minor.* 4.0 percent.

(h) Except as provided in paragraph (i) of this section, inspection level IV as described in MIL-STD-414, 11 June 1957, including Change Notice No.1, ''Sampling Procedures and Tables for Inspection by Variables for Percent Defective,'' or an equivalent procedure, shall be used for major and minor characteristics and 100 percent inspection for critical characteristics. Inspection level II as described in MIL-STD-105D, 29 April 1963, ''Sampling Procedures and Tables for Inspection by Attributes,'' is an example of an equivalent procedure.

(i) Subject to the approval of the Institute, where the quality control plan provisions for raw material, processes, manufacturing, and fabrication, inspections are adequate to ensure control of finished article quality, destructive testing of finished articles may be conducted at a lower level of inspection than that specified in paragraph (h) of this section.

(The information collections contained in this section are approved under OMB control number 0920–0109)

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.42 Proposed quality control plans; approval by the Institute.

(a) Each proposed quality control plan submitted in accordance with this subpart shall be reviewed by the Institute to determine its effectiveness in ensuring the quality of respiratory protection provided by the respirator for which an approval is sought.

(b) If the Institute determines that the proposed quality control plan submitted by the applicant will not ensure adequate quality control, the Institute shall require the applicant to modify the procedures and testing requirements of the plan prior to approval of the plan and issuance of any certificate of approval.

(c) Approved quality control plans shall constitute a part of and be incorporated into any certificate of approval issued by the Institute, and compliance with such plans by the applicant shall be a condition of approval.

§ 84.43 Quality control records; review by the Institute; revocation of approval.

(a) The applicant shall keep quality control inspection records sufficient to carry out the procedures required in MIL-STD-414, 11 June 1957, including Change Notice No. 1, ''Sampling Procedures and Tables for Inspection by Variables for Percent Defective,'' or an approved equivalent sampling procedure. MIL-STD-105D, 29 April 1963, ''Sampling Procedures and Tables for Inspection by Attributes,'' is an example of an approved equivalent sampling procedure. MIL-STD-414 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from DODSSP, Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, Pa. 19111–5094. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* Copies of MIL-STD-105D may be inspected or obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

(b) The Institute reserves the right to have its representatives inspect the applicant's quality control test methods, equipment, and records, and to interview any employee or agent of the applicant in regard to quality control test methods, equipment, and records.

(c) The Institute reserves the right to revoke, for cause, any certificate of approval where it is found that the applicant's quality control test methods, equipment, or records do not ensure effective quality control over the respirator for which the approval was issued.

(The information collections contained in this section are approved under OMB control number 0920–0109)

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

Subpart F—Classification of Approved Respirators; Scope of Approval; Atmospheric Hazards; Service Time

§ 84.50 Types of respirators to be approved; scope of approval.

Approvals shall be issued for the types of respirators which have been classified pursuant to this subpart F, have been inspected, examined and tested by the Institute, in accordance with the provisions of subparts G through L of this part, and have been found to provide respiratory protection for fixed periods of time against the hazards specified in such approval.

§ 84.51 Entry and escape, or escape only; classification.

Respirators described in subparts H through L of this part shall be classified for use as follows:

(a) *Entry and escape.* Respirators designed and approved for use during entry into a hazardous atmosphere, and for escape from a hazardous atmosphere; or

(b) *Escape only.* Respirators designed and approved for use only during escape from a hazardous atmosphere.

§ 84.52 Respiratory hazards; classification.

Respirators described in subparts H through L of this part shall be classified as approved for use against any or all of the following respiratory hazards:

(a) Oxygen deficiency;

(b) Gases and vapors; and

(c) Particles, including dusts, fumes and mists.

§ 84.53 Service time; classification.

(a) Respirators described in subparts H through L of this part shall be classified, where applicable, as approved for use during the following prescribed service times:

(1) Four hours;

(2) Three hours;

(3) Two hours;

(4) One hour;

(5) Forty-five minutes;

(6) Thirty minutes;

(7) Fifteen minutes;

(8) Ten minutes;

(9) Five minutes; or

(10) Three minutes.

(b) Other service times may be prescribed by the Institute.

Subpart G—General Construction and Performance Requirements

§ 84.60 Construction and performance requirements; general.

(a) The Institute shall issue approvals for the types of respirators described in subparts H through O of this part which have met the minimum requirements set forth for such respirators in this part.

(b) In addition to the types of respirators specified in subparts H through L of this part, the Institute shall issue approvals for other respiratory protective devices not specifically described in this part subject to such additional requirements as may be imposed in accordance with § 84.63(c).

[60 FR 30355, June 8, 1995, as amended at 77 FR 14192, Mar. 8, 2012; 85 FR 20607, Apr. 14, 2020]

§ 84.61 General construction requirements.

(a) Respirators will not be accepted by the Institute for examination, inspection and testing unless they are designed on sound engineering and scientific principles, constructed of suitable materials and evidence good workmanship.

(b) Respirator components which come into contact with the wearer's skin shall be made of nonirritating materials.

(c) Components replaced during or after use shall be constructed of materials which will not be damaged by normal handling.

(d) Mouthpieces, hoods, helmets, and facepieces, except those employed in single-use respirators, shall be constructed of materials which will withstand repeated disinfection as recommended by the applicant in his instructions for use of the device.

§ 84.62 Component parts; minimum requirements.

(a) The component parts of each respirator shall be:

(1) Designed, constructed, and fitted to insure against creation of any hazard to the wearer;

(2) Assembled to permit easy access for inspection and repair of functional parts; and

(3) Assembled to permit easy access to parts which require periodic cleaning and disinfecting.

(b) Replacement parts shall be designed and constructed to permit easy installation and to maintain the effectiveness of the respirator.

§ 84.63 Test requirements; general.

(a) Each respirator and respirator component shall when tested by the applicant and by the Institute, and meet the applicable requirements set forth in subparts H through O of this part.

(b) Where a combination respirator is assembled from two or more types of respirators, as described in this part, each of the individual respirator types which have been combined shall, as applicable, meet the minimum requirements for such respirators set forth in subparts H through O of this part, and such combination respirators, except as specified in §84.70(b)(2), will be classified by the type of respirator in the combination which provides the least protection to the user.

(c) In addition to the minimum requirements set forth in subparts H through O of this part, the Institute reserves the right to require, as a further condition of approval, any additional requirements deemed necessary to establish the quality, effectiveness, and safety of any respirator used as protection against hazardous atmospheres.

(d) Where it is determined after receipt of an application that additional requirements will be required for approval, the Institute will notify the applicant in writing of these additional requirements, and necessary examinations, inspections, or tests, stating generally the reasons for such requirements, examinations, inspections, or tests.

[60 FR 30355, June 8, 1995, as amended at 77 FR 14192, Mar. 8, 2012; 85 FR 20607, Apr. 14, 2020]

§ 84.64 Pretesting by applicant; approval of test methods.

(a) Prior to making or filing any application for approval or modification of approval, the applicant shall conduct, or cause to be conducted, examinations, inspections, and tests of respirator performance which are equal to or exceed the severity of those prescribed in this part.

(b) With the application, the applicant shall provide a statement to the Institute showing the types and results of the examinations, inspections, and tests required under paragraph (a) of this section and state that the respirator meets the minimum requirements of subparts H through O of this part, as applicable. Complete examination, inspection, and test data shall be retained on file by the applicant and be submitted, upon request, to the Institute.

(c) The Institute may, upon written request by the applicant, provide drawings and descriptions of its test equipment and otherwise assist the applicant in establishing a test laboratory or securing the services of a testing agency.

(d) No approval will be issued until the Institute has validated the applicant's test results.

[60 FR 30355, June 8, 1995, as amended at 77 FR 14193, Mar. 8, 2012; 85 FR 20607, Apr. 14, 2020]

§ 84.65 Conduct of examinations, inspections, and tests by the Institute; assistance by applicant; observers; recorded data; public demonstrations.

(a) All examinations, inspections, and tests conducted pursuant to subparts H through O of this part will be

under the sole direction and control of the Institute.

(b) The Institute may, as a condition of approval, require the assistance of the applicant or agents of the applicant during the assembly, disassembly, or preparation of any respirator or respirator component prior to testing or in the operation of such equipment during testing.

(c) Only Institute personnel, persons assisting the Institute pursuant to paragraph (b) of this section, and such other persons as are requested by the Institute or the applicant to be observers, shall be present during any examination, inspection, or test conducted prior to the issuance of an approval by the Institute for the equipment under consideration.

(d) The Institute shall hold as confidential any analyses, drawings, specifications, or materials submitted by the applicant and shall not disclose any principles or patentable features of such equipment, except as required by statute or regulation.

(e) As a condition of each approval issued for any respirator, the Institute reserves the right, following the issuance of such approval, to conduct such public tests and demonstrations of the approved respiratory equipment as is deemed appropriate.

[60 FR 30355, June 8, 1995, as amended at 77 FR 14193, Mar. 8, 2012; 85 FR 20607, Apr. 14, 2020]

§ 84.66 Withdrawal of applications.

(a) Any applicant may, upon a written request submitted to the Institute, withdraw any application for approval of any respirator.

(b) Upon the receipt of a written request from the applicant for the withdrawal of an application, NIOSH will invoice the applicant based on the fee calculated, as specified under § 84.21(e).

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

Subpart H—Self-Contained Breathing Apparatus

§ 84.70 Self-contained breathing apparatus; description.

(a) Self-contained breathing apparatus, including all completely assembled, portable, self-contained devices designed for use as respiratory protection during entry into and escape from or escape only from hazardous atmospheres, are described as follows:

(1) *Closed-circuit apparatus.* An apparatus of the type in which the exhalation is rebreathed by the wearer after the carbon dioxide has been effectively removed and a suitable oxygen concentration restored from sources composed of:

(i) Compressed oxygen; or

(ii) Chemical oxygen; or

(iii) Liquid-oxygen.

(2) Open-circuit apparatus. An apparatus of the following types from which exhalation is vented to the atmosphere and not rebreathed:

(i) *Demand-type apparatus.* An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during exhalation and negative during inhalation; or

(ii) *Pressure-demand-type apparatus.* An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.

(b) The following respirators may be classified as designed and approved for use during emergency entry into a hazardous atmosphere:

(1) A combination respirator which includes a self-contained breathing apparatus; and

(2) A Type ''C'' or Type ''CE'' supplied air respirator, where—

(i) The self-contained breathing apparatus is classified for 3-, 5-, or 10-minute service time and the air line supply is used during entry; or

(ii) The self-contained breathing apparatus is classified for 15 minutes or longer service time and not more than 20 percent of the rated capacity of the air supply is used during entry.

(c) Self-contained breathing apparatus classified for less than 1 hour service time will not be approved for use during underground mine rescue and recovery operations except as auxiliary equipment.

(d) Self-contained breathing apparatus classified for less than 30 minutes' service time will not be approved for use as auxiliary equipment during

underground mine rescue and recovery operations.

[60 FR 30355, June 8, 1995, as amended at 77 FR 14193, Mar. 8, 2012; 84 FR 16412, Apr. 19, 2019]

§ 84.71 Self-contained breathing apparatus; required components.

(a) Each self-contained breathing apparatus described in § 84.70 shall, where its design requires, contain the following component parts:

(1) Facepiece or mouthpiece, and noseclip;

(2) Respirable breathing gas container;

(3) Supply of respirable breathing gas;

(4) Gas pressure or liquid level gages;

(5) Timer;

(6) Remaining service life indicator or warning device;

(7) Hand-operated valves;

(8) Breathing bag;

(9) Safety relief valve or safety relief system; and

(10) Harness.

(b) The components of each self-contained breathing apparatus shall meet the minimum construction requirements set forth in subpart G of this part.

§ 84.72 Breathing tubes; minimum requirements.

Flexible breathing tubes used in conjunction with breathing apparatus shall be designed and constructed to prevent:

(a) Restriction of free head movement;

(b) Disturbance of the fit of facepieces and mouthpieces;

(c) Interference with the wearer's activities; and

(d) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 84.73 Harnesses; installation and construction; minimum requirements.

(a) Each apparatus shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the apparatus in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of apparatus parts and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 84.74 Apparatus containers; minimum requirements.

(a) Apparatus may be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains, and all appropriate approval labels.

(b) Containers supplied by the applicant for carrying or storing self-contained breathing apparatus will be inspected, examined, and tested as components of the respirator for which approval is sought.

(c) Containers for self-contained breathing apparatus shall be designed and constructed to permit easy removal of the apparatus.

§ 84.75 Half-mask facepieces, full facepieces, mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes, either:

(1) By providing more than one facepiece size; or

(2) By providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for the optional use of corrective spectacles or lenses which shall not reduce the respiratory protective qualities of the apparatus.

(c) Apparatus with mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or apparatus and provide an airtight seal.

(d) Facepieces shall be designed to prevent eyepiece, spectacle, and lens fogging.

§ 84.76 Facepieces; eyepieces; minimum requirements.

(a) Facepieces shall be designed and constructed to provide adequate vision which is not distorted by the eyepiece.

(b) All eyepieces shall be designed and constructed to be impact and penetration resistant. Federal Specification, Mask, Air Line: and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965 with interim amendment-1, July 30, 1969, is an example of

an appropriate standard for determining impact and penetration resistance. Copies of GGG-M-125d may be obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.77 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against damage and distortion.

(b) Exhalation valves shall be—

(1) Protected against external influence; and

(2) Designed and constructed to prevent inward leakage of contaminated air.

§ 84.78 Head harnesses; minimum requirements.

(a) Facepieces shall be equipped with adjustable and replaceable head harnesses designed and constructed to provide adequate tension during suspension and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses designed and constructed to hold the mouthpiece in place.

§ 84.79 Breathing gas; minimum requirements.

(a) Breathing gas used to supply apparatus shall be respirable and contain no less than 19.5 (dry atmosphere) volume percent of oxygen.

(b) Oxygen, including liquid oxygen, shall contain not less than 99.0 percent, by volume, of pure O_2, not more than 0.03%, by volume, carbon dioxide, and not more than 0.001%, by volume, carbon monoxide. Methods for making these determinations can be found in the U.S. Pharmacopeia National Formulary. Containers used for oxygen must not be treated with any toxic, sleep-inducing, narcosis-producing, or respiratory tract irritating compounds.

(c) Compressed, gaseous breathing air shall meet the applicable minimum grade requirements for Type I gaseous air set forth in the Compressed Gas Association Commodity Specification for Air, G–7.1, 1966 (Grade D or higher quality). G–7.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

(d) Compressed, liquefied breathing air shall meet the applicable minimum grade requirements for Type II liquid air set forth in the Compressed Gas Association Commodity Specification for Air, G–7.1, 1966 (Grade B or higher quality). G–7.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.80 Interchangeability of oxygen and air prohibited.

Approvals shall not be issued by the Institute for any apparatus, combination of respirator assemblies, or any apparatus or respirator component which is designed or constructed to permit the interchangeable use of oxygen and air.

§ 84.81 Compressed breathing gas and liquefied breathing gas containers; minimum requirements.

(a) Compressed breathing gas and liquefied breathing gas containers shall meet the minimum requirements of the Department of Transportation for interstate shipment of such containers when fully charged.

(b) Such containers shall be permanently and legibly marked to identify their contents, e.g., compressed breathing air, compressed breathing oxygen, liquefied breathing air, or liquefied breathing oxygen.

(c) Containers normally removed from apparatus for refilling shall be equipped with a dial indicating gage which shows the pressure in the container.

(d) Compressed breathing gas contained valves or a separate charging system or adapter provided with each apparatus shall be equipped with outlet threads specified for the service by the American Standards Association, Compressed Gas Cylinder Valve Outlet and Inlet Connections, B57.1–1965. B57.1–1965 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.82 Gas pressure gages; minimum requirements.

(a) Gas pressure gages employed on compressed breathing gas containers shall be calibrated in pounds per square inch.

(b) Liquid-level gages shall be calibrated in fractions of total container capacity, or in units of liquid volume.

(c) Gas pressure gages other than those specified in paragraphs (a) and (b) of this section shall be calibrated in:

(1) Pounds per square inch; or

(2) In fractions of total container capacity; or

(3) Both in pounds per square inch and fractions of total container capacity.

(d)(1) Dial-indicating gages shall be reliable to within ±5 percent of full scale when tested both up and down the scale at each of 5 equal intervals.

(2) The full-scale graduation of dial-indicating gages shall not exceed 150 percent of the maximum rated cylinder pressures specified for the container in applicable Department of Transportation specifications or permits.

(e)(1) Stem-type gages shall be readable by sight and by touch and shall have a stem travel distance of not less than one-fourth inch between each graduation.

(2) A minimum of five graduations shall be engraved on the stem of each gage and these graduations shall include readings for empty, one-quarter, one-half, three-quarters, and full.

(3) Stem gage readings shall not vary from true readings by more than one-sixteenth inch per inch of stem travel.

(f) The loss of gas through a broken gage or severed gage connection shall not exceed 70 liters per minute when the cylinder pressure is 6,900 kN/m.^{2} (1,000 pounds per square inch gage) or when the liquid level is at one-half.

(g) Where gages are connected to the apparatus through a gage line, the gage and line shall be capable of being isolated from the apparatus except where the failure of the gage or line would not impair the performance or service life of the apparatus.

(h) Oxygen pressure gages shall have the words ''Oxygen'' and ''Use No Oil'' marked prominently on the gage.

(i)(1) Apparatus using compressed breathing gas, except apparatus classified for escape only, shall be equipped with gages visible to the wearer which indicate the remaining gas content in the container.

(2) Apparatus using liquefied breathing gas, except apparatus classified for escape only, shall be equipped with

gages visible to the wearer which indicate the remaining liquid content in the container; however, where the liquid content cannot be rapidly vented, and the service time of the device begins immediately after filling, a timer shall be provided in place of a visible gage.

§ 84.83 Timers; elapsed time indicators; remaining service life indicators; minimum requirements.

(a) Elapsed time indicators shall be provided for apparatus with a chemical oxygen source, except:

(1) Apparatus used for escape only; or

(2) Liquefied breathing gas apparatus equipped with gages visible to the wearer which indicate the remaining liquid content in the container.

(b) The timer or other indicator shall be accurately calibrated in minutes of remaining service life.

(c) Timers shall be readable by sight and by touch during use by the wearer.

(d) Timers shall be equipped with automatically preset alarms which will warn the wearer for a period of 7 seconds or more after the preset time has elapsed.

(e) Remaining service-life indicators or warning devices shall be provided in addition to a pressure gage on compressed gas self-contained breathing apparatus, except apparatus used for escape only, and shall operate automatically without preadjustment by the wearer.

(f) Each remaining service-life indicator or warning device must give an alarm when the remaining service life is reduced to a minimum of 25 percent of its rated service time or any higher minimum percent value or values as specified in the approval. Open-circuit demand and pressure-demand respirators must alarm continuously until depletion of the breathing air supply. The percent value set for indicator activation must be identified by labels and/or markings on each respirator unit.

[60 FR 30355, June 8, 1995, as amended at 78 FR 2622, Jan. 14, 2013]

§ 84.84 Hand-operated valves; minimum requirements.

(a) Hand-operated valves shall be designed and constructed to prevent removal of the stem from the valve body during normal usage to insure against a sudden release of the full pressure of the container when the valve is opened.

(b) Valves shall be designed or positioned to prevent accidental opening and closing, and damage from external forces.

(c) Valves operated during use of the apparatus shall be installed in locations where they can be readily adjusted by the wearer.

(d) Main-line valves, designed and constructed to conserve gas in the event of a regulator or demand valve failure, shall be provided in addition to gas container valves, except when such failure will not affect performance.

(e) Hand-operated bypass systems designed and constructed to permit the wearer to breathe and to conserve his gas supply in the event of a regulator or demand valve failure, shall be provided where necessary.

(f) Valves installed on apparatus shall be clearly distinguishable from one another by sight and touch.

(g) The bypass system valve control shall be colored red.

(h) A main-line or bypass valve or system will not be required on apparatus for escape only.

(i) Safety relief valves or systems, designed and constructed to release excess pressure in the breathing circuit, shall be provided on closed-circuit apparatus, and shall meet the following requirements:

(1) The relief valve or system shall operate automatically when the pressure in the breathing circuit on the inhalation side of the breathing bag reaches 13 mm. (one-half inch) water-column height of pressure above the minimum pressure required to fill the breathing bag, within the breathing resistance requirements for the apparatus.

(2) The relief valve or system shall be designed to prevent external atmospheres from entering the breathing circuit.

(3) The relief valve or system shall be designed to permit manual overriding for test purposes and in the event of a failure in the valve or system.

§ 84.85 Breathing bags; minimum requirements.

(a) Breathing bags shall have sufficient volume to prevent gas waste during exhalation and to provide an adequate reserve for inhalation.

(b) Breathing bags shall be constructed of materials which are flexible and resistant to gasoline vapors.

(c) Breathing bags shall be installed in a location which will protect them from damage or collapse by external forces, except on apparatus classified for escape only.

§ 84.86 Component parts exposed to oxygen pressures; minimum requirements.

Each applicant shall certify that the materials employed in the construction of component parts exposed to oxygen pressures above atmospheric pressure are safe and compatible for their intended use.

§ 84.87 Compressed gas filters; minimum requirements.

All self-contained breathing apparatus using compressed gas shall have a filter downstream of the gas source to effectively remove particles from the gas stream.

§ 84.88 Breathing bag test.

(a) Breathing bags will be tested in an air atmosphere saturated with gasoline vapor at room temperature (24–30 °C./75–85 °F.) for a continuous period of twice the rated time of the apparatus (except for apparatus for escape only where the test period shall be the rated time of the apparatus).

(b) The bag will be operated during this test by a breathing machine with 24 respirations per minute and a minute-volume of 40 liters.

(c) A breathing machine cam with a work rate of 622 kp.-m./min. will be used. The dimensions of a suitable breathing machine cam are available from the Institute upon request.

(d) The air within the bag(s) shall not contain more than 100 parts per million of gasoline vapor at the end of the test.

§ 84.89 Weight requirement.

(a) The completely assembled and fully charged apparatus shall not weigh more than 16 kg. (35 pounds); however, where the weight decreases by more than 25 percent of its initial charge weight during its rated service life, the maximum allowable weight of a completely assembled and fully charged apparatus shall be 18 kg. (40 pounds).

(b) Where an apparatus employs equipment which contributes materially to the wearer's comfort, e.g., a cooling system, the completely assembled and fully charged apparatus shall not weigh more than 18 kg. (40 pounds) regardless of the decrease in weight during use.

§ 84.90 Breathing resistance test; inhalation.

(a) Resistance to inhalation airflow will be measured in the facepiece or mouthpiece while the apparatus is operated by a breathing machine as described in § 84.88.

(b) The inhalation resistance of open-circuit apparatus shall not exceed 32 mm. (1.25 inch) water-column height (at a flow rate of 120 liters per minute).

(c) The inhalation resistance of closed-circuit apparatus shall not exceed the difference between exhalation resistance (§ 84.91(e)) and 10 cm. (4 inches) water-column height.

§ 84.91 Breathing resistance test; exhalation.

(a) Resistance to exhalation airflow will be measured in the facepiece or mouthpiece of open-circuit apparatus with air flowing at a continuous rate of 85 liters per minute.

(b) The exhalation resistance of demand apparatus shall not exceed 25 mm. (1 inch) water-column height.

(c) The exhalation resistance of pressure-demand apparatus shall not exceed the static pressure in the facepiece by more than 51 mm. (2 inches) water-column height.

(d) The static pressure (at zero flow) in the facepiece shall not exceed 38 mm. (1.5 inches) water-column height.

(e) Resistance to exhalation airflow will be measured in the facepiece or mouthpiece of closed-circuit apparatus with a breathing machine as described in § 84.88, and the exhalation resistance shall not exceed 51 mm. (2 inches) water-column height.

§ 84.92 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. (1 inch) water-column height while in a normal operating position.

(b) Leakage between the valve and the valve seat shall not exceed 30 milliliters per minute.

§ 84.93 Gas flow test; open-circuit apparatus.

(a) A static-flow test will be performed on all open-circuit apparatus.

(b) The flow from the apparatus shall be greater than 200 liters per minute when the pressure in the facepiece of demand-apparatus is lowered by 51 mm. (2 inches) water-column height when full container pressure is applied.

(c) Where pressure demand apparatus are tested, the flow will be measured at zero gage pressure in the facepiece.

(d) Where apparatus with compressed-breathing-gas containers are tested, the flow test shall also be made with 3,450 kN/m.^{2} (500 p.s.i.g.) container pressure applied.

§ 84.94 Gas flow test; closed-circuit apparatus.

(a) Where oxygen is supplied by a constant-flow device only, the rate of flow shall be at least 3 liters per minute for the entire rated service time of the apparatus.

(b) Where constant flow is used in conjunction with demand flow, the constant flow shall be greater than 1.5 liters per minute for the entire rated service time.

(c) All demand-flow devices shall provide at least 30 liters of oxygen per minute when in the fully open position.

§ 84.95 Service time test; open-circuit apparatus.

(a) Service time will be measured with a breathing machine as described in § 84.88.

(b) The open-circuit apparatus will be classified according to the length of time it supplies air or oxygen to the breathing machine.

(c) The service time obtained on this test will be used to classify the open-circuit apparatus in accordance with § 84.53.

§ 84.96 Service time test; closed-circuit apparatus.

(a) The closed-circuit apparatus will be classified according to the length of time it supplies adequate breathing gas to the wearer during man test No. 4 described in Table 4 of this subpart.

(b) The service time obtained on man test No. 4 will be used to classify the closed-circuit apparatus in accordance with § 84.53.

§ 84.97 Test for carbon dioxide in inspired gas; open- and closed-circuit apparatus; maximum allowable limits.

(a) *Open-circuit apparatus.* (1) The concentration of carbon dioxide in inspired gas in open-circuit apparatus will be measured at the mouth while the apparatus mounted on a dummy head is operated by a breathing machine. An acceptable method for measuring the concentration of carbon dioxide is described in Bureau of Mines Report of Investigations 6865, A Machine-Test Method for Measuring Carbon Dioxide in the Inspired Air of Self-Contained Breathing Apparatus, 1966. Copies of Report of Investigations 6865 may be inspected or obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

(2) The breathing rate will be 14.5 respirations per minute with a minute-volume of 10.5 liters.

(3) A sedentary breathing machine cam will be used.

(4) The apparatus will be tested at a temperature of 27 ±2 °C. (80 ±5 °F.).

(5) A concentration of 5 percent carbon dioxide in air will be exhaled into the facepiece.

(b) *Closed-circuit apparatus.* The concentration of carbon dioxide in inspired gas in closed-circuit apparatus will be measured at the mouth while the parts of the apparatus contributing to dead-air space are mounted on a dummy head and operated by the breathing machine as in paragraphs (a) (1) through (5) of this section.

(c) During the testing required by paragraphs (a) and (b) of this section, the concentration of carbon dioxide in inspired gas at the mouth will be continuously recorded, and the maximum

average concentration during the inhalation portion of the breathing cycle shall not exceed the following limits:

Where the service time is	Maximum allowable average concentration of carbon dioxide in inspired air percent by volume
Not more than 30 minutes	2.5
1 hour	2.0
2 hours	1.5
3 hours	1.0
4 hours	1.0

(d) In addition to the test requirements for closed-circuit apparatus set forth in paragraph (b) of this section, gas samples will be taken during the course of the man tests described in Tables 1, 2, 3, and 4 of this subpart. These gas samples will be taken from the closed-circuit apparatus at a point downstream of the carbon dioxide sorbent, and they shall not contain more than 0.5 percent carbon dioxide at any time, except on apparatus for escape only, using a mouthpiece only, the sample shall not contain more than 1.5 percent carbon dioxide at any time.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.98 Tests during low temperature operation.

(a) The applicant shall specify the minimum temperature for safe operation and two persons will perform the tests described in paragraphs (c) and (d) of this section, wearing the apparatus according to applicant's directions. At the specified temperature, the apparatus shall meet all the requirements described in paragraph (e) of this section.

(b) The apparatus will be precooled at the specified minimum temperature for 4 hours.

(c) The apparatus will be worn in the low temperature chamber for 30 minutes, or for the service time of the apparatus, whichever is less.

(d) During the test period, alternate 1-minute periods of exercise and rest will be required with the exercise periods consisting of stepping onto and off a box 21.5 cm. (8½ inches) high at a rate of 30 cycles per minute.

(e)(1) The apparatus shall function satisfactorily at the specified minimum temperature on duplicate tests.

(2) The wearer shall have sufficient unobscured vision to perform the work.

(3) The wearer shall not experience undue discomfort because of airflow restriction or other physical or chemical changes in the operation of the apparatus.

(f) Auxiliary low-temperature parts which are commercially available to the user may be used on the apparatus to meet the requirements described in paragraph (e) of this section.

§ 84.99 Man tests; testing conditions; general requirements.

(a) The man tests described in Tables 1, 2, 3, and 4 of this subpart represent the workload performed in the mining, mineral, or allied industries by a person wearing the apparatus tested.

(b) The apparatus tested will be worn by Institute personnel trained in the use of self-contained breathing apparatus, and the wearer will, before participating in these tests, pass a physical examination conducted by a qualified physician.

(c) All man tests will be conducted by the Institute.

(d) The apparatus will be examined before each man test to ensure that it is in proper working order.

(e) Breathing resistance will be measured within the facepiece or mouthpiece and the wearer's pulse and respiration rate will be recorded during each 2 minute sample period prescribed in tests 1, 2, 3, and 4.

(f) Man tests 1, 2, 3, 4, 5, and 6 will be conducted in duplicate.

(g) If man tests are not completed through no fault of the apparatus, the test will be repeated.

§ 84.100 Man tests 1, 2, 3, and 4; requirements.

Man tests 1, 2, 3, and 4, set forth in Tables 1, 2, 3, and 4 of this subpart, respectively, prescribe the duration and sequence of specific activities. These tests will be conducted to—

(a) Familiarize the wearer with the apparatus during use;

(b) Provide for a gradual increase in activity;

(c) Evaluate the apparatus under different types of work and physical orientation; and

(d) Provide information on the operating and breathing characteristics of the apparatus during actual use.

§ 84.101 Man test 5; requirements.

(a) Test 5 will be conducted to determine the maximum length of time the apparatus will supply the respiratory needs of the wearer while he is sitting at rest.

(b) The wearer will manipulate the devices controlling the supply of breathing gas to the advantage of the apparatus.

(c) Samples of inspiration from within the apparatus facepiece or mouthpiece shall be taken once every 15 minutes, and shall meet the minimum requirement for oxygen specified in § 84.79(a), and the maximum allowable average concentration of carbon dioxide specified in § 84.97(c).

(d) One sample of inspiration will be taken in the case of 3-, 5-, and 10-minute apparatus.

§ 84.102 Man test 6; requirements.

(a) Man test 6 will be conducted with respect to liquefied breathing gas apparatus only.

(b) This test will be conducted to evaluate operation of the apparatus in other than vertical positions.

(c) The wearer will lie face downward for one-fourth the service life of the apparatus with a full charge of liquefied breathing gas, and then a one-quarter full charge of liquefied breathing gas.

(d) The test will be repeated with the wearer lying on each side and on his back.

(e) The oxygen content of the gas supplied to the wearer by the apparatus will be continuously measured.

§ 84.103 Man tests; performance requirements.

(a) The apparatus shall satisfy the respiratory requirements of the wearer for the classified service time.

(b) Fogging of the eyepiece shall not obscure the wearer's vision, and the wearer shall not experience undue discomfort because of fit or other characteristics of the apparatus.

(c) When the ambient temperature during testing is 24 ±6 °C. (75 ±10 °F.), the maximum temperature of inspired air recorded during man tests shall not exceed the following, after correction for deviation from 24 °C. (75 °F.):

Where service life of apparatus is—	Where percent relative humidity of inspired air is—	Maximum permissible temperature of inspired air shall not exceed—	
		°F.	°C.
¼ hour or less	0–100	135	57
¼ hour to ¾ hour	0–50	125	52
	50–100	[1] 110	[1] 43
1 to 2 hours	0–50	115	46
	50–100	[1] 105	[1] 41
3 hours	0–50	110	43
	50–100	[1] 100	[1] 38
4 hours	0–50	105	41
	50–100	[1] 95	[1] 35

[1] Where percent relative humidity is 50–100 and apparatus is designed for escape only, these maximum permissible temperatures will be increased by 5 °C (10 °F).

§ 84.104 Gas tightness test; minimum requirements.

(a) Each apparatus will be tested for tightness by persons wearing it in an atmosphere of 1,000 p.p.m. isoamyl acetate.

(b) Six persons will each wear the apparatus in the test concentrations specified in paragraph (a) of this section for 2 minutes and none shall detect the odor or taste of the test vapor.

TABLES TO SUBPART H OF PART 84

TABLE 1—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 1, IN MINUTES

[42 CFR part 84, subpart H]

Activity	Service time—							
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3, and 4 hours
Sampling and readings	.....	.....	.....	2	2	2	2	Perform 1 hour test 2, 3, or 4 times respectively.
Walks at 4.8 km. (3 miles) per hour.	3	5	3	4	8	12	18	
Sampling and readings	.....	.....	2	2	2	2	2	
Walks at 4.8 km. (3 miles) per hour.	.....	.....	3	5	8	12	18	
Sampling and readings	.....	.....	2	2	2	2	2	
Walks at 4.8 km. (3 miles) per hour.	.....	.....	.....	.....	6	13	16	
Sampling and readings	.....	.....	.....	.....	2	2	2	

TABLE 2—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 2, IN MINUTES

[42 CFR part 84, subpart H]

Activity	Service time—							
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Sampling and readings	.....	.....	.....	2	2	2	2	2
Walks at 4.8 km. (3 miles) per hour	.....	.....	1	1	3	4	6	10.
Carries 23 kg. (50 pound) weight over overcast	.....	.....	1 time in 2 minutes	1 time in 2 minutes	2 times in 4 minutes	3 times in 6 minutes	4 times in 8 minutes	5 times in 10 minutes.
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	1	3	3	3	5.
Climbs vertical treadmill [2] (or equivalent)	1	1	1	1	1	1	1	1.
Walks at 4.8 km. (3 miles) per hour	.....	1	1	.....	.....	2	3	5
Climbs vertical treadmill (or equivalent)	.....	1	.....	.....	.....	1	1	1.
Sampling and readings	.....	.....	.....	.....	2	2	2	2.
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	2	2	3	5	11.
Climbs vertical treadmill (or equivalent)	.....	.....	.....	1	1	1	1	1.
Carries 23 kg. (50 pound) weight over overcast	.....	.....	.....	1 time in 2 minutes	3 times in 6 minutes	4 times in 8 minutes	5 times in 10 minutes	5 times in 10 minutes.
Sampling and readings	.....	.....	2	.....	.....	2	2	2.
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	1	3	3	3	.....
Climbs vertical treadmill (or equivalent)	.....	.....	1	1	1	1	1	Then repeat above activities once.
Walks at 4.8 km. (3 miles) per hour	.....	.....	2	.....	.....	2	3	
Climbs vertical treadmill (or equivalent)	.....	.....	.....	.....	.....	1	1	.....
Carries 20 kg. (45 pound) weight and walks at 4.8 km. (3 miles) per hour	1	.....	.....	.....	.....	.....	2	.....
Walks at 4.8 km. (3 miles) per hour	1	2	.....	.....	.....	1	4	.....

TABLE 2—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 2, IN MINUTES—Continued

[42 CFR part 84, subpart H]

Activity	Service time—							
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Sampling and readings	.....	.....	.....	2	2	2	2	.....

[1] Total test time for Test 2 for 2-hour, 3-hour, and 4-hour apparatus is 2 hours.
[2] Treadmill shall be inclined 15° from vertical and operated at a speed of 1 foot per second.

TABLE 3—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 3, IN MINUTES

[42 CFR part 84, subpart H]

Activity	Service time—							
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Sampling and readings	.....	.....	.....	2	2	2	2	(2)
Walks at 4.8 km. (3 miles) per hour	.....	.....	1	1	2	2	3	.....
Runs at 9.7 km. (6 miles) per hour	1	1	1	1	1	1	1	.....
Pulls 20 kg. (45 pound) weight to 5 feet	.....	15 times in 1 minute	.....	30 times in 2 minutes	30 times in 2 minutes	30 times in 2 minutes	60 times in 6 minutes	.....
Lies on side	1/2	1	1	2	3	4	5	.....
Lies on back	1/2	1	1	2	2	3	3	.....
Crawls on hands and knees	1	1	1	2	2	2	2	.....
Sampling and readings	.....	.....	2	.....	2	2	2	.....
Runs at 9.7 km. (6 miles) per hour	.....	.....	.....	1	1	1	1	.....
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	.....	2	8	10	.....
Pulls 20 kg. (45 pound) weight to 5 feet	.....	.....	30 times in 2 minutes	.....	60 times in 6 minutes	60 times in 6 minutes	60 times in 6 minutes	.....
Sampling and readings	.....	.....	.....	2	.....	2	2	.....
Walks at 4.8 km. (3 miles) per hour	.....	.....	1	.....	3	4	10	.....
Lies on side	.....	.....	.....	.....	.....	2	4	.....
Lies on back	.....	.....	.....	.....	.....	2	1	.....
Sampling and readings	.....	.....	.....	.....	2	2	2	.....

[1] Total test time for Test 3 for 2-hour, 3-hour, and 4-hour apparatus is 2 hours.
[2] Perform test No. 3 for 1 hr. apparatus; then perform test No. 1 for 1 hour apparatus.

TABLE 4—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 4, IN MINUTES

[42 CFR part 84, subpart H]

Activity	Service time—									
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2 hours	3 hours	4 hours
Sampling and readings	.....	.....	.....	2	2	2	2	(2)	(3)	(4)
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	1	2	2	2	.....	.....	.....
Climbs vertical treadmill [1] (or equivalent)	1	1	1	1	1	1	1	.....	.....	.....
Walks at 4.8 km. (3 miles) per hour	.....	1	1	1	2	2	2	.....	.....	.....
Pulls 20 kg. (45 pound) weight to 5 feet	.....	30 times in 2 minutes	30 times in 2 minutes	30 times in 2 minutes	60 times in 5 minutes	60 times in 5 minutes	60 times in 5 minutes	.....	.....	.....
Walks at 4.8 km. (3 miles) per hour	.....	.....	1	1	1	2	3	.....	.....	.....

TABLE 4—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 4, IN MINUTES—Continued
[42 CFR part 84, subpart H]

Activity	Service time—									
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2 hours	3 hours	4 hours
Carries 23 kg. (50 pound) weight over overcast	.....	.....	.....	1 time in 1 minute	1 time in 1 minute	2 times in 3 minutes	4 times in 8 minutes	.....	.....	.....
Sampling and readings	.....	.....	2	.....	2	2	2	.....	.....	.....
Walks at 4.8 km. (3 miles) per hour	.....	.....	.....	1	3	3	4	.....	.....	.....
Runs at 9.7 km. (6 miles) per hour	.....	1	1	1	1	1	1	.....	.....	.....
Carries 23 kg. (50 pound) weight over overcast	.....	.....	1 time in 1 minute	1 time in 1 minute	2 times in 3 minutes	4 times in 6 minutes	6 times in 9 minutes	.....	.....	.....
Pulls 20 kg (45 pound) weight to 5 feet	15 times in 1 minute	.....	.....	15 times in 1 minute	60 times in 5 minutes	30 times in 2 minutes	36 times in 3 minutes	.....	.....	.....
Sampling and readings	.....	.....	.....	2	2	2	2	.....	.....	.....
Walks at 4.8 km. (3 miles) per hour	1	.....	1	.....	.....	2	6	.....	.....	
Pulls 20 kg. (45 pound) weight to 5 feet	.....	.....	.....	.....	.....	60 times in 5 minutes	60 times in 5 minutes	.....	.....	.....
Carries 20 kg. (45 pound) weight and walks at 4.8 km. (3 miles) per hour	.....	.....	.....	.....	.....	3	3	.....	.....	.....
Sampling and readings	.....	.....	.....	.....	.....	2	2	.....	.....	.....

[1] Treadmill shall be inclined 15° from vertical and operated at a speed of 30 cm. (1 foot) per second.
[2] Perform test No. 1 for 30-minute apparatus; then perform test No. 4 for 1-hour apparatus; then perform test No. 1 for 30-minute apparatus.
[3] Perform test No. 1 for 1-hour apparatus; then perform test No. 4 for 1-hour apparatus; then perform test No. 1 for 1-hour apparatus.
[4] Perform test No. 1 for 1-hour apparatus; then perform test No. 4 for 1-hour apparatus; then perform test No. 1 for 1-hour apparatus twice (i.e., two one-hour tests).

Subpart I—Gas Masks

§ 84.110 Gas masks; description.

(a) Gas masks including all completely assembled air purifying masks designed for use as respiratory protection during entry into atmospheres not immediately dangerous to life or health or escape only from hazardous atmospheres containing adequate oxygen to support life are described as follows:

(1) *Front-mounted or back-mounted gas mask.* A gas mask which consists of a full facepiece, a breathing tube, a canister at the front or back, a canister harness, and associated connections.

(2) *Chin-style gas mask.* A gas mask which consists of a full facepiece, a canister which is usually attached to the facepiece, and associated connections.

(3) *Escape gas mask.* A gas mask designed for use during escape only from hazardous atmospheres which consists of a facepiece or mouthpiece, a canister, and associated connections.

(b) Gas masks shall be further described according to the types of gases or vapors against which they are designed to provide respiratory protection, as follows:

Type of front-mounted or back-mounted gas mask:
Acid gas[1 2 3]
Ammonia
Carbon monoxide
Organic Vapor[1 2 3]
Other gas(es) and vapor(s)[1 2 3]
Combination of two or more of the above gases and vapors.[1 2 3]
Combination of acid gas, ammonia, carbon monoxide, and organic vapors.[1 2 3]
Type of chin-style gas mask:
Acid gas[1 2 3]
Ammonia
Carbon monoxide
Organic vapor[1 2 3]
Other gas(es) and vapor[1 2 3]
Combination of two or more of the above gases and vapors.[1 2 3]
Type of escape gas mask:
Acid gas[1 2 3 4]
Ammonia[4]
Carbon monoxide
Organic vapor[1 2 3 4]
Other gas(s) and vapor(s)[1 2 3 4]
Combination of two or more of the above gases and vapors.[1 2 3 4]

[1] Approval may be for acid gases or organic vapors as a class or for specific acid gases or organic vapors.

[2] Not for use against gases or vapors with poor warning properties (except where MSHA or Occupational Safety and Health Administration standards permit such use for a specific gas or vapor), or those which generate high heats or reaction with sorbent materials in the canister.

[3] Use of the gas mask may be limited by factors such as lower explosive limit, toxicological effects, and facepiece fit. Limitations on gas mask service life and sorbent capacity limitations shall be specified by the applicant in instructions for selection, use and maintenance of the gas mask.

[4] Eye protection may be required in certain concentrations of gases and vapors.

(c) Gas masks for respiratory protection against gases and vapors other than those specified in paragraph (b) of this section, may be approved upon submittal of an application in writing for approval to the National Personal Protective Technology Laboratory listing the gas or vapor and suggested maximum use concentration for the specific type of gas mask. The Institute will consider the application and accept or reject it on the basis of effect on the wearer's health and safety and any field experience in use of gas masks for such exposures. If the application is accepted, the Institute will test such masks in accordance with the requirements of this subpart.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.111 Gas masks; required components.

(a) Each gas mask described in § 84.110 shall, where its design requires, contain the following component parts:

(1) Facepiece or mouthpiece and noseclip;

(2) Canister or cartridge;

(3) Canister harness;

(4) External check valve; and

(5) Breathing tube.

(b) The components of each gas mask shall meet the minimum construction requirements set forth in subpart G of this part.

§ 84.112 Canisters and cartridges in parallel; resistance requirements.

Where two or more canisters or cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 84.113 Canisters and cartridges; color and markings; requirements.

The color and markings of all canisters and cartridges or labels shall conform with the requirements of the American National Standards Institute, American National Standard for Identification of Air-Purifying Respirator Canisters and Cartridges, ANSI K13.1–1973. ANSI K13.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.114 Filters used with canisters and cartridges; location; replacement.

(a) Particulate matter filters used in conjunction with a canister or cartridge shall be located on the inlet side of the canister or cartridge.

(b) Filters shall be incorporated in or firmly attached to the canister or cartridge and each filter assembly shall, where applicable, be designed to permit its easy removal from and replacement in the canister or cartridge.

§ 84.115 Breathing tubes; minimum requirements.

Flexible breathing tubes used in conjunction with gas masks shall be designed and constructed to prevent:

(a) Restriction of free head movement;

(b) Disturbance of the fit of facepieces or mouthpieces;

(c) Interference with the wearer's activities; and

(d) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 84.116 Harnesses; installation and construction; minimum requirements.

(a) Each gas mask shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the gas mask in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of gas mask parts, and where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 84.117 Gas mask containers; minimum requirements.

(a) Gas masks shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of mask it contains and all appropriate approval labels.

(b) Containers for gas masks shall be designed and constructed to permit easy removal of the mask.

§ 84.118 Half-mask facepieces, full facepieces, and mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either:

(1) By providing more than one facepiece size; or

(2) By providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective qualities of the gas mask.

(c) Half-mask facepieces shall not interfere with the fit of common industrial safety spectacles, as determined by the Institute's facepiece tests in § 84.124.

(d) Gas masks with mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or gas mask and provide an airtight seal.

(e) Facepieces shall be designed to prevent eyepiece fogging.

§ 84.119 Facepieces; eyepieces; minimum requirements.

(a) Full facepieces shall be designed and constructed to provide adequate vision which is not distorted by the eye.

(b) All eyepieces shall be designed and constructed to be impact and penetration resistant. Federal Specification, Mask, Air Line: and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965 with interim amendment-1, July 30, 1969, is an example of an appropriate standard for determining impact and penetration resistance. Copies of GGG-M-125d may be obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.120 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against damage and distortion.

(b) Inhalation valves shall be designed and constructed to prevent excessive exhaled air from adversely affecting cartridges, canisters, and filters.

(c) Exhalation valves shall be protected against external influence, and designed and constructed to prevent inward leakage of contaminated air.

§ 84.121 Head harnesses; minimum requirements.

(a) Facepieces shall be equipped with adjustable and replaceable head harnesses, designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses designed and constructed to hold the mouthpiece in place.

§ 84.122 Breathing resistance test; minimum requirements.

(a) Resistance to airflow will be measured in the facepiece or mouthpiece of a gas mask mounted on a breathing machine both before and after each test conducted in accordance with §§ 84.124, 84.125, and 84.126, with air flowing at a continuous rate of 85 liters per minute.

(b) The maximum allowable resistance requirements for gas masks are as follows:

MAXIMUM RESISTANCE

[mm. water-column height]

Type of gas mask	Inhalation		Exhalation
	Initial	Final [1]	
Front-mounted or back-mounted (without particulate filter)	60	75	20
Front-mounted or back-mounted (with approved particulate filter)	70	85	20
Chin-style (without particulate filter)	40	55	20
Chin-style (with approved particulate filter)	65	80	20
Escape (without particulate filter)	60	75	20
Escape (with approved particulate filter)	70	85	20

[1] Measured at end of the service life specified in Tables 5, 6, and 7 of this subpart.

§ 84.123 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 84.124 Facepiece tests; minimum requirements.

(a) The complete gas mask will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for the gas mask, together with the approximate measurements of faces they are designed to fit, the Institute will insure that test subjects suit such facial measurements.

(c) Any gas mask parts which must be removed to perform the facepiece or mouthpiece fit test shall be replaceable without special tools and without disturbing the facepiece or mouthpiece fit.

(d) The facepiece or mouthpiece fit test, using positive or negative pressure recommended by the applicant and described in his instructions will be used before each test specified in paragraph (e) of this section, and in § 84.125.

(e)(1) Each wearer will enter a chamber containing 100 p.p.m. isoamyl acetate vapor for a half-mask facepiece and 1,000 p.p.m. isoamyl acetate vapor for a full facepiece or mouthpiece.

(2) The facepiece or mouthpiece may be adjusted, if necessary, in the test chamber before starting the tests.

(3) Each wearer will remain in the chamber for 8 minutes while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and

(iv) Two minutes, pumping with a tire pump into a 28 liter (1 cubic foot) container.

(4) Each wearer shall not detect the odor of isoamyl acetate during the test.

§ 84.125 Particulate tests; canisters containing particulate filters; minimum requirements.

Gas mask canisters containing filters for protection against particulates (e.g. dusts, fumes, mists, and smokes) in combination with gases, vapors, or gases and vapors, shall also comply with the requirements as prescribed in §§ 84.170 through 84.181, except for the airflow resistance test of § 84.172.

[60 FR 30355, June 8, 1995, as amended at 85 FR 20607, Apr. 14, 2020]

§ 84.126 Canister bench tests; minimum requirements.

(a)(1) Bench tests, except for carbon monoxide tests, will be made on an apparatus that allows the test atmosphere at 50 ±5 percent relative humidity and room temperature (25 ±2.5 °C.) to enter the canister continuously at concentrations and rates of flow specified in Tables 5, 6, and 7 of this subpart.

(2) Three canisters will be removed from containers and tested as received from the applicant.

(3) Two canisters, other than those described in paragraph (a)(2) of this section, will be equilibrated at room temperature by passing 25 percent relative humidity air through them at 64 liters per minute for 6 hours.

(4) Two canisters, other than those described in paragraphs (a) (2) and (3) of this section, will be equilibrated at room temperature by passing 85 percent relative humidity air through them at 64 liters per minute for 6 hours.

(5) The equilibrated canisters will be resealed, kept in an upright position at room temperature, and tested within 18 hours.

(b) Front-mounted and back-mounted gas mask canisters will be tested and shall meet the minimum requirements set forth in Table 5 of this subpart.

(c)(1) Front-mounted, and back-mounted, and chin-style canisters designated as providing respiratory protection against gases, ammonia, organic vapors, carbon monoxide and particulate contaminants shall have a window or other indicator to warn the gas mask wearer when the canister will no longer satisfactorily remove carbon monoxide from the inhaled air.

(2) Other types of front- and back-mounted canisters may also be equipped with a window or other indicator to warn of imminent leakage of other gases or vapors.

(3) The window indicator canisters will be tested as regular canisters, but shall show a satisfactory indicator change or other warning before the allowable canister penetration has occurred.

(d) Chin-style gas mask canisters shall meet the minimum requirements set forth in Table 6 of this subpart.

(e) Escape gas mask canisters shall meet the minimum requirements set forth in Table 7 of this subpart.

(f) Powered air-purifying respirators with a canister(s) and particulate filter(s) must meet the as-received minimum service-life requirements and half of the equilibrated minimum service-life requirements set forth in Tables 5, 6, and 7 of subpart I using the flows specified in subpart K, § 84.175(b) and equilibrated in accordance with paragraphs (a) through (e) of this section using the flows specified in subpart K, § 84.175(b).

[60 FR 30355, June 8, 1995, as amended at 85 FR 20607, Apr. 14, 2020]

TABLES TO SUBPART I OF PART 84

TABLE 5—CANISTER BENCH TESTS AND REQUIREMENTS FOR FRONT-MOUNTED AND BACK-MOUNTED GAS MASK CANISTERS

[42 CFR part 84, subpart I]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetratin (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute)			
Acid gas	As received	SO_2	20,000	64	3	5	12
	Equilibrated	Cl_2	20,000	64	3	5	12
		SO_2	20,000	32	4	5	12
		Cl_2	20,000	32	4	5	12
Organic vapor	As received	CCl_4	20,000	64	3	5	12
	Equilibrated	CCl_4	20,000	32	4	5	12
Ammonia	As received	NH_3	30,000	64	3	50	12
	Equilibrated	NH_3	30,000	32	4	50	12
Carbon monoxide	As received	CO	20,000	[4] 64	2	([3])	60
	Equilibrated	CO	5,000	[2] 32	3	([3])	60
		CO	3,000	[2] 32	3	([3])	60
Combination of 2 or 3 of above types [5]							
Combination of all above types [6]							

[1] Minimum life will be determined at the indicated penetration.
[2] Relative humidity of test atmosphere will be 95 ±3pct; temperature of test atmosphere will be 25 ±2.5 °C.
[3] Maximum allowable CO penetration will be 385 cm^3 during the minimum life. The penetration shall not exceed 500 p/m during this time.
[4] Relative humidity of test atmosphere will be 95 ±3pct; temperature of test atmosphere entering the test fixture will be 0 ±2.5 °C – 0 °C.
[5] Test conditions and requirements will be applicable as shown in this table.
[6] Test conditions and requirements will be applicable as shown in this table, except the minimum service lives for acid gas, organic vapor, and ammonia will be 6 min instead of 12 min.

TABLE 6—CANISTER BENCH TESTS AND REQUIREMENTS FOR CHIN-STYLE GAS MASK CANISTERS

[42 CFR part 84, subpart I]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetration (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute)			
Acid gas	As received Equilibrated	SO_2	50,000	64	3	5	12
		Cl_2	5,000	64	3	5	12
		SO_2	5,000	32	4	5	12
		Cl_2	5,000	32	4	5	12
Organic vapor	As received Equilibrated	CCl_4	5,000	64	3	5	12
		CCl_4	5,000	32	4	5	12
Ammonia	As received Equilibrated	NH_3	5,000	64	3	50	12
	As received Equilibrated	NH_3	5,000	32	4	50	12
Carbon monoxide	As received	CO	20,000	[2] 64	2	([3])	60
		CO	5,000	[4] 32	3	([3])	60
		CO	3,000	[2] 32	3	([3])	60
Combination of 2 or 3 of above types [5]							
Combination of all above types [6]							

[1] Minimum life will be determined at the indicated penetration.
[2] Relative humidity of test atmosphere will be 95 ±3pct; temperature of test atmosphere will be 25 ±2.5 °C.
[3] Maximum allowable CO penetration will be 385 cm^3 during the minimum life. The penetration shall not exceed 500 p/m during this time.
[4] Relative humidity of test atmosphere will be 95 ±3pct; temperature of test atmosphere entering the test fixture will be 0 ±2.5 °C – 0 °C.
[5] Test conditions and requirements will be applicable as shown in this table.
[6] Test conditions and requirements will be applicable as shown in this table, except the minimum service lives for acid gas, organic vapor, and ammonia will be 6 min instead of 12 min.

TABLE 7—CANISTER BENCH TESTS AND REQUIREMENTS FOR ESCAPE GAS MASK CANISTERS

[42 CFR part 84, subpart I]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetration (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute)			
Acid gas	As received	SO_2	5,000	64	3	5	12
	Equilibrated	Cl_2	5,000	64	3	5	12
		SO_2	5,000	32	4	5	12
		Cl_2	5,000	32	4	5	12
Organic vapor	As received	CCl_4	5,000	64	3	5	12
	Equilibrated	CCl_4	5,000	32	4	5	12
Ammonia	As received	NH_3	5,000	64	3	50	12
	Equilibrated	NH_3	5,000	32	4	50	12
Carbon monoxide	As received	CO	10,000	[2] 32	2	([3])	[4] 60
		CO	5,000	[5] 32	3	([3])	60
		CO	3,000	[2] 32	3	([3])	60

[1] Minimum life will be determined at the indicated penetration.

[2] Relative humidity of test atmosphere will be 95 ±3 pct; temperature of test atmosphere will be 25 ±2.5 °C.

[3] Maximum allowable CO penetration will be 385 cm^3 during the minimum life. The penetration shall not exceed 500 p/m during this time.

[4] If effluent temperature exceeds 100 °C during this test, the escape gas mask shall be equipped with an effective heat exchanger.

[5] Relative humidity of test atmosphere will be 95 ±3 pct; temperature of test atmosphere entering the test fixture will be 0 ±2.5 °C – 0 °C.

Subpart J—Supplied-Air Respirators

§ 84.130 Supplied-air respirators; description.

Supplied-air respirators, including all completely assembled respirators designed for use as respiratory protection during entry into and escape from atmospheres not immediately dangerous to life or health are described as follows:

(a) *Type ''A'' supplied-air respirators.* A hose mask respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a motor-driven or hand-operated blower that permits the free entrance of air when the blower is not operating, a strong large-diameter hose having a low resistance to airflow, a harness to which the hose and the life-line are attached and a tight-fitting facepiece.

(b) *Type ''AE'' supplied-air respirators.* A Type ''A'' supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

(c) *Type ''B'' supplied-air respirators.* A hose mask respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a strong large-diameter hose with low resistance to airflow through which the user draws inspired air by means of his lungs alone, a harness to which the hose is attached, and a tight-fitting facepiece.

(d) *Type ''BE'' supplied-air respirators.* A type ''B'' supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

(e) *Type ''C'' supplied-air respirators.* An airline respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a source of respirable breathing air, a hose, a detachable coupling, a control valve, orifice, a demand valve or pressure demand valve,

an arrangement for attaching the hose to the wearer, and a facepiece, hood, or helmet.

(f) *Type ''CE'' supplied-air respirators.* A type ''C'' supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

§ 84.131 Supplied-air respirators; required components.

(a) Each supplied-air respirator described in § 84.130 shall, where its design requires, contain the following component parts:

(1) Facepiece, hood, or helmet;

(2) Air supply valve, orifice, or demand or pressure-demand regulator;

(3) Hand operated or motor driven air blower;

(4) Air supply hose;

(5) Detachable couplings;

(6) Flexible breathing tube; and

(7) Respirator harness.

(b) The component parts of each supplied-air respirator shall meet the minimum construction requirements set forth in subpart G of this part.

§ 84.132 Breathing tubes; minimum requirements.

Flexible breathing tubes used in conjunction with supplied-air respirators shall be designed and constructed to prevent:

(a) Restriction of free head movement;

(b) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(c) Interference with the wearer's activities; and

(d) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 84.133 Harnesses; installation and construction; minimum requirements.

(a) Each supplied-air respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts, and where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 84.134 Respirator containers; minimum requirements.

Supplied-air respirators shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains, and all appropriate approval labels.

§ 84.135 Half-mask facepieces, full facepieces, hoods, and helmets; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either:

(1) By providing more than one facepiece size; or

(2) By providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective qualities of the respirator.

(c) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(d) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

§ 84.136 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

(a) Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepiece.

(b) All eyepieces except those on Types B, BE, C, and CE supplied-air respirators shall be designed and constructed to be impact and penetration

resistant. Federal Specification, Mask, Air Line: and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965 with interim amendment-1, July 30, 1969, is an example of an appropriate standard for determining impact and penetration resistance. Copies of GGG-M-125d may be obtained from the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236.

(c)(1) The eyepieces of AE, BE, and CE type supplied-air respirators shall be shielded by plastic, glass, woven wire, sheet metal, or other suitable material which does not interfere with the vision of the wearer.

(2) Shields shall be mounted and attached to the facepiece to provide easy access to the external surface of the eyepiece for cleaning.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3907, Jan. 26, 2015]

§ 84.137 Inhalation and exhalation valves; check valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against distortion.

(b) Exhalation valves shall be:

(1) Protected against damage and external influence; and

(2) Designed and constructed to prevent inward leakage of contaminated air.

(c) Check valves designed and constructed to allow airflow toward the facepiece only shall be provided in the connections to the facepiece or in the hose fitting near the facepiece of all Type A, AE, B, and BE supplied-air respirators.

§ 84.138 Head harnesses; minimum requirements.

Facepieces shall be equipped with adjustable and replaceable head harnesses which are designed and constructed to provide adequate tension during use, and an even distribution of pressure over the entire area in contact with the face.

§ 84.139 Head and neck protection; supplied-air respirators; minimum requirements.

Type AE, BE, and CE supplied-air respirators shall be designed and constructed to provide protection against impact and abrasion from rebounding abrasive materials to the wearer's head and neck.

§ 84.140 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable within pressure and hose length requirements and shall not exceed 80 dBA.

§ 84.141 Breathing gas; minimum requirements.

(a) Breathing gas used to supply supplied-air respirators shall be respirable breathing air and contain no less than 19.5 volume-percent of oxygen.

(b) Compressed, gaseous breathing air shall meet the applicable minimum grade requirements for Type I gaseous air set forth in the Compressed Gas Association Commodity Specification for Air, G–7.1, 1966 (Grade D or higher quality). G–7.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(c) Compressed, liquefied breathing air shall meet the applicable minimum grade requirements for Type II liquid air set forth in the Compressed Gas Association Commodity Specification for Air, G–7.1, 1966 (Grade B or higher quality). G–7.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance

with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

[60 FR 30355, June 8, 1995, amended at 80 FR 3907, Jan. 26, 2015]

§ 84.142 Air supply source; hand-operated or motor driven air blowers; Type A supplied-air respirators; minimum requirements.

(a) Blowers shall be designed and constructed to deliver an adequate amount of air to the wearer with either direction of rotation, unless constructed to permit rotation in one direction only, and to permit the free entrance of air to the hose when the blower is not operated.

(b) No multiple systems, whereby more than one user is supplied by one blower, will be approved, unless each hose line is connected directly to a manifold at the blower.

§ 84.143 Terminal fittings or chambers; Type B supplied-air respirators; minimum requirements.

(a) Blowers or connections to air supplies providing positive pressures shall not be approved for use on Type B supplied-air respirators.

(b) Terminal fittings or chambers employed in Type B supplied-air respirators, shall be:

(1) Installed in the inlet of the hose.

(2) Designed and constructed to provide for the drawing of air through corrosion resistant material arranged so as to be capable of removing material larger than 0.149 mm. in diameter (149 micrometers, 100-mesh, U.S. Standard sieve).

(3) Installed to provide a means for fastening or anchoring the fitting or chamber in a fixed position in a zone of respirable air.

§ 84.144 Hand-operated blower test; minimum requirements.

(a) Hand-operated blowers shall be tested by attaching them to a mechanical drive and operating them 6 to 8 hours daily for a period of 100 hours at a speed necessary to deliver 50 liters of air per minute through each completely assembled respirator. Each respirator shall be equipped with the maximum length of hose with which the device is to be approved and the hose shall be connected to each blower or manifold outlet designed for hose connections.

(b) The crank speed of the hand-operated blower shall not exceed 50 revolutions per minute in order to deliver the required 50 liters of air per minute to each facepiece.

(c) The power required to deliver 50 liters of air per minute to each wearer through the maximum length of hose shall not exceed one-fiftieth horsepower, and the torque shall not exceed a force of 2.3 kg. (5 pounds) on a 20 cm. (8-inch) crank, as defined in § 84.146.

(d) The blower shall operate throughout the period without failure or indication of excessive wear of bearings or other working parts.

§ 84.145 Motor-operated blower test; minimum requirements.

(a) Motor-operated blowers shall be tested by operating them at their specified running speed 6 to 8 hours daily for a period of 100 hours when assembled with the kind and maximum length of hose for which the device is to be approved and when connected to each blower or manifold outlet designed for hose connections.

(b) The connection between the motor and the blower shall be so constructed that the motor may be disengaged from the blower when the blower is operated by hand.

(c) The blower shall operate throughout the period without failure or indication of excessive wear of bearings or other working parts.

(d) Where a blower, which is ordinarily motor driven, is operated by hand, the power required to deliver 50 liters of air per minute to each wearer through the maximum length of hose shall not exceed one-fiftieth horsepower, and the torque shall not exceed

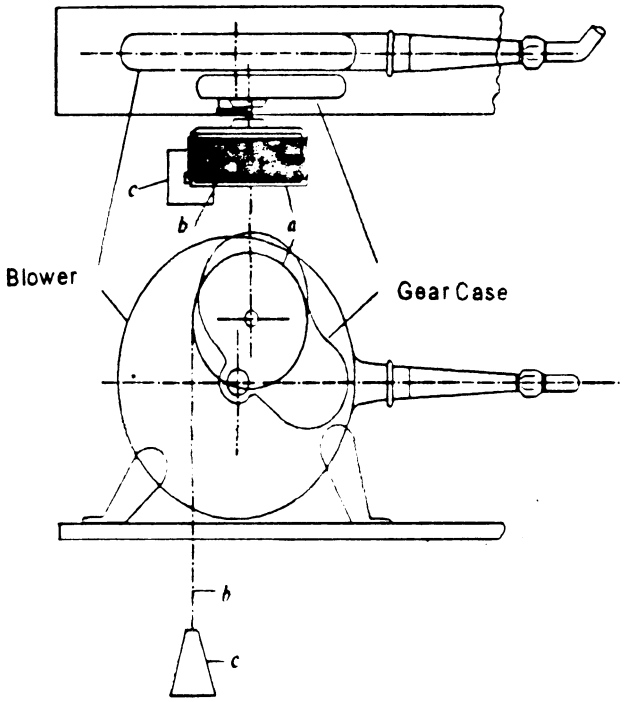
a force of 2.3 kg. (5 pounds) on a 20 cm. (8-inch) crank, as defined in § 84.146.

(e) Where the respirator is assembled with the facepiece and 15 m. (50 feet) of the hose for which it is to be approved, and when connected to one outlet with all other outlets closed and operated at a speed not exceeding 50 revolutions of the crank per minute, the amount of air delivered into the respiratory-inlet covering shall not exceed 150 liters per minute.

§ 84.146 Method of measuring the power and torque required to operate blowers.

As shown in Figure 1 of this section, the blower crank is replaced by a wooden drum, a (13 cm. (5 inches) in diameter is convenient). This drum is wound with about 12 m. (40 feet) of No. 2 picture cord, b. A weight, c, of sufficient mass to rotate the blower at the desired speed is suspended from this wire cord. A mark is made on the cord about 3 to 4.5 m. (10 to 15 feet) from the weight, c. Another mark is placed at a measured distance (6–9 m./20–30 feet is convenient) from the first. These are used to facilitate timing. To determine the torque or horsepower required to operate the blower, the drum is started in rotation manually at or slightly above the speed at which the power measurement is to be made. The blower is then permitted to assume constant speed, and then as the first mark on the wire leaves the drum, a stopwatch is started. The watch is stopped when the second mark leaves the drum. From these data the foot-pounds per minute and the torque may be calculated.

FIGURE 1—APPARATUS FOR MEASURING POWER REQUIRED TO OPERATE BLOWER. (42 CFR PART 84, SUBPART J, § 84.146)



§ 84.147 Type B supplied-air respirator; minimum requirements.

No Type B supplied-air respirator shall be approved for use with a blower or with connection to an air supply device at positive pressures.

§ 84.148 Type C supplied-air respirator, continuous flow class; minimum requirements.

(a) Respirators tested under this section shall be approved only when they supply respirable air at the pressures and quantities required.

(b) The pressure at the inlet of the hose connection shall not exceed 863 kN/m.^{2} (125 pounds per square inch gage).

(c) Where the pressure at any point in the supply system exceeds 863 kN/m.^{2} (125 pounds per square inch gage), the respirator shall be equipped with a pressure-release mechanism that will prevent the pressure at the hose connection from exceeding 863 kN/m.^{2} (125 pounds per square inch gage) under any conditions.

§ 84.149 Type C supplied-air respirator, demand and pressure demand class; minimum requirements.

(a) Respirators tested under this section shall be approved only when used to supply respirable air at the pressures and quantities required.

(b) The manufacturer shall specify the range of air pressure at the point of attachment of the air-supply hose to the air-supply system, and the range of hose length for the respirator. For example, he might specify that the respirator be used with compressed air at pressures ranging from 280–550 kN/m.^{2} (40 to 80 pounds per square inch) with from 6 to 76 m. (15 to 250 feet) of air-supply hose.

(c) The specified air pressure at the point of attachment of the hose to the air-supply system shall not exceed 863 kN/m.^{2} (125 pounds per square inch gage).

(d)(1) Where the pressure in the air-supply system exceeds 863 kN/m.^{2} (125 pounds per square inch gage), the respirator shall be equipped with a pressure-release mechanism that will prevent the pressure at the point of attachment of the hose to the air-supply system from exceeding 863 kN/m.^{2} (125 pounds per square inch gage).

(2) The pressure-release mechanism shall be set to operate at a pressure not more than 20 percent above the manufacturer's highest specified pressure. For example, if the highest specified pressure is 863 kN/m.^{2} (125 pounds per square inch), the pressure-release mechanism would be set to operate at a maximum of 1,035 kN/m.^{2} (150 pounds per square inch).

§ 84.150 Air-supply line tests; minimum requirements.

Air supply lines employed on Type A, Type B, and Type C supplied-air respirators shall meet the minimum test requirements set forth in Table 8 of this subpart.

§ 84.151 Harness test; minimum requirements.

(a)(1) Shoulder straps employed on Type A supplied-air respirators shall be tested for strength of material, joints, and seams and must separately withstand a pull of 113 kg. (250 pounds) for 30 minutes without failure.

(2) Belts, rings, and attachments for life lines must withstand a pull of 136 kg. (300 pounds) for 30 minutes without failure.

(3) The hose shall be firmly attached to the harness so as to withstand a pull of 113 kg. (250 pounds) for 30 minutes without separating, and the hose attachments shall be arranged so that the pull or drag of the hose behind an advancing wearer does not disarrange the harness or exert pull upon the facepiece.

(4) The arrangement and suitability of all harness accessories and fittings will be considered.

(b)(1) The harness employed on Type B supplied-air respirators shall not be uncomfortable, disturbing, or interfere with the movements of the wearer.

(2) The harness shall be easily adjustable to various sizes.

(3) The hose shall be attached to the harness in a manner that will withstand a pull of 45 kg. (100 pounds) for 30 minutes without separating or showing signs of failure.

(4) The design of the harness and attachment of the line shall permit dragging the maximum length of hose considered for approval over a concrete floor without disarranging the harness or exerting a pull on the facepiece.

(5) The arrangement and suitability of all harness accessories and fittings will be considered.

(c) The harness employed on Type C respirators shall be similar to that required on the Type B respirator, or, it may consist of a simple arrangement for attaching the hose to a part of the wearer's clothing in a practical manner that prevents a pull equivalent to dragging the maximum length of the hose over a concrete floor from exerting pull upon the respiratory-inlet covering.

(d) Where supplied-air respirators have a rigid or partly rigid head covering, a suitable harness shall be required to assist in holding this covering in place.

§ 84.152 Breathing tube test; minimum requirements.

(a)(1) Type A and Type B supplied-air respirators shall employ one or two flexible breathing tubes of the nonkinking type which extend from the facepiece to a connecting hose coupling attached to the belt or harness.

(2) The breathing tubes employed shall permit free head movement, insure against closing off by kinking or by chin or arm pressure, and they shall not create a pull that will loosen the facepiece or disturb the wearer.

(b) Breathing tubes employed on Type C supplied-air respirators of the continuous flow class shall meet the minimum requirements set forth in paragraph (a) of this section, however, an extension of the connecting hose may be employed in lieu of the breathing tubes required.

(c)(1) A flexible, nonkinking type breathing tube shall:

(i) Be employed on Type C supplied-air respirators of the demand and pressure-demand class; and

(ii) Extend from the facepiece to the demand or pressure-demand valve, except where the valve is attached directly to the facepiece.

(2) The breathing tube shall permit free head movement, insure against closing off by kinking or by chin or arm pressure, and shall not create a pull that will loosen the facepiece or disturb the wearer.

§ 84.153 Airflow resistance test, Type A and Type AE supplied-air respirators; minimum requirements.

(a) Airflow resistance will be determined when the respirator is completely assembled with the respiratory-inlet covering, the air-supply device, and the maximum length of air-supply hose coiled for one-half its length in loops 1.5 to 2.1 m. (5 to 7 feet) in diameter.

(b) The inhalation resistance, drawn at the rate of 85 liters (3 cubic feet) per minute when the blower is not operating or under any practical condition of blower operation shall not exceed the following amounts:

Maximum length of hose for which respirator is approved		Maximum resistance, water column height	
Feet	Meters	Inches	Millimeters
75	23	1.5	38
150	46	2.5	64
250	76	3.5	89
300	91	4.0	102

(c) The exhalation resistance shall not exceed 25 mm. (1 inch) of water-column height at a flow rate of 85 liters (3 cubic feet) per minute when the blower is not operating or under any practical condition of blower operation.

§ 84.154 Airflow resistance test; Type B and Type BE supplied-air respirators; minimum requirements.

(a) Airflow resistance shall be determined when the respirator is completely assembled with the respiratory-inlet covering and the hose in the maximum length to be considered for approval, coiled in loops 1.5 to 2.1 m. (5 to 7 feet) in diameter.

(b) Airflow resistance shall not exceed 38 mm. (1.5 inches) of water-column height to air drawn at the flow rate of 85 liters (3 cubic feet) per minute.

(c) The exhalation resistance shall not exceed 25 mm. (1 inch) of water-column height at this flow rate.

§ 84.155 Airflow resistance test; Type C supplied-air respirator, continuous flow class and Type CE supplied-air respirator; minimum requirements.

The resistance to air flowing from the respirator shall not exceed 25 mm. (1 inch) of water-column height when the air flow into the respiratory-inlet covering is 115 liters (4 cubic feet) per minute.

§ 84.156 Airflow resistance test; Type C supplied-air respirator, demand class; minimum requirements.

(a) Inhalation resistance shall not exceed 50 millimeters (2 inches) of water at an air flow of 115 liters (4 cubic feet) per minute.

(b) The exhalation resistance to a flow of air at a rate of 85 liters (3 cubic feet) per minute shall not exceed 25 millimeters (1 inch) of water.

§ 84.157 Airflow resistance test; Type C supplied-air respirator, pressure-demand class; minimum requirements.

(a) The static pressure in the facepiece shall not exceed 38 mm. (1.5 inches) of water-column height.

(b) The pressure in the facepiece shall not fall below atmospheric at inhalation airflows less than 115 liters (4 cubic feet) per minute.

(c) The exhalation resistance to a flow of air at a rate of 85 liters (3 cubic feet) per minute shall not exceed the static pressure in the facepiece by more than 51 mm. (2 inches) of water-column height.

§ 84.158 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 84.159 Man tests for gases and vapors; supplied-air respirators; general performance requirements.

(a) Wearers will enter a chamber containing a gas or vapor as prescribed in §§ 84.160, 84.161, 84.162, and 84.163.

(b) Each wearer will spend 10 minutes in work to provide observations on freedom of the device from leakage. The freedom and comfort allowed the wearer will also be considered.

(c) Time during the test period will be divided as follows:

(1) *Five minutes.* Walking, turning head, dipping chin; and

(2) *Five minutes.* Pumping air with a tire pump into a 28-liter (1 cubic foot) container, or equivalent work.

(d) No odor of the test gas or vapor shall be detected by the wearer in the air breathed during any such test, and the wearer shall not be subjected to any undue discomfort or encumbrance because of the fit, air delivery, or other features of the respirator during the testing period.

§ 84.160 Man test for gases and vapors; Type A and Type AE respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1 ±0.025 percent isoamyl acetate vapor, and the blower, the intake of the hose, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The man in the isoamyl acetate atmosphere will draw his inspired air through the hose, connections, and all parts of the air device by means of his lungs alone (blower not operating).

(c) The 10-minute work test will be repeated with the blower in operation at any practical speed up to 50 revolutions of the crank per minute.

§ 84.161 Man test for gases and vapors; Type B and Type BE respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1 ±0.025 percent isoamyl acetate vapor, and the intake of the hose, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The man in the isoamyl acetate atmosphere will draw his inspired air through the hose and connections by means of his lungs alone.

§ 84.162 Man test for gases and vapors; Type C respirators, continuous-flow class and Type CE supplied-air respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1 ±0.025 percent isoamyl acetate vapor, the intake of the hose will be connected to a suitable source of respirable air, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The minimum flow of air required to maintain a positive pressure in the respiratory-inlet covering throughout the entire breathing cycle will be supplied to the wearer, provided however, that airflow shall not be less than 115 liters per minute for tight-fitting and not less than 170 liters per minute for loose-fitting respiratory inlet-coverings.

(c) The test will be repeated with the maximum rate of flow attainable within specified operating pressures.

§ 84.163 Man test for gases and vapors; Type C supplied-air respirators, demand and pressure-demand classes; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1 ±0.025 percent isoamyl acetate vapor, the intake of the hose will be connected to a suitable source of respirable air, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The test will be conducted at the minimum pressure with the maximum hose length and will be repeated at the maximum pressure with the minimum hose length.

TABLE TO SUBPART J OF PART 84

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS

[42 CFR part 84, subpart J]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
Length of hose	Maximum of 91 m. (300 feet), in multiples of 7.6 m. (25 feet).	Maximum of 23 m. (75 feet) in multiples of 7.6 m. (25 feet).	Maximum of 91 m. (300 feet) in multiples of 7.6 m. (25 feet). It will be permissible for the applicant to supply hose of the approved type of shorter length than 7.6 m. (25 feet) provided it meets the requirements of the part.
Air flow	None	None	The air-supply hose with air regulating valve or orifice shall permit a flow of not less than 115 liters (4 cubic feet) per minute to tight-fitting and 170 liters (6 cubic feet) per minute to loose-fitting respiratory-inlet coverings through the maximum length of hose for which approval is granted and at the minimum specified air-supply pressure. The maximum flow shall not exceed 425 liters (15 cubic feet) per minute at the maximum specified air-supply pressure with the minimum length of hose for which approval is granted.

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS—Continued

[42 CFR part 84, subpart J]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
Air flow	.....do	.....do	The air-supply hose, detachable coupling, and demand valve of the demand class or pressure-demand valve of the pressure-demand class for Type C supplied-air respirators, demand and pressure-demand classes, shall be capable of delivering respirable air at a rate of not less than 115 liters (4 cubic feet) per minute to the respiratory-inlet covering at an inhalation resistance not exceeding 50 millimeters (2 inches) of water-column height measured in the respiratory-inlet covering with any combination of air-supply pressure and length of hose within the applicant's specified range of pressure and hose length. The airflow rate and resistance to inhalation shall be measured while the demand or pressure-demand valve is actuated 20 times per minute by a source of intermittent suction. The maximum rate of flow to the respiratory-inlet covering shall not exceed 425 liters (15 cubic feet) per minute under the specified operating conditions.
Air-regulating valve	.....do	.....do	If an air-regulating valve is provided, it shall be so designed that it will remain at a specific adjustment, which will not be affected by the ordinary movement of the wearer. The valve must be so constructed that the air supply with the maximum length of hose and at the minimum specified air-supply pressure will not be less than 115 liters (4 cubic feet) of air per minute to tight-fitting and 170 liters (6 cubic feet) of air per minute of loose-fitting respiratory inlet coverings for any adjustment of the valve. If a demand or pressure-demand valve replaces the air-regulating valve, it shall be connected to the air-supply at the maximum air pressure for which approval is sought by means of the minimum length of air-supply hose for which approval is sought. The outlet of the demand or pressure-demand valve shall be connected to a source of intermittent suction so that the demand or pressure-demand valve is actuated approximately 20 times per minute for a total of 100,000 inhalations. To expedite this test, the rate of actuation may be increased if mutually agreeable to the applicant and NIOSH. During this test the valve shall function without failure and without excessive wear of the moving parts. The demand or pressure-demand valve shall not be damaged in any way when subjected at the outlet to a pressure or suction of 25 cm. (10 inches) of water gage for 2 minutes.
Noncollapsibility	The hose shall not collapse or exhibit permanent deformation when a force of 90 kg. (200 pounds) is applied for 5 minutes between 2 planes 7.6 cm. (3 inches) wide on opposite sides of the hose.	Same as Type A	None.

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS—Continued

[42 CFR part 84, subpart J]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
Nonkinkability	None	None	A 7.6 m. (25 foot) section of the hose will be placed on a horizontal-plane surface and shaped into a one-loop coil with one end of the hose connected to an airflow meter and the other end of the hose supplied with air at the minimum specified supply pressure. The connection shall be in the plane of the loop. The other end of the hose will be pulled tangentially to the loop and in the plane of the loop until the hose straightens. To meet the requirements of this test the loop shall maintain a uniform near-circular shape and ultimately unfold as a spiral, without any localized deformation that decreases the flow of air to less than 90 percent of the flow when the hose is tested while remaining in a straight line.
Strength of hose and couplings.	Hose and couplings shall not separate or fail when tested with a pull of 113 kg. (250 pounds) for 5 minutes.	Same as Type A	Hose and couplings shall not exhibit any separation or failure when tested with a pull of 45 kg. (100 pounds) for 5 minutes and when tested by subjecting them to an internal air pressure of 2 times the maximum respirator-supply pressure that is specified by the applicant or at 173 kN/m. 2 (25 pounds per square inch) gage, whichever is higher.
Tightness	No air leakage shall occur when the hose and couplings are joined and the joint(s) are immersed in water and subjected to an internal air pressure of 35 kN/m. 2 (5 pounds per square inch) gage.	None	Leakage of air exceeding 50 cc. per minute at each coupling shall not be permitted when the hose and couplings are joined and are immersed in water, with air flowing through the respirator under a pressure of 173 kN/m. 2 (25 pounds per square inch) gage applied to the inlet end of the air-supply hose, or at twice the maximum respirator-supply pressure that is specified by the applicant, whichever is higher.
Permeation of hose by gasoline.	The permeation of the hose by gasoline will be tested by immersing 7.6 m. (25 feet) of hose and one coupling in gasoline, with air flowing through the hose at the rate of 8 liters per minute for 6 hours. The air from the hose shall not contain more than 0.01 percent by volume of gasoline vapor at the end of the test.	Same as for Type A	Same as for Type A, except the test period shall be 1 hour.
Detachable coupling	None	None	A hand-operated detachable coupling by which the wearer can readily attach or detach the connecting hose shall be provided at a convenient location. This coupling shall be durable, remain connected under all conditions of normal respirator use, and meet the prescribed tests for strength and tightness of hose and couplings.

Subpart K—Air-Purifying Particulate Respirators

SOURCE: 85 FR 20608, Apr. 14, 2002, unless otherwise noted.

§ 84.170 Air-purifying particulate respirators; description.

(a) *Non-powered air-purifying particulate respirators (series N, R, and P).* (1) Non-powered air-purifying particulate respirators utilize the wearer's negative inhalation pressure to draw the ambient air through the air-purifying filter elements (filters) to remove particulates from the ambient air. They are designed for use as respiratory protection against atmospheres with particulate contaminants at concentrations that are not immediately dangerous to life or health and that contain adequate oxygen to support life.

(2) Non-powered air-purifying particulate respirators are classified into three series, N-, R-, and P-series. The N-series filters are restricted to use in those workplaces free of oil aerosols. The R- and P-series filters are intended for removal of any particulate that includes oil-based liquid particulates.

(3) Non-powered air-purifying particulate respirators are classified according to the efficiency level of the filter(s) as tested according to the requirements of this part.

(i) N100, R100, and P100 filters must demonstrate a minimum efficiency level of 99.97 percent.

(ii) N99, R99, and P99 filters must demonstrate a minimum efficiency level of 99 percent.

(iii) N95, R95, and P95 filters must demonstrate a minimum efficiency level of 95 percent.

(b) *Powered air-purifying particulate respirators (PAPR classes HE and PAPR100).* (1) Powered air-purifying particulate respirators utilize a blower to move the ambient air through the air-purifying filter elements (filters) to remove particulate contaminants and deliver clean air to the respiratory inlet covering. They are designed for use as respiratory protection against atmospheres considered not immediately dangerous to life or health and that contain adequate oxygen to support life.

(2) Powered air-purifying particulate respirators are classified into two classes, HE and PAPR100, and three series, HE, PAPR100–N, and PAPR100–P. The N-series filters are restricted to use in those workplaces free of oil aerosols. The P-series filters are intended for removal of any particulate that includes oil-based liquid particulates.

(3) All three filter series, HE, PAPR100–N, and PAPR100–P, for powered air-purifying particulate respirators must demonstrate a minimum efficiency level of 99.97 percent.

§ 84.171 Required components and attributes.

The components of each air-purifying particulate respirator must meet the minimum construction requirements set forth in subpart G of this part. Each air-purifying particulate respirator described in § 84.170 must, where its design requires, contain the following component parts:

(a) *Respiratory inlet covering.* (1) Tight fitting respiratory inlet coverings must be designed and constructed to fit persons with various facial shapes and sizes either:

(i) By providing more than one size; or

(ii) By providing one size which will fit varying facial shapes and sizes.

(2) Full facepieces must provide for optional use of corrective spectacles or lenses, which must not reduce the respiratory protective qualities of the respirator.

(3) Loose fitting respiratory inlet coverings must be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(4) Mouthpieces must be equipped with noseclips which are securely attached to the mouthpiece or respirator and provide an airtight seal.

(5) Respiratory inlet coverings that incorporate a lens or faceshield must be designed to prevent eyepiece fogging.

(6) Half-mask facepieces must not interfere with the fit of common industrial safety spectacles, including corrective safety spectacles.

(7) Respiratory inlet coverings must be designed and constructed to provide adequate vision which is not distorted by the eyepieces.

(b) *Filter unit.* The respirator manufacturer, as part of the application for certification, must specify the filter series and the filter efficiency level (*i.e.*, ''N95,'' ''R95,'' ''P95,'' ''N99,'' ''R99,'' ''P99,'' ''N100,'' ''R100,'' ''P100,'' ''HE,'' ''PAPR100–N'' or ''PAPR100–P'') for which certification is being sought.

(1) Filters for non-powered respirators (series N, R, and P) must be prominently labeled as follows:

(i) N100 filters must be labeled ''N100 Particulate Filter (99.97% filter efficiency level)'' and must be a color other than magenta.

(ii) R100 filters must be labeled ''R100 Particulate Filter (99.97% filter efficiency level)'' and must be a color other than magenta.

(iii) P100 filters must be labeled ''P100 Particulate Filter (99.97% filter efficiency level)'' and must be color coded magenta.

(iv) N99 filters must be labeled ''N99 Particulate Filter (99% filter efficiency level)'' and must be a color other than magenta.

(v) R99 filters must be labeled ''R99 Particulate Filter (99% filter efficiency level)'' and must be a color other than magenta.

(vi) P99 filters must be labeled ''P99 Particulate Filter (99% filter efficiency level)'' and must be a color other than magenta.

(vii) N95 filters must be labeled as ''N95 Particulate Filter (95% filter efficiency level)'' and must be a color other than magenta.

(viii) R95 filters must be labeled as ''R95 Particulate Filter (95% filter efficiency level)'' and must be a color other than magenta.

(ix) P95 filters must be labeled as ''P95 Particulate Filter (95% filter efficiency level)'' and must be a color other than magenta.

(2) Filters for powered respirators (classes HE and PAPR100) must be prominently labeled as follows:

(i) HE filters must be labeled as ''HE Particulate Filter (99.97% filter efficiency level)'' and must be color coded magenta.

(ii) PAPR100–N filters must be labeled as ''PAPR100–N Particulate Filter (99.97% filter efficiency level)'' and must be color coded magenta.

(iii) PAPR100–P filters must be labeled as ''PAPR100–P Particulate Filter (99.97% filter efficiency level)'' and must be color coded magenta.

(c) *Valves.* (1) Inhalation and exhalation valves must be protected against distortion.

(2) Inhalation valves must be designed and constructed and provided where necessary to prevent excessive exhaled air from adversely affecting filters, except where filters are specifically designed to resist moisture.

(3) Exhalation valves must be:

(i) Provided where necessary;

(ii) Protected against damage and external influence; and

(iii) Designed and constructed to prevent inward leakage of contaminated air.

(d) *Head harness.* (1) All facepieces must be equipped with head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(2) Facepiece head harnesses, except those employed on filtering facepiece respirators, must be adjustable and replaceable.

(3) Mouthpieces must be equipped, where applicable, with adjustable and replaceable harnesses, designed and constructed to hold the mouthpiece in place.

(e) *Breathing tube.* Flexible breathing tubes used in conjunction with respirators must be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces, mouthpieces, or loose fitting respiratory-inlet covering;

(3) Interference with the wearer's activities; and

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

(f) *Drink tube.* (1) For particulate respirators equipped with a drink tube, the respirator must meet all requirements of the standard with the drink tube in place.

(2) Dry drinking tube assembly will be subjected to a suction of 75 mm

water column height while in a normal operating position (closed).

(3) Leakage through the drinking tube assembly must not exceed 30 mL per minute.

(g) *Container.* (1) Except as provided in paragraph (b) of this section, each respirator must be equipped with a substantial, durable container bearing markings which show the applicant's name, the type of respirator it contains, and all appropriate approval labels.

(2) Containers for respirators may provide for storage of more than one respirator; however, such containers must be designed and constructed to prevent contamination of respirators which are not removed, and to prevent damage to respirators during transit.

(h) *Harness.* (1) Each respirator must, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(2) Harnesses must be designed and constructed to permit easy removal and replacement of respirator parts, and, where applicable, provide for holding a full facepiece in the ready position when not in use.

(i) *Attached blower—PAPR classes HE and PAPR100.* Blowers must be designed to achieve the air flow rates required by the testing standards in § 84.175.

(j) *Low-flow warning device—PAPR class PAPR100.* (1) The design must include a low-flow warning. It must actively and readily indicate when flow inside the respiratory inlet covering falls below the minimum air flow defined in § 84.175.

(2) Any warning must be detectable by the wearer without any intervention by the wearer.

(3) Warning devices must be configured so that they may not be de-energized while the blower is energized.

(4) During use, warning devices must not switch off automatically and must not be capable of being switched off by the wearer.

(5) Any warnings which require different reactions by the wearer must be distinguishable from one another.

(6) If the warning provided is audible only, or other warnings are not readily apparent to the wearer, the minimum sound level must be 80 dBA.

§ 84.172 Airflow resistance test.

(a) Resistance to airflow will be measured in the tight-fitting respiratory inlet covering of a complete particulate respirator mounted on a test fixture with air flowing at continuous rate of 85 ±2 liters per minute, before each test conducted in accordance with § 84.173.

(b) Resistance of a complete tight-fitting powered air-purifying particulate respirator system will be measured with the blower off if the manufacturer indicates that the respirator should not be doffed in the event of a blower failure.

(c) The maximum allowable resistance requirements for air-purifying particulate respirators are as follows:

MAXIMUM RESISTANCE

[mm water-column height]

Respirator type	Inhalation		Exhalation
	Initial	Final	
Non-Powered (N, R, and P)	35	N/A	25
Powered (tight fitting) (HE class and PAPR100 class)	50	70	20

§ 84.173 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat must not exceed 30 mL per minute.

§ 84.174 Filter efficiency level determination test—non-powered series N, R, and P filtration.

(a) Twenty filters of each non-powered air-purifying particulate respirator model will be tested for filter efficiency against:

(1) A solid sodium chloride particulate aerosol as per this section, if N-series certification is requested by the applicant.

(2) A dioctyl phthalate (DOP) or equivalent liquid particulate aerosol as per this section, if R-series or P-series certification is requested by the applicant.

(b) Filters including holders and gaskets, when separable, will be tested for filter efficiency level, as mounted on a test fixture in the manner as used on the respirator.

(c) Prior to filter efficiency testing of 20 N-series filters, the 20 to be tested will be taken out of their packaging and placed in an environment of 85 ± 5 percent relative humidity at 38 ± 2.5 °C for 25 ±1 hours. Following the pre-conditioning, filters will be sealed in a gas-tight container and tested within 10 hours.

(d) When the filters do not have separable holders and gaskets, the exhalation valves will be blocked so as to ensure that leakage, if present, is not included in the filter efficiency level evaluation.

(e) For non-powered air-purifying particulate respirators with a single filter, filters will be tested at a continuous airflow rate of 85 ± 4 liters per minute. Where filters are to be used in pairs, the test-aerosol airflow rate will be 42.5 ± 2 liters per minute through each filter.

(f) Filter efficiency test aerosols:

(1) When testing N-series filters, a sodium chloride or equivalent solid aerosol at 25 ± 5 °C and relative humidity of 30 ± 10 percent that has been neutralized to the Boltzmann equilibrium state will be used. Each filter will be challenged with a concentration not exceeding 200 mg/m^3.

(2) When testing R-series and P-series filters, a neat cold-nebulized dioctyl phthalate (DOP) or equivalent aerosol at 25 ± 5 °C that has been neutralized to the Boltzmann equilibrium state will be used. Each filter will be challenged with a concentration not exceeding 200 mg/m^3.

(3) The test will continue until minimum efficiency is achieved or until an aerosol mass of at least 200 ± 5 mg has contacted the filter. For P-series filters, if the filter efficiency is decreasing when the 200 ± 5 mg challenge point is reached, the test will be continued until there is no further decrease in efficiency.

(g) The sodium chloride test aerosol will have a particle size distribution with count median diameter of 0.075 ± 0.020 μm and a standard geometric deviation not exceeding 1.86 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent. The DOP aerosol will have a particle size distribution with count median diameter of 0.185 ± 0.020 μm and a standard geometric deviation not exceeding 1.60 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent.

(h) The efficiency of the filter will be monitored and recorded throughout the test period by a suitable forward-light-scattering photometer or equivalent instrumentation.

(i) The minimum efficiency for each of the 20 filters will be determined and recorded and must be equal to or greater than the filter efficiency criterion listed for each level as follows:

Filter series	Efficiency (%)
P100, R100, N100	≥99.97
P99, R99, N99	≥99
P95, R95, N95	≥95

§ 84.175 Instantaneous filter efficiency level determination test—PAPR series HE, PAPR100–N, and PAPR100–P filtration.

(a) Three filters from each powered air-purifying particulate respirator for efficiency will be tested against a neat cold-nebulized dioctyl phthalate (DOP) or equivalent aerosol at 25 ± 5 °C that has been neutralized to the Boltzmann equilibrium state.

(b) Single air-purifying particulate respirator filter units will be tested in an atmosphere concentration of 100 mg/m^3 of DOP at the following continuous flow rates for a period of 5 to 10 seconds:

Type of respiratory inlet covering	Airflow rate (liters per minute)
Tight-fitting	115
Loose-fitting	170

(c) Powered air-purifying particulate respirators with multiple filter units

will be tested by dividing the flow rate specified in paragraph (b) of this section by the total number of filters used.

(d) The filter will be mounted on a connector in the same manner as used on the respirator and the total efficiency must be ≥99.97 percent.

§ 84.176 Fit test—PAPR classes HE and PAPR100.

NIOSH will assess powered air-purifying respirator fit using either isoamyl acetate or generated aerosol.

(a) *Isoamyl acetate (IAA) fit test.* The applicant must provide a charcoal-filled canister or cartridge of a size and resistance similar to the filter unit with connectors which can be attached to the facepiece in the same manner as the filter unit.

(1) The canister or cartridge will be used in place of the filter unit, and persons will each wear a modified half-mask facepiece for 8 minutes in a test chamber containing 100 parts (by volume) of isoamyl acetate vapor per million parts of air.

(i) The following work schedule will be performed by each wearer in the test chamber:

(A) Two minutes nodding up and down, and turning head side to side; and

(B) Two minutes calisthenic arm movements.

(C) Two minutes running in place.

(D) Two minutes pumping with tire pump.

(ii) The facepiece must be capable of adjustment, according to the applicant's instructions, to each wearer's face, and the odor of isoamyl acetate must not be detectable by any wearer during the test.

(2) Where the respirator is equipped with a full facepiece, hood, helmet, or mouthpiece, the canister or cartridge will be used in place of the filter unit, and persons will each wear the modified respiratory inlet covering for 8 minutes in a test chamber containing 500 parts (by volume) of isoamyl acetate vapor per million parts of air, performing the work schedule specified in paragraph (b)(2) of this section.

(b) *Generated aerosol fit test.* The powered air-purifying particulate respirator system is tested in an atmosphere containing 20–40 mg/m^3 corn oil aerosol having a mass median aerodynamic diameter of 0.4 to 0.6 μm.

(1) The following activities will be performed by each wearer in the test chamber:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and

(iv) Two minutes, pumping with a tire pump into a 28-liter (1 ft^3) container.

(2) The respiratory inlet covering will be adjusted, according to the applicant's instructions, to each wearer's face.

(3) The appropriate fit factor must be exceeded during the entire test.

§ 84.177 Total noise level test—PAPR classes HE and PAPR100.

Noise levels generated by any powered air-purifying respirators that cover the ears (*i.e.*, hood or helmet) will be measured at the entrance to each ear at maximum airflow obtainable and must not exceed 80 dBA.

§ 84.178 Breath response type, airflow resistance test—PAPR classes HE and PAPR100.

Resistance to airflow will be measured with a breathing machine as described in § 84.88.

(a) Minimum inhalation resistance must be greater than zero mm of water-column height.

(b) Maximum exhalation resistance must be less than 89 mm of water-column height.

§ 84.179 Silica dust loading test—PAPR series HE filtration.

(a) Three powered air-purifying particulate respirators will be tested for a period of 4 hours each at a flowrate not less than 115 liters per minute for tight-fitting facepieces, and not less than 170 liters per minute for loose-fitting hoods and helmets.

(b) The relative humidity in the test chamber will be 20–80 percent, and the room temperature approximately 25 °C.

(c) The test suspension in the chamber will not be less than 50 nor more

than 60 mg of flint (99 + percent free silica) per m^3 of air.

(d) The flint in suspension will be 99 + percent through a 270-mesh sieve.

(e) The particle-size distribution of the test suspension will have a geometric mean of 0.4 to 0.6 μm and the standard geometric deviation will not exceed 2.

(f) The total amount of unretained test suspension in samples taken during testing must not exceed 14.4 mg for a powered air-purifying particulate respirator with tight-fitting facepiece, and 21.3 mg for a powered air-purifying particulate respirator with loose-fitting hood or helmet.

§ 84.180 Particulate loading test—PAPR series PAPR100–N and PAPR100–P filtration.

(a) Twenty filters of each powered air-purifying particulate respirator design will be tested for filter efficiency against:

(1) A solid sodium chloride particulate aerosol, in accordance with paragraph (d)(1) of this section, if series PAPR100–N approval is requested by the applicant.

(2) A dioctyl phthalate or equivalent liquid particulate aerosol, in accordance with paragraph (d)(2) of this section, if series PAPR100–P approval is requested by the applicant.

(b) Prior to filter efficiency testing of 20 series PAPR100–N filters, the 20 to be tested will be taken out of their packaging and placed in an environment of 85 ±5 percent relative humidity at 38 ±2.5 °C for 25 ±1 hours. Following the pre-conditioning, filters will be sealed in a gas-tight container and tested within 10 hours.

(c) For powered air-purifying particulate respirators with a single filter, filters will be tested at a continuous airflow rate of 85 ±4 liters per minute. Where filters are to be used in pairs, the test-aerosol airflow rate will be 42.5 ±2 liters per minute through each filter.

(d) Filter efficiency test aerosols:

(1) Series PAPR100–N filters:

(i) A sodium chloride or equivalent solid aerosol at 25 ±5 °C and relative humidity of 30 ±10 percent that has been neutralized to the Boltzmann equilibrium state will be used. Each filter will be challenged with a concentration not exceeding 200 mg/m^3.

(ii) The sodium chloride test aerosol will have a particle size distribution with count median diameter of 0.075 ±0.020 μm and a standard geometric deviation not exceeding 1.86 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent.

(2) Series PAPR100–P filters:

(i) A neat cold-nebulized dioctyl phthalate (DOP) or equivalent aerosol at 25 ± 5 °C that has been neutralized to the Boltzmann equilibrium state will be used. Each filter will be challenged with a concentration not exceeding 200 mg/m^3.

(ii) The DOP aerosol shall have a particle size distribution with count median diameter of 0.185 ±0.020 μm and a standard geometric deviation not exceeding 1.60 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent.

(e) The test will continue until minimum efficiency is achieved or until an aerosol mass of at least 200 ±5 mg has contacted the filter. For PAPR100–P series filters, if the filter efficiency is decreasing when the 200 ±5 mg challenge point is reached, the test will be continued until there is no further decrease in efficiency.

(f) The efficiency of the filter will be monitored and recorded throughout the test period by a suitable forward-light scattering photometer or equivalent instrumentation.

(g) The minimum efficiency for each of the 20 filters will be determined and recorded and must be equal to or greater than the filter efficiency criterion for PAPR100–N and PAPR100–P, efficiency ≥99.97 percent, pursuant to § 84.170(b).

§ 84.181 Communication performance test—PAPR class PAPR100.

(a) Powered air-purifying respirators must be designed to allow for proper communication while worn.

(b) A Modified Rhyme Test[7] will be used to test the wearer's ability to communicate efficiently.

[7] The Modified Rhyme Test is used in speech intelligibility experiments. *See https:// Continued*

(c) The communications requirement is met if the overall performance rating is greater than or equal to 70 percent.

Subpart L—Chemical Cartridge Respirators

§ 84.190 Chemical cartridge respirators: description.

(a) Chemical cartridge respirators including all completely assembled respirators which are designed for use as respiratory protection during entry into or escape from atmospheres not immediately dangerous to life and health, are described according to the specific gases or vapors against which they are designed to provide respiratory protection, as follows:

Type of chemical cartridge respirator [1]	Maximum use concentration, parts per million
Ammonia	300
Chlorine	10
Hydrogen chloride	50
Methyl amine	100
Organic vapor	[2] 1,000
Sulfur dioxide	50
Vinyl chloride	10

[1] Not for use against gases or vapors with poor warning properties (except where MSHA or Occupational Safety and Health Administration standards may permit such use for a specific gas or vapor) or those which generate high heats of reaction with sorbent material in the cartridge.

[2] Maximum use concentrations are lower for organic vapors which produce atmospheres immediately hazardous to life or health at concentrations equal to or lower than this concentration.

(b) Chemical cartridge respirators for respiratory protection against gases or vapors, which are not specifically listed with their maximum use concentration, may be approved if the applicant submits a request for such approval, in writing, to the Institute. The Institute shall consider each such application and accept or reject the application after a review of the effects on the wearer's health and safety and in the light of any field experience in use of chemical cartridge respirators as protection against such hazards.

www.nist.gov/ctl/pscr/modified-rhyme-test-audio-library.

§ 84.191 Chemical cartridge respirators; required components.

(a) Each chemical cartridge respirator described in § 84.190 shall, where its design requires, contain the following component parts:

(1) Facepiece, mouthpiece, and noseclip, hood, or helmet;

(2) Cartridge;

(3) Cartridge with filter;

(4) Harness;

(5) Breathing tube; and

(6) Attached blower.

(b) The components of each chemical cartridge respirator shall meet the minimum construction requirements set forth in subpart G of this part.

§ 84.192 Cartridges in parallel; resistance requirements.

Where two or more cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 84.193 Cartridges; color and markings; requirements.

The color and markings of all cartridges or labels shall conform with the requirements of the American National Standards Institute, American National Standard for Identification of Air-Purifying Respirator Canisters and Cartridges, ANSI K13.1–1973. ANSI K13.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. Copies may be inspected at the NIOSH, National Personal Protective Technology Laboratory, P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

[60 FR 30355, June 8, 1995, as amended at 80 FR 3908, Jan. 26, 2015]

§ 84.194 Filters used with chemical cartridges; location; replacement.

(a) Particulate matter filters used in conjunction with a chemical cartridge

shall be located on the inlet side of the cartridge.

(b) Filters shall be incorporated in or firmly attached to the cartridge and each filter assembly shall, where applicable, be designed to permit its easy removal from and replacement on the cartridge.

§ 84.195 Breathing tubes; minimum requirements.

Flexible breathing tubes used in conjunction with respirators shall be designed and constructed to prevent:

(a) Restriction of free head movement;

(b) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(c) Interference with the wearer's activities; and

(d) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 84.196 Harnesses; installation and construction; minimum requirements.

(a) Each respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 84.197 Respirator containers; minimum requirements.

Respirators shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains and all appropriate approval labels.

§ 84.198 Half-mask facepieces, full facepieces, mouthpieces, hoods, and helmets; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either:

(1) By providing more than one facepiece size; or

(2) By providing one facepiece size which will fit varying facial shapes and sizes.

(b) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(c) Mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or respirator and provide an airtight fit.

(d) Full facepieces shall provide for optional use of corrective spectacles or lenses which shall not reduce the respiratory protective qualities of the respirator.

(e) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

§ 84.199 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepieces.

§ 84.200 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against distortion.

(b) Inhalation valves shall be designed and constructed to prevent excessive exhaled air from entering cartridges or adversely affecting canisters.

(c) Exhalation valves shall be—

(1) Protected against damage and external influence; and

(2) Designed and constructed to prevent inward leakage of contaminated air.

§ 84.201 Head harnesses; minimum requirements.

(a)(1) Facepieces for chemical cartridge respirators other than single-use vinyl chloride shall be equipped with adjustable and replaceable head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(2) Facepieces for single-use vinyl chloride respirators shall be equipped

with adjustable head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped where applicable, with an adjustable and replaceable harness designed and constructed to hold the mouthpiece in place.

§ 84.202 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable and shall not exceed 80 dBA.

§ 84.203 Breathing resistance test; minimum requirements.

(a) Resistance to airflow will be measured in the facepiece, mouthpiece, hood, or helmet of a chemical cartridge respirator mounted on a test fixture with air flowing at a continuous rate of 85 liters per minute, both before and after each test conducted in accordance with §§ 84.206 through 84.207.

(b) The maximum allowable resistance requirements for chemical cartridge respirators are as follows:

MAXIMUM RESISTANCE

[Millimeter water column height]

Type of chemical-cartridge respirator	Inhalation		Exhalation
	Initial	Final [1]	
Other than single-use vinyl chloride respirators:			
For gases, vapors, or gases and vapors	40	45	20
For gases, vapors, or gases and vapors, and particulates	50	70	20
Single-use respirator with valves:			
For vinyl chloride	20	25	20
For vinyl chloride and particulates	30	45	2
Single-use respirator without valves:			
For vinyl chloride	15	20	([2])
For vinyl chloride and particulates	25	40	([2])

[1] Measured at end of service life specified in Table 11 of this subpart.
[2] Same as inhalation.

§ 84.204 Exhalation valve leakage test; minimum requirements.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 84.205 Facepiece test; minimum requirements.

(a) The complete chemical cartridge respirator will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for the respirator together with the approximate measurement of faces they are designed to fit, the Institute will provide test subjects to suit such facial measurements.

(c) Any chemical cartridge respirator part which must be removed to perform the facepiece or mouthpiece fit test shall be replaceable without special tools and without disturbing facepiece or mouthpiece fit.

(d) The facepiece or mouthpiece fit test using the positive or negative pressure recommended by the applicant and described in his instructions will be used before each test.

(e)(1) Each wearer will enter a chamber containing 100 p.p.m. isoamyl acetate vapor for half-mask facepieces, and 1,000 p.p.m. for full facepieces, mouthpieces, hoods, and helmets.

(2) The facepiece or mouthpiece may be adjusted, if necessary, in the test chamber before starting the test.

(3) Each wearer will remain in the chamber for 8 minutes while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and

(iv) Two minutes, pumping with a tire pump into a 28-liter (1 cubic-foot) container.

(4) Each wearer shall not detect the odor of isoamyl-acetate vapor during the test.

§ 84.206 Particulate tests; respirators with filters; minimum requirements; general.

(a) Three respirators with cartridges containing, or having attached to them, filters for protection against particulates will be tested in accordance with the provisions of § 84.207.

(b) In addition to the test requirements set forth in paragraph (a) of this section, three such respirators will be tested, as appropriate, in accordance with the provisions of §§ 84.170 through 84.181; however, the maximum allowable resistance of complete particulate, and gas, vapor, or gas and vapor chemical cartridge respirators shall not exceed the maximum allowable limits set forth in § 84.203.

[60 FR 30355, June 8, 1995, as amended at 85 FR 20607, Apr. 14, 2020]

§ 84.207 Bench tests; gas and vapor tests; minimum requirements; general.

(a) Bench tests will be made on an apparatus that allows the test atmosphere at 50 ±5 percent relative humidity and room temperature, approximately 25 °C, to enter the cartridges continuously at predetermined concentrations and rates of flow, and that has means for determining the test life of the cartridges.

(b) Where two cartridges are used in parallel on a chemical cartridge respirator, the bench test will be performed with the cartridges arranged in parallel, and the test requirements will apply to the combination rather than to the individual cartridges.

(c) Three cartridges or pairs of cartridges will be removed from containers and tested as received from the applicant.

(d) Two air purifying cartridges or pairs of cartridges will be equilibrated at room temperature by passing 25 percent relative humidity air through them at the flow rate of 25 liters per minute (l.p.m.) for 6 hours.

(e) Two air purifying cartridges or pairs of cartridges will be equilibrated by passing 85 percent relative humidity air through them at the flow rate of 25 l.p.m.

(f) All cartridges will be resealed, kept in an upright position, at room temperatures, and tested within 18 hours.

(g) Cartridges will be tested and shall meet the minimum requirements set forth in Table 11 of this subpart.

(h) Powered air-purifying respirators with a cartridge(s) and particulate filter(s) must meet the as-received minimum service-life requirements and half of the equilibrated minimum service-life requirements set forth in table 11 of subpart L using the flows specified in subpart K, § 84.175(b) and equilibrated in accordance with paragraphs (a) through (g) of this section using the flows specified in subpart K, § 84.175(b).

[60 FR 30355, June 8, 1995, as amended at 85 FR 20607, Apr. 14, 2020]

Tables to Subpart L of Part 84

Tables 9–10 [Reserved]

Table 11—Cartridge Bench Tests and Requirements

[42 CFR part 84, subpart L]

Cartridge	Test condition	Test atmosphere		Flowrate (l.p.m.)	Number of tests	Penetration [1] (p.p.m.)	Minimum life [2] (min.)
		Gas or vapor	Concentration (p.p.m.)				
Ammonia	As received	NH_3	1000	64	3	50	50
Ammonia	Equilibrated	NH_3	1000	32	4	50	50
Chlorine	As received	Cl_2	500	64	3	5	35
Chlorine	Equilibrated	Cl_2	500	32	4	5	35
Hydrogen chloride.	As received	HCl	500	64	3	5	50

TABLE 11—CARTRIDGE BENCH TESTS AND REQUIREMENTS—Continued

[42 CFR part 84, subpart L]

Cartridge	Test condition	Test atmosphere		Flowrate (l.p.m.)	Number of tests	Penetration [1] (p.p.m.)	Minimum life [2] (min.)
		Gas or vapor	Concentration (p.p.m.)				
Hydrogen chloride.	Equilibrated	HCl	500	32	4	5	50
Methylamine	As received	$CH_3 NH_2$	1000	64	3	10	25
Methylamine	Equilibrated	$CH_3 NH_2$	1000	32	4	10	25
Organic vapors ..	As received	CCl_4	1000	64	3	5	50
Organic vapors ..	Equilibrated	CCl_4	1000	32	4	5	50
Sulfur dioxide	As received	SO_2	500	64	3	5	30
Sulfur dioxide	Equilibrated	SO_2	500	32	4	5	30

[1] Minimum life will be determined at the indicated penetration.

[2] Where a respirator is designed for respiratory protection against more than one type of gas or vapor, as for use in ammonia and in chlorine, the minimum life shall be one-half that shown for each type of gas or vapor. Where a respirator is designed for respiratory protection against more than one gas of a type, as for use in chlorine and sulfur dioxide, the stated minimal life shall apply.

Subpart M [Reserved]

Subpart N—Special Use Respirators

§ 84.250 Vinyl chloride respirators; description.

Vinyl chloride respirators, including all completely assembled respirators which are designed for use as respiratory protection during entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life, are described according to their construction as follows:

(a) Front-mounted or back-mounted gas masks;

(b) Chin-style gas masks;

(c) Chemical-cartridge respirators;

(d) Powered air-purifying respirators; and

(e) Other devices, including combination respirators.

§ 84.251 Required components.

(a) Each vinyl chloride respirator described in § 84.250 shall, where its design requires, contain the following component parts:

(1) Facepiece;

(2) Canister with end-of-service-life indicator;

(3) Cartridge with end-of-service-life indicator;

(4) Harness;

(5) Attached blower; and

(6) Breathing tube.

(b) The components of each vinyl chloride respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 84.252 Gas masks; requirements and tests.

(a) Except for the tests prescribed in § 84.126, the minimum requirements and performance tests for gas masks, prescribed in Subpart I of this part, are applicable to vinyl chloride gas masks.

(b) The following bench tests are applicable to canisters designed for use with gas masks for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life:

(1) Four canisters will be equilibrated at 25 ±5 °C by passing 85 ±5 percent relative humidity air through them at 64 liters per minute for six hours.

(2) The equilibrated canisters will be resealed, kept in an upright position at room temperature, and tested according to paragraph (b)(3) of this section within 18 hours.

(3) The canisters equilibrated and stored as described in paragraphs (b) (1) and (2) of this section will be tested on an apparatus that allows the test atmosphere at 85 ±5 percent relative humidity and 25 ±5 °C to enter the canister continuously at a concentration of 25 ppm vinyl chloride monomer at a total flow rate of 64 liters per minute.

(4) The maximum allowable penetration after six hours of testing according to paragraph (b)(3) of this section shall not exceed 1 ppm vinyl chloride.

(c) Where canisters are submitted for testing and approval with a service life of more than four hours, the period of

time for testing for vinyl chloride penetration will be performed at 150% of the service life specified in the manufacturer's application. (Example: If a manufacturer requests approval of a respirator for six hours use against exposure to vinyl chloride, the maximum allowable penetration after nine hours of testing shall not exceed 1 ppm vinyl chloride.)

§ 84.253 Chemical-cartridge respirators; requirements and tests.

(a) Except for the tests prescribed in §§ 84.206 and 84.207, the minimum requirements and performance tests for chemical-cartridge respirators prescribed in Subpart L of this part are applicable to replaceable-cartridge and single-use vinyl chloride chemical-cartridge respirators.

(b) The following bench tests are applicable to cartridges designed for use with chemical-cartridge respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life:

(1) Where two cartridges are used in parallel on a chemical-cartridge respirator, the bench test requirements will apply to the combination rather than the individual cartridges.

(2) Four cartridges or pairs of cartridges will be equilibrated at 25 ±5 °C by passing 85 ±5 percent relative humidity air through them at 25 liters per minute for six hours.

(3) The equilibrated cartridges will be resealed, kept in an upright position, at room temperature, and tested according to paragraphs (b)(4) and (b)(5) of this section for other than single-use respirators or according to paragraphs (b)(6) and (b)(7) of this section for single-use respirators within 18 hours.

(4) The cartridges or pairs of cartridges for other than single-use respirators, equilibrated and stored as described in paragraphs (b)(1), (b)(2), and (b)(3) of this section, will be tested on an apparatus that allows the test atmosphere at 85 ±5 percent relative humidity and 25 ±5 °C, to enter the cartridges or pairs of cartridges continuously at a concentration of 10 ppm vinyl chloride monomer at a total flowrate of 64 liters per minute.

(5) The maximum allowable penetration after 90 minutes testing of cartridges or pairs of cartridges for other than single-use respirators, according to paragraph (b)(4) of this section shall not exceed 1 ppm vinyl chloride.

(6) The single-use respirators, equilibrated and stored as described in paragraphs (b)(2) and (b)(3) of this section, will be tested on an apparatus that allows a test atmosphere at 85 ±5 percent relative humidity and 25 ±5 °C to be cycled through the respirator by a breathing machine at a concentration of 10 ppm vinyl chloride monomer at the rate of 24 respirations per minute at a minute volume of 40 ±0.6 liters. Air exhaled through the respirator will be 35 ±2 °C with 94 ±3 percent relative humidity.

(7) The maximum allowable penetration after 144 minutes testing of respirators, according to paragraph (b)(6) of this section, shall not exceed 1 ppm vinyl chloride.

§ 84.254 Powered air-purifying respirators; requirements and tests.

(a) Except for the tests prescribed in § 84.207, the minimum requirements and performance tests for powered air-purifying respirators prescribed in subpart L of this part are applicable to vinyl chloride powered air-purifying respirators.

(b) The following bench tests are applicable to cartridges designed for use with powered air-purifying respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life:

(1) Four cartridges will be equilibrated at 25 ±°C by passing 85 ±5 percent relative humidity air through them at 115 liters per minute for tight-fitting facepieces and 170 liters per minute for loose-fitting hoods and helmets, for six hours.

(2) The equilibrated cartridges will be resealed, kept in an upright position at room temperature and tested according to paragraph (b)(3) of this section within 18 hours.

(3) The cartridges equilibrated and stored as described in paragraphs (b) (1) and (2) of this section will be tested on an apparatus that allows the test atmosphere at 85 ±5 percent relative humidity and 25 ±5 °C to enter the cartridge continuously at a concentration of 25 ppm vinyl chloride monomer at a

total flow rate of 115 liters per minute for tight-fitting facepieces and 170 liters per minute for loose-fitting hoods and helmets.

(4) The maximum allowable penetration after six hours of testing according to paragraph (b)(3) of this section shall not exceed 1 ppm vinyl chloride.

§ 84.255 Requirements for end-of-service-life indicator.

(a) Each canister or cartridge submitted for testing and approval in accordance with §§ 84.252, 84.253, and 84.254 shall be equipped with a canister or cartridge end-of-service-life indicator which shows a satisfactory indicator change or other obvious warning before 1 ppm vinyl chloride penetration occurs. The indicator shall show such change or afford such warning at 80 ±10 percent of the total service life to 1 ppm leakage, as determined by continuing each test described in §§ 84.252(b), 84.253(b), and 84.254(b) until a 1 ppm leakage of vinyl chloride occurs.

(b) The applicant shall provide sufficient pretest data to verify the performance of the end-of-service-life indicator required in paragraph (a) of this section.

§ 84.256 Quality control requirements.

(a) In addition to the construction and performance requirements specified in §§ 84.251, 84.252, 84.253, 84.254, and 84.255, the quality control requirements in paragraphs (b), (c), and (d) of this section apply to approval of gas masks, chemical cartridge respirators, and powered air-purifying respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life.

(b) The respirators submitted for approval as described in paragraph (a) of this section shall be accompanied by a complete quality control plan meeting the requirements of subpart E of this part.

(c)(1) The applicant shall specify in the plan that a sufficient number of samples will be drawn from each bulk container of sorbent material and that where activated carbon is used, the following specific tests will be performed:

(i) Apparent density;

(ii) Iodine number;

(iii) Moisture content;

(iv) Carbon tetrachloride number; and

(v) Mesh size.

(2) The tests in paragraph (c)(1) of this section shall be performed in a quantity necessary to assure continued satisfactory conformance of the canisters and cartridges to the requirements of this subpart.

(d) Final performance quality control tests on the complete canisters and cartridges shall be accomplished using the bench tests and procedures prescribed in §§ 84.252, 84.253, 84.254, and 84.255.

§ 84.257 Labeling requirements.

(a) A warning shall be placed on the label of each gas mask, chemical-cartridge respirator, and powered air-purifying respirator, and on the label of each canister and cartridge, alerting the wearer to the need for a fitting test in accordance with the manufacturer's facepiece fitting instructions, providing service life information, providing specific instructions for disposal, and advising that the wearer may communicate to NIOSH any difficulties that may be experienced in the design and performance of any gas mask, chemical-cartridge respirator, or powered air-purifying respirator approved under the requirements of this subpart. The service lives of respirators meeting the test requirements of this subpart shall be specified as follows:

Chemical-cartridge respirator .....1 hour.
Gas mask .....4 hours.
Powered air-purifying respirator .....4 hours.

(b) Where the service life of a respirator is approved for more than four hours, the service life for which the respirator has been approved will be specified.

Subpart O—Closed-Circuit Escape Respirators

SOURCE: 77 FR 14193, Mar. 8, 2012, unless otherwise noted.

§ 84.300 Closed-circuit escape respirator; description.

The closed-circuit escape respirator (CCER), technically a subset of self-contained breathing apparatus (SCBAs)

which are otherwise covered under subpart H of this part, is used in certain industrial and other work settings in emergencies to enable users to escape from atmospheres that can be immediately dangerous to life and health. Known in the mining community as self-contained self-rescuers (SCSRs), and in other industries as emergency escape breathing devices (EEBDs) or apparatus (EEBAs), CCERs are relied upon primarily by underground coal miners, sailors in federal service, and railroad workers to escape dangerous atmospheres after a fire, explosion, or chemical release. CCERs are commonly worn on workers' belts or stored in close proximity to be accessible in an emergency. They are relatively small respirators, typically the size of a water canteen, that employ either compressed oxygen with a chemical system for removing exhaled carbon dioxide from the breathing circuit, or a chemical that both provides a source of oxygen and removes exhaled carbon dioxide. Users re-breathe their exhalations after the oxygen and carbon dioxide levels have been restored to suitable levels, which distinguishes these ''closed-circuit'' self-contained respirators from ''open-circuit'' self-contained respirators, which vent each exhalation.

§ 84.301 Applicability to new and previously approved CCERs.

(a) Any CCER approval issued after April 9, 2012 must comply with the technical requirements of subpart O.

(b) The continued manufacturing, labeling, and sale of closed-circuit apparatus previously approved under subpart H is authorized for units required for use in underground coal mines pursuant to 30 CFR 75.1714–1.

(c) Any manufacturer-requested modification to a device approved under the subpart H technical requirements must comply with the subpart H technical requirements and address an identified worker safety or health concern to be granted an extension of the NIOSH approval. Major modifications to the configuration that will result in a new approval must meet and be issued approvals under the requirements of this subpart O.

[84 FR 16412, Apr. 19, 2019]

§ 84.302 Required components, attributes, and instructions.

(a) Each CCER must include components and/or attributes appropriate to its design, as follows:

(1) Eye protection: Each CCER must include safety goggles or an escape hood lens that protects against impact, fogging, and permeation by gas, vapor, and smoke, as specified under § 84.308(c);

(2) Thermal exposure indicators: If the manufacturer specifies a maximum and/or minimum environmental temperature limit for storage of the CCER, then the CCER must include a component, an attribute, or other means by which a person can determine whether the CCER has been exposed to temperatures that exceed the limit(s);

(3) Chemical bed physical integrity indicators: If the CCER includes a chemical oxygen storage or chemical carbon dioxide scrubber that can be functionally damaged by impact, vibration, or any other environmental factor to which the CCER might be exposed, then the CCER must include a component, an attribute, or other means by which a person can detect any damage or alteration of the chemical oxygen storage or chemical carbon dioxide scrubber that could diminish the NIOSH-certified performance of the CCER, as tested under this subpart;

(4) Oxygen storage vessel: If the CCER includes an oxygen storage vessel, the vessel must be approved by the U.S. Department of Transportation (DOT) under 49 CFR part 107, ''Hazardous Materials Program Procedures,'' unless exempted under subpart B of 49 CFR part 107;

(5) Tamper-resistant/tamper-evident casing: If the CCER is not designed for its casing to be opened prior to use for an actual escape (e.g., for maintenance, escape drills, or inspection of the components), the casing must include a component, an attribute, or other means to prevent a person from accidentally opening the casing and, upon such opening, to either prevent the casing from being closed or to clearly indicate to a potential user that the casing has been previously opened; and

(6) Moisture damage indicators: If the CCER is not designed for its casing to be opened for inspection of its internal

components, the casing must include a component, an attribute, or other means by which a person can detect any ingress of water or water vapor that could diminish the NIOSH-certified performance, as tested under this subpart.

(7) Oxygen starter indicators: If the oxygen starter is a critical component of the CCER design, then the CCER must include a component, an attribute, or other means by which a person can detect observable damage, premature activation, or recognized potential defect of the starter.

(b) Where an indicator is required, the indication of the occurrence of the monitored condition must be clear and unambiguous: It must not depend on a subjective interpretation of subtle, graduated, or other non-discrete changes to the indicator.

(c) Where an indicator is required, the manufacturer shall provide NIOSH with an explanation of its function and operation, and shall provide relevant data and equipment to allow NIOSH to conduct a thorough evaluation of its accuracy and reliability.

(d) The components of each CCER must meet the general construction requirements specified in § 84.61.

(e) The CCER must be resistant to the permeation of the breathing circuit by gasoline vapors. To verify such resistance, NIOSH will test one unit by applying the gasoline vapor permeation test specified on the NIOSH Web site at *http://www.cdc.gov/niosh/npptl*, using a breathing machine applying a ventilation rate of 40 liters per minute, performing the test for the longest duration achieved by any of the units that underwent the capacity testing specified under § 84.304.

(f) Exposed parts of the CCER must not be composed of metals or other materials that could, upon impact, create frictional sparks or that could store or generate static electrical charges of sufficient energy to ignite flammable gaseous mixtures.

(g) The design, construction, or materials of the CCER must not constitute a hazard to the user as a result of the wearing, inspection, or use of the CCER.

(h) CCER instructions and a service life plan must be provided to purchasers. This document must be clearly written.

(1) Instructions must address the following topics and elements:

(i) An explanation of how the CCER works;

(ii) A schematic diagram of the CCER;

(iii) Procedures for donning and use;

(iv) Procedures for inspecting the operating condition of the CCER;

(v) Procedures and conditions for storage, including but not limited to any recommended minimum and maximum temperatures for storage;

(vi) Limitations on use, including but not limited to any recommended minimum and maximum temperatures for use;

(vii) Procedures for disposal; and

(viii) Procedures for registration of the unit with NIOSH, pursuant to § 84.311.

(2) The service life must be addressed covering at least the following topics:

(i) The maximum number of years, from the date of manufacture, that the unit may remain available for use; this limit is intended to prevent the continued use of a unit that the applicant cannot assure would continue to perform as approved by NIOSH, due to reasonably foreseeable degradation of materials used in its construction;

(ii) Any other conditions, other than that specified under paragraph (h)(2)(i) of this section, that should govern the removal from service of the CCER (including an indication given by the activation or operation of any required indicator showing the monitored condition has occurred); and

(iii) Any procedures by which a user or others should inspect the CCER, perform any maintenance possible and necessary, and determine when the CCER should be removed from service.

(i) Each individual CCER unit approval label shall identify the capacity rating and number of liters of oxygen as determined by the capacity testing, pursuant to § 84.304.

§ 84.303 General testing conditions and requirements.

(a) NIOSH will conduct capacity and performance tests on the CCER using a breathing and metabolic simulator to provide quantitative evaluations and

human subjects on a treadmill to provide qualitative evaluations. Information on the design and operation of the simulator is available from the NIOSH Web site at *http://www.cdc.gov/niosh/npptl*. Technical specifications can be obtained from NIOSH by contacting the National Personal Protective Technology Laboratory (NPPTL) by mail: P.O. Box 18070, 626 Cochrans Mill Road, Pittsburgh, PA 15236. Telephone: 412–386–4000 (this is not a toll-free number). Email: *npptl@cdc.gov*.

(b) Capacity, performance, and wearability tests will continuously monitor the stressors listed in Table 1. The stressors and their respective acceptable ranges will be measured at the interface between the CCER and the mouth by instruments capable of breath-by-breath measurement. Stressor measurements will be evaluated as 1-minute averages. The operating averages of each stressor will be calculated upon the completion of each test as the average of the 1-minute measurements of the stressor recorded during the test. The level of any excursion for a stressor occurring during a test will be defined by the 1-minute average value(s) of the excursion(s).

TABLE 1—MONITORED STRESSORS AND THEIR ACCEPTABLE RANGES

Stressor	Acceptable range operating average	Acceptable range excursion
Average inhaled CO_2	<1.5%	≤4%.
Average inhaled O_2	>19.5%	≥15%.
Peak Breathing Pressures	$\Delta P \leq 200$ mm H_2O	$-300 \leq \Delta P \leq 200$ mm H_2O.
Wet-bulb temperature[1]	<43 °C	≤50 °C.

[1] Wet-bulb temperature is a measurement of the temperature of a wet surface. It represents the temperature of the inhaled breathing gas in the CCER user's trachea.

(c) Capacity and performance tests will conclude when the stored breathing gas supply has been fully expended.

(d) NIOSH will determine a CCER to have failed a capacity, performance, or wearability test if any of the following occurs:

(1) A 1-minute average measurement of any stressor listed in Table 1 occurs outside the acceptable excursion range specified in Table 1; or an average stressor measurement calculated at the completion of a performance or capacity test exceeds the acceptable operating average range specified in Table 1; or

(2) A human subject cannot complete the test for any reason related to the CCER, as determined by NIOSH.

(e) Unless otherwise stated, tests required under this subpart will be conducted at the following ambient conditions:

(1) Ambient temperatures of 23 °C ±3 °C; and

(2) Atmospheric pressures of 735 mm Hg ±15 mm Hg.

§ 84.304 Capacity test requirements.

(a) NIOSH will conduct the capacity test on a total of 8 to 10 of the units submitted for approval, as follows:

(1) Three units will be tested on a breathing and metabolic simulator in the condition in which they are received from the applicant;

(2) Two units will be tested on a breathing and metabolic simulator after being subjected to the environmental treatments specified in § 84.307 of this subpart;

(3) Two units will be tested on a breathing and metabolic simulator at the cold-temperature limit recommended by the manufacturer under § 84.302(h)(1), after the unit has been stored for a minimum of 24 hours at this limit; and

(4) One unit, in the condition in which it is received from the applicant, will be tested by a human subject on a treadmill.

(5) To approve a CCER for use in coal mines, two units will also be tested by a human subject under the specifications of §§ 84.99 and 84.100 that are applicable to man test 4.

(b) The capacity test will begin upon the first inhalation from or exhalation into the unit.

(c) Each unit will be tested at a constant work rate, depending on the capacity value specified by the manufacturer, according to the requirements

specified in Table 2. All volumes are given at standard temperature (0 C) and pressure (760 mm Hg), dry, unless otherwise noted.

(d) NIOSH will rate an approved CCER using the appropriate capacity rating, as specified in Table 2.

TABLE 2—CAPACITY TEST REQUIREMENTS

Capacity rating	Capacity (L of O_2)	VO_2 (L/min)	VCO_2 (L/min)	Ve (L/min)	RF (Breaths/min)
Cap 1	20 ≤L ≤59	2.50	2.50	55	22
Cap 2	60 ≤L ≤79	2.00	1.80	44	20
Cap 3	L ≥80	1.35	1.15	30	18

VO_2 = volume of oxygen consumed per minute; VCO_2 = volume of carbon dioxide produced per minute.
Ve = ventilation rate in liters of air per minute; RF = respiratory frequency.

(e) NIOSH will document the least value achieved by the seven units tested using the breathing and metabolic simulator. NIOSH will quantify this value of achieved capacity within an increment of 5 liters, rounding intermediate values to the nearest lower 5-liter increment.

§ 84.305 Performance test requirements.

(a) NIOSH will conduct the performance test on a total of six of the units submitted for approval, as follows:

(1) Three units will be tested on a breathing and metabolic simulator in the condition in which they were received from the applicant; and

(2) Two units will be tested on a breathing and metabolic simulator after being subjected to the environmental treatments specified in § 84.307; and

(3) One unit will be tested, in the condition in which it was received from the applicant, by a human subject on a treadmill.

(b) Except as provided under paragraph (c) of this section, the performance test will apply a repeating cycle of work rates, according to the sequence and requirements specified in Table 3, until the oxygen supply of the unit is exhausted.

(c) Testing of CCERs with less than 50 liters of capacity, as determined by the capacity testing under § 84.304, will require the submission of additional test units to fully apply the work-rate test sequence and requirements specified in Table 3. The testing of each individual unit will complete the cycle specified in Table 3 until the breathing supply of the initial test unit is exhausted. This initial test unit will then be replaced by a second unit, which will continue the test cycle, beginning at the work rate in the cycle at which the initial unit was exhausted, and completing the full period specified in Table 3 for that work rate before proceeding to the subsequent work rate, if any, specified in Table 3. Each initial testing unit will be replaced as many times as necessary to complete the cycle, not to exceed two replacement units per initial test unit.

(d) The performance test will begin with two exhalations into the unit at the specified ventilation rate and then follow the manufacturer's instructions to determine the design's susceptibility to hypoxia upon initial donning.

TABLE 3—PERFORMANCE TEST REQUIREMENTS

Work-rate test sequence	Duration per cycle (in minutes)	VO_2 (L/min)	VCO_2 (L/min)	Ve (L/min)	RF (breaths/min)
1. Peak	5	3.00	3.20	65.0	25
2. High	15	2.00	1.80	44.0	20
3. Low	10	0.50	0.40	20.0	12

VO_2 = volume of oxygen consumed per minute; VCO_2 = volume of carbon dioxide produced per minute.
Ve = ventilation rate in liters of air per minute; RF = respiratory frequency.

§ 84.306 Wearability test requirements.

(a) NIOSH will conduct the wearability test on a total of three of the units submitted for approval. Three human subjects (two males and one female), one subject per unit, will conduct the test. The three subjects will range in height and weight as follows: One subject of height ≥174 cm and weight ≥90 kg; one subject of either 163 cm ≤height <174 cm, regardless of weight, or 72 kg ≥weight <90 kg, regardless of height; and one subject of height <163 cm and weight <72 kg. All units tested must meet all conditions specified in this section to receive approval.

(b) NIOSH will evaluate the ease and speed with which users can don the CCER, as follows:

(1) Each test subject will be provided with manufacturer instructions, and must be able to don the CCER correctly, isolating the lungs within 30 seconds;[1] and

(2) A CCER must not include any design, construction, or material characteristic that can be anticipated or demonstrated, under plausible conditions, to hinder the user in the correct and timely donning of the CCER.

(c) NIOSH will continuously monitor CCER use by each test subject during the activities specified in Table 4 to evaluate the ability of the CCER to provide an adequate and uninterrupted breathing supply, including but not limited to the requirements of § 84.303(b), without harming or hindering a user. NIOSH will not approve a CCER if the use of any unit during these activities indicates any potential for the CCER to harm or hinder the user or to fail to provide an adequate and uninterrupted breathing supply to the user during reasonably anticipated conditions and activities of an escape.

TABLE 4—WEARABILITY TEST REQUIREMENTS

Activity	Minimum duration
Sitting	1 minute.
Stooped walking	1 minute.
Crawling	1 minute.
Lying on left side	1 minute.
Lying on right side	1 minute.
Lying on back	1 minute.
Bending over to touch toes	1 minute.
Turning head from side to side	1 minute (at least 10 times).
Nodding head up and down	1 minute (at least 10 times).
Climbing steps or a laddermill	1 minute (1 step/second).
Carrying 50-lb bag on treadmill at 5 kph	1 minute.
Lifting 20-lb weight from floor to an upright position	1 minute (at least 10 times).
Running on treadmill at 10 kph	1 minute.

§ 84.307 Environmental treatments.

(a) Four units submitted for approval will be tested for capacity and performance, pursuant to the requirements of §§ 84.303 through 84.305, after exposure to environmental treatments simulating extreme storage temperatures, shock, and vibration.

(b) The units will be stored for 16 hours at a temperature of −45 °C and for 48 hours at a temperature of 71 °C. Units will be returned to room temperature between high and low temperature treatments. The maximum rate of change for thermal loading shall not exceed 3 °C per minute and constant temperatures shall be maintained within ±2 °C.

(c) The units, in the casing in which they are deployed for individual use, will be subjected to physical shock according to the following procedure:

(1) The unit will be dropped six times from a height of 1 meter onto a concrete surface; and

(2) Each drop will test a different orientation of the unit, with two drops along each of its three major axes (top to bottom, left to right, and front to back).

[1] This time limit does not apply to any additional steps that might be required after the lungs are protected to adjust the unit for wear.

(d) The units will be subjected to vibration according to the following procedure:

(1) The unit will be firmly secured to a shaker table, which will be vibrated with motion applied along a single axis for 180 minutes;

(2) The unit will be vibrated one axis at a time along each of three axes for a total of 9 hours; and

(3) The vibration frequency regimen applied to each axis will be cyclical, repeating the sequence and specifications provided in Table 5 every 20 minutes.

TABLE 5—VIBRATION TEST SEQUENCE

Sequence	Frequency (Hertz)	Acceleration g (±peak)
1	5–92	2.5
2	92–500	3.5
3	500–2000	1.5

§ 84.308 Additional testing.

(a) NIOSH will conduct additional tests, as indicated below, on one or more of the units submitted for approval. Each unit tested must meet the conditions specified in these tests for the CCER to receive approval.

(b) NIOSH will perform safety hazard tests on any CCER that stores more than 200 liters of oxygen or that stores compressed oxygen at pressures exceeding 3,000 psi. The applicant must submit 15 units in addition to the 21–23 units required for testing under §§ 84.304 through 84.307. These units will be evaluated for fire and explosion hazards using the tests specified in RI 9333, pages 4–18; RI 8890, pages 6–62; and PRC Report No. 4294, pages 18–62.

(c) NIOSH will perform the following tests on the eye protection (gas-tight goggles or escape hood lens) of one or more units of every CCER submitted for approval:

(1) NIOSH will test the effectiveness of the eye protection against dust using the method specified in ISO 4855–1981(E) Clause 13, Test for protection against dust. The result will be satisfactory if the reflectance after the test is equal to or greater than 80 percent of its value before testing.

(2) NIOSH will test the effectiveness of the eye protection against gas using the method specified in ISO 4855–1981(E), Clause 14, Test for protection against gas. The test must not result in staining of the area enclosed by the eye protection.

(3) NIOSH will test the durability of the eye protection using the method specified in International Standard ISO 4855–1981(E), Sub-clause 3.1, Unmounted oculars. The lens shall not crack or fracture as a result of the test.

(4) NIOSH will test the eye protection's resistance to fogging in accordance with the method specified in BS EN 168:2002, Clause 16, Test for resistance to fogging of oculars. The lens shall remain free from fogging for a minimum of 8 seconds, pursuant to Clause 16.

(d) The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR Part 51. All approved material is available for inspection at NIOSH, National Personal Protection Technology Laboratory (NPPTL), Bruceton Research Center, 626 Cochrans Mill Road, Pittsburgh, PA 15236. To arrange for an inspection at NIOSH, call 412–386–6111. Copies are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(1) British Standards Institute, 389 Chiswick High Road, London W4 4AL, UK, *http://www.bsigroup.com/en/Standards-and-Publications:*

(i) BS EN 168:2002, Personal Eye Protectors—Non-Optical Test Methods, November 2001.

(ii) [Reserved]

(2) International Organization for Standardization, 1, ch. de la Voie-Creuse, Case postale 56, CH–1211 Geneva 20, Switzerland, *http://www.iso.org/iso/store.htm:*

(i) ISO 4855–1981(E), Personal Eye Protectors—Non-Optical Test Methods, First edition April 1, 1981.

(ii) [Reserved]

(3) U.S. Department of the Interior, Bureau of Mines, 2401 E Street, NW., MS #9800, Washington, DC 20241–0001. These reports are also available from NIOSH upon request 1–800–CDC–INFO (232–4636).

(i) Pittsburgh Research Center (PRC) Report No. 4294, Evaluation of the Safety of One-Hour Chemical Self Rescuers, July 1980;

(ii) Report of Investigations (RI) 8890, Evaluation of the Safety of One-Hour Compressed Oxygen Self-Rescuers—Results of Destructive Testing, 1984;

(iii) RI 9333 Evaluation of the Safety of the CSE SR–100 Self-Contained Self-Rescuer, 1991.

§ 84.309 Additional testing and requirements for dockable CCERs.

(a) NIOSH will conduct additional testing of the CCERs that are designed to allow the user to resupply the oxygen source and the carbon dioxide scrubber while using the respirator during an escape.

(1) NIOSH will test the docking mechanism and procedure to ensure that they maintain the integrity of the breathing circuit (against the intake of hazardous fumes or gases) and the continuity of the breathing gas supply throughout the docking process.

(2) NIOSH will test the docking mechanism and procedure to ensure that users can employ the docking process reliably, safely, and quickly under escape conditions.

(b) NIOSH will designate CCERs that pass the tests specified in this section as ''Dockable.''

(c) NIOSH will assign the capacity rating to the dockable CCER, as specified under § 84.304(d), by conducting the capacity testing using only the breathing gas supply included for the initial use of the wearable apparatus.

(d) NIOSH will test the supplemental capacities of all breathing gas resupply units produced by the manufacturer for use with the dockable CCER. Such tests will follow procedures consistent with those specified under § 84.304, including the rating requirements in § 84.304(d). The manufacturer must label the breathing gas resupply unit to indicate its capacity as tested by NIOSH and its compatibility with the CCER for which it is designed.

(e) NIOSH may require the applicant to provide additional units of the CCER and breathing gas resupply units to conduct the testing specified in this section.

(f) NIOSH will not approve a CCER with docking components, with or without the ''Dockable'' NIOSH designation, unless it satisfies the testing and other requirements of this section.

§ 84.310 Post-approval testing.

(a) NIOSH will periodically test the capacity and performance of units of approved CCERs.

(b) NIOSH may test units that are new and/or units that have been deployed in the field and have remaining service life.

(c) NIOSH will conduct such testing pursuant to the methods specified in §§ 84.303 through 84.305, except as provided under paragraphs (c)(1) and (2) of this section:

(1) Post-approval tests may exclude human subject testing and environmental conditioning at the discretion of NIOSH.

(2) The numbers of units of an approved CCER to be tested under this section may exceed the numbers of units specified for testing in §§ 84.304 and 84.305.

(d) Failure of a unit to meet the capacity and performance requirements of this section may result in revocation of the approval for the CCER or in requirements for specific remedial actions to address the cause or causes of the failure.

(e) NIOSH will replace deployed units obtained for testing with new NIOSH-approved units of the same or similar design, at no cost to the employer.

(f) To maintain the approved status of a CCER, an applicant must make available for purchase by NIOSH, within 3 months of a NIOSH purchase request, the number of units requested by the Institute. Within any 12-month period, NIOSH will not request to purchase more than 100 units for post-approval testing.

[77 FR 14193, Mar. 8, 2012, as amended at 84 FR 16412, Apr. 19, 2019]

§ 84.311 Registration of CCER units upon purchase.

(a) The user instructions will include a copy of procedures for registering the units with NIOSH. The applicant can obtain a copy of these procedures from the NIOSH web page: *http://www.cdc.gov/niosh/npptl*.

(b) The applicant shall notify in writing each purchaser of the purpose of registering a unit with NIOSH, as specified under paragraph (c) of this section. If the purchaser is a distributor of the CCER, the applicant must request in writing that the distributor voluntarily notify in writing each of its purchasers of the purpose of registering a unit with NIOSH, as specified under paragraph (c) of this section.

(c) ''The National Institute for Occupational Safety and Health (NIOSH) requests, but does not require, that purchasers of this respirator register each unit with NIOSH. Registration will enable NIOSH, which approved this model of respirator, to attempt to notify you if a problem is discovered that might affect the safety or performance of this respirator. Registration will also assist NIOSH in locating deployed units to periodically evaluate whether this respirator model is remaining effective under field conditions of storage and use.''

Subparts P–JJ [Reserved]

APPENDIX A TO PART 84—ANNUAL (FIXED) RESPIRATOR CERTIFICATION FEES

RESPIRATOR CERTIFICATION FEE SCHEDULE A—ANNUAL (FIXED) FEES

[Implemented on May 26, 2015]

Fee type	Legal citation	Amount	Due date
Maintenance of Product Performance (product audit).	42 CFR 84.20(b)(5)	• Annual fee: $761 per each approval holder. • Variable fee: As billed by NIOSH based on the respirators chosen to be tested each year.	• Upon billing from NIOSH.[1] • October.
Records Maintenance.	42 CFR 84.20(b)(1)	$50 for all listed[2] approvals on file with NIOSH on July 1st of each year.	• Upon billing from NIOSH.[1] • October (beginning in 2015).
Quality Assurance Maintenance (site audit).	42 CFR 84.20(b)(4)	• Annual fee: $3,000 per every manufacturing site registered with NIOSH. • Variable fee:[3] ■ 1 day domestic audit—$2,500 per site. ■ 2 day domestic audit—$5,000 per site. ■ 1 day international audit—$7,500 per site. ■ 2 day international audit—$10,000 per site.	• Upon billing from NIOSH.[1] • October (beginning in 2015).
Maintenance of Testing and Approval Facilities.	42 CFR 84.20(b)(2)	$34 per every listed[2] approval on file with NIOSH on July 1st of each applicable year.	• Upon billing from NIOSH.[1] • October (beginning in 2015).
Maintenance of Test Equipment.	42 CFR 84.20(b)(2)	$36 per every active[4] approval on file with NIOSH on July 1st of each applicable year.	• Upon billing from NIOSH.[1] • October (beginning in 2015).

[1] For the first year that annual fees are in effect, NIOSH will provide manufacturers with a pre-invoice/advanced billing/invoice preview no later than July 1, 2015. The actual invoice will be sent in September 2015.
[2] ''Listed'' approvals include all active and obsolete approvals. The Certified Equipment List (CEL) reflects the current listed approvals maintained by NIOSH. See *http://www.cdc.gov/niosh/npptl/topics/respirators/CEL/default.html.*
[3] Applies to design as well as manufacturing sites.
[4] Does not include obsolete approvals.

[80 FR 3908, Jan. 26, 2015]

APPENDIX B TO PART 84—APPLICATION-BASED RESPIRATOR CERTIFICATION FEES

RESPIRATOR CERTIFICATION FEE SCHEDULE B—APPLICATION-BASED FEES

[Implemented on May 26, 2015]

Fee type	Legal citation	Amount	Due date
Application	42 CFR 84.20(b)(1)	$200 per application submitted	Upon receipt of any application request.
Approval	42 CFR 84.20(b)(1)	$100 per each certificate of approval issued.	Upon completion of the application and granting of an approval number.

RESPIRATOR CERTIFICATION FEE SCHEDULE B—APPLICATION-BASED FEES—Continued

[Implemented on May 26, 2015]

Fee type	Legal citation	Amount	Due date
Approval Modification.	42 CFR 84.20(b)(1)	$50 per each certificate of approval modified.	Upon completion of the application and issuing a modified approval.
Site Qualification	42 CFR 84.20(b)(3)	• Existing approval holder, paper review: $400 per each request to inspect new production facility. • Non-approval holders: ..... ■ Domestic site visit—$2,500 ..... ■ International site visit—$7,500 ...	Upon agreement on the date of the site qualification examination.

Standard Test Procedure	Fee ($)
Testing Fees	
Descriptor:	For testing respirators.
Amount:	See below.
Basis:	Per each test.
Due date:	Upon initiation of testing.
Air-Purifying Respirators	
TEB–APR–STP–0001 Determination of particulate filter penetration (PAPR)	150
RCT–APR–STP–0003—Determination of exhalation resistance	150
TEB–APR–STP–0004—Determination of exhalation valve leakage	300
TEB–APR–STP–0005—Determination of qualitative isoamyl acetate (IAA) facepiece fit test	1,800
TEB–APR–STP–0005A—Determination of qualitative isoamyl acetate (IAA) facepiece fit test	1,800
TEB–APR–STP–0006—Determination of qualitative isoamyl acetate (IAA) facepiece fit test	1,800
TEB–APR–STP–0007—Determination of inhalation resistance	150
RCT–APR–STP–0012—Determination of air flow for powered air-purifying respirators	150
RCT–APR–STP–0014—Determination of leakage of drinking tube and accessories for respirator facepieces	300
RCT–APR–STP–0025—Determination of silica dust loading test for powered air-purifying respirator filters	1,200
RCT–APR–STP–0030—Determination of noise level test, powered air-purifying respirator with hoods or helmets.	450
TEB–APR–STP–0033A—Determination of ammonia service-life test, air-purifying respirators with cartridges	750
TEB–APR–STP–0033B—Determination of ammonia service-life test, air-purifying respirators with canisters	750
TEB–APR–STP–0033C—Determination of ammonia service-life test, powered air-purifying respirators with cartridges.	750
TEB–APR–STP–0033D—Determination of ammonia service-life test, tight-fitting powered air-purifying respirators with gas mask canister(s).	750
RCT–APR–STP–0034—Carbon monoxide service life	750
RCT–APR–STP–0035—Determination of chlorine service life	750
RCT–APR–STP–0036—Determination of chlorine dioxide service life	750
RCT–APR–STP–0037—Determination of a-chloroacetophenone (CN) service life	2,400
RCT–APR–STP–0038—Determination of ethylene oxide service life	450
TEB–APR–STP–0039A—Determination of formaldehyde service-life test, air-purifying respirators with cartridges.	750
TEB–APR–STP–0039B—Determination of formaldehyde service-life test, air-purifying respirators with canisters.	750
TEB–APR–STP–0039C—Determination of formaldehyde service-life test, powered air-purifying respirators with cartridges.	750
RCT–APR–STP–0040—Determination of hydrogen chloride service life	500
RCT–APR–STP–0041—Determination of hydrogen cyanide service life	1,800
RCT–APR–STP–0042—Determination of hydrogen fluoride service life	750
TEB–APR–STP–0043A—Determination of hydrogen sulfide service-life test, air-purifying respirators with cartridges.	750
TEB–APR–STP–0043B—Determination of hydrogen sulfide service-life test, air-purifying respirators with canisters.	750
TEB–APR–STP–0043C—Determination of hydrogen sulfide service-life test, powered air-purifying respirators with cartridges.	750
RCT–APR–STP–0044—Determination of mercury vapor service life	2,400
TEB–APR–STP–0045A—Determination of methylamine service-life test, air-purifying respirators with cartridges.	450
TEB–APR–STP–0045B—Determination of methylamine service-life test, air-purifying respirators with canisters.	450
TEB–APR–STP–0045C—Determination of methylamine service-life test, powered air-purifying respirators with cartridges.	450

Standard Test Procedure	Fee ($)
TEB–APR–STP–0045D—Determination of methylamine service-life test, tight-fitting powered air-purifying respirators with gas mask canister(s).	450
TEB–APR–STP–0046A—Determination of organic vapor (carbon tetrachloride) service-life test, air-purifying respirators with cartridges.	450
TEB–APR–STP–0046B—Determination of organic vapor (carbon tetrachloride) service-life test, air-purifying respirators with cartridges.	450
TEB–APR–STP–0046C—Determination of organic vapor (carbon tetrachloride) service-life test, powered air-purifying respirators with cartridges.	450
TEB–APR–STP–0046D—Determination of organic vapor (carbon tetrachloride) service-life test, tight-fitting powered air-purifying respirators with gas mask canister(s).	450
RCT–APR–STP–0047—Determination of phosphine service life	750
TEB–APR–STP–0048A—Determination of sulfur dioxide service-life test, air-purifying respirators with cartridges.	450
TEB–APR–STP–0048B—Determination of sulfur dioxide service-life test, air-purifying respirators with canisters.	450
TEB–APR–STP–0048C—Determination of sulfur dioxide service-life test, powered air-purifying respirators with cartridges.	450
TEB–APR–STP–0048D—Determination of sulfur dioxide service-life test, tight-fitting powered air-purifying respirators with gas mask canisters.	450
RCT–APR–STP–0050—Determination of O-chlorobenzylidene malononitrile (CS) service life	2,400
TEB–APR–STP–0051—Determination of particulate filter efficiency level for P100 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0052—Determination of particulate filter efficiency level for P99 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0053—Determination of particulate filter efficiency level for P95 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0054—Determination of particulate filter efficiency level for R100 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0055—Determination of particulate filter efficiency level for R99 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0056—Determination of particulate filter efficiency level for R95 series filters against liquid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0057—Determination of particulate filter efficiency level for N100 series filters against solid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0058—Determination of particulate filter efficiency level for N99 series filters against solid particulates for non-powered, air-purifying respirators.	1,200
TEB–APR–STP–0059—Determination of particulate filter efficiency level for N95 series filters against solid particulates for non-powered, air-purifying respirators.	1,200
RCT–APR–STP–0060—Determination of end-of-service-life indicator drop	300
RCT–APR–STP–0061—Determination of end-of-service-life indicator visibility	300
RCT–APR–STP–0062—Determination of nitrogen dioxide service life	750
RCT–APR–STP–0063—Determination of facepiece carbon dioxide and oxygen concentration levels—tight fitting, powered air-purifying respirators, with the blower unit running.	300
RCT–APR–STP–0064—Determination of facepiece carbon dioxide and oxygen concentration levels, tight fitting, powered air-purifying respirators, with the blower unit off.	300
RCT–APR–STP–0065—Determination of air flow resistance, breath responsive, powered air-purifying respirators.	300
RCT–APR–STP–0066—Determination of end-of-service-life indicator (ESLI)	300
RCT–APR–STP–0067—Particulate respirator qualitative fit test utilizing saccharin or bitrex solutions	1800
Air-Supplied Respirators	
RCT–ASR–STP–0100—Determination of strength of hoses and couplings, type C and CE supplied-air respirators.	150
RCT–ASR–STP–0101—Determination of tightness of hoses and couplings, type C and CE supplied-air respirators.	150
RCT–ASR–STP–0102—Determination of nonkinkability of hoses, type C and CE supplied-air respirators	150
RCT–ASR–STP–0103—Determination of gasoline permeation of hoses and couplings, type C and CE supplied-air respirators.	450
RCT–ASR–STP–0104—Determination of air-regulating valve 100,000 cycles performance, demand and pressure-demand type C and CE supplied-air respirators.	3,000
RCT–ASR–STP–0105—Determination of airflow, continuous flow type C and CE supplied-air respirators	300
RCT–ASR–STP–0105A—Determination of airflow, demand and pressure-demand type C and CE supplied-air respirators.	300
RCT–ASR–STP–0106—Determination of inhalation airflow resistance, pressure-demand type C and CE supplied-air respirators.	150
RCT–ASR–STP–0107—Determination of exhalation airflow resistance, pressure-demand type C and CE supplied-air respirators.	150
RCT–ASR–STP–0108—Determination of inhalation airflow resistance, demand type C and CE supplied-air respirators.	150
RCT–ASR–STP–0109—Determination of exhalation airflow resistance, demand type C and CE supplied-air respirators.	150

Standard Test Procedure	Fee ($)
RCT–ASR–STP–0110—Determination of gas-tightness test, isoamyl acetate (IAA), type C and CE supplied-air respirators.	450
RCT–ASR–STP–0111—Determination of air velocity and noise levels—sound level, type C and CE supplied-air respirators.	450
RCT–ASR–STP–0112—Determination of the level of protection provided by abrasive blast, type CE supplied-air respirators using a challenge aerosol of NaCl (sodium chloride) or corn oil.	450
RCT–ASR–STP–0113—Determination of airflow resistance—continuous-flow, type C and CE supplied-air respirators.	150
RCT–ASR–STP–0114—Determination of sound-level measurement—escape, open-circuit self-contained breathing apparatus using hoods or helmets.	450
RCT–ASR–STP–0115—Determination of rated service time—constant-flow, escape, open-circuit self-contained breathing apparatus.	150
RCT–ASR–STP–0116—Determination of airflow resistance—continuous-flow, escape, open-circuit self-contained breathing apparatus with hoods.	150
RCT–ASR–STP–0117—Determination of positive pressure—closed-circuit, pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0118—Determination of low temperature operation—minimum temperature per applicant, open-circuit self-contained breathing apparatus.	1,200
RCT–ASR–STP–0119—Determination of low-temperature operation—minimum temperature per applicant, combination open-circuit self-contained breathing apparatus and type C and CE supplied-air respirators.	1,200
RCT–ASR–STP–0120—Determination of positive pressure—open-circuit, pressure-demand self-contained breathing apparatus.	75
RCT–ASR–STP–0121—Determination of rated service time—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	75
RCT–ASR–STP–0121A—Determination of rated service time—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	75
RCT–ASR–STP–0122—Determination of exhalation breathing resistance—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0123—Determination of gas flow measurements—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0124—Determination of remaining service-life indicator—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0124A—Determination of alarm pressure—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0125—Determination of gas tightness—isoamyl acetate (IAA)—self-contained breathing apparatus with facepieces and mouthpieces.	750
RCT–ASR–STP–0125A—Determination of gas tightness—isoamyl acetate (IAA)—self-contained breathing apparatus with hoods or helmets.	750
RCT–ASR–STP–0126—Determination of by-pass valve flow—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0127—Determination of by-pass valve flow—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0128—Determination of accuracy of gauge—self-contained breathing apparatus	150
RCT–ASR–STP–0132—Determination of inhalation breathing resistance—open-circuit, demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0133—Determination of exhalation breathing resistance—open-circuit, pressure-demand, self-contained breathing apparatus using two second stage regulators.	150
RCT–ASR–STP–0134—Determination of gasoline permeation test on breathing bags—closed-circuit, self-contained breathing apparatus.	750
RCT–ASR–STP–0135—Determination of inhalation and exhalation breathing resistance—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0136—Determination of demand gas flow—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0137—Determination of continuous gas flow on constant flow with demand flow—closed-circuit, self-contained breathing apparatus.	450
RCT–ASR–STP–0138—Determination of safety relief valve operation—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0139—Determination of facepiece carbon dioxide concentrations—self-contained breathing apparatus.	450
RCT–ASR–STP–0140—Man tests—self-contained breathing apparatus	3,000
RCT–ASR–STP–0141—Man test number 5—closed-circuit, self-contained breathing apparatus	150
RCT–ASR–STP–0142—Determination of vibration (Ro-Tap test) for man test number 1—escape, closed-circuit, demand, self-contained breathing apparatus.	750
RCT–ASR–STP–0143—Determination of low-temperature operation—minimum per manufacturer—closed-circuit, self-contained breathing apparatus.	1,200
RCT–ASR–STP–0144—Determination of continuous gas flow on constant flow—closed-circuit, self-contained breathing apparatus.	300
RCT–ASR–STP–0145—Determination of sound level measurements for remaining service-life indicators—self-contained breathing apparatus.	750
RCT–ASR–STP–0146—Determination of diaphragm over-pressurization—open-circuit, self-contained breathing apparatus with belt mounted regulators and breathing tubes.	300
RCT–ASR–STP–0147—Determination of mode transfer test—combination, open-circuit self-contained breathing apparatus and supplied-air respirators (SCBA/SAR).	150

Standard Test Procedure	Fee ($)
RCT–ASR–STP–0148—Determination of remote gauge leak-flow test—open-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0148A—Determination of remote gauge leak-flow test—closed-circuit, demand and pressure-demand, self-contained breathing apparatus.	150
RCT–ASR–STP–0155—Man test number 6—self-contained breathing apparatus using liquefied gas	2,400
Chemical, Biological, Radiologic, Nuclear (CBRN) Air-Purifying and Air-Supplied Respirators	
NIOSH/NPPTL administrative support for all CBRN projects	1,300
# *RCT–CBRN–STP–0200, 0201*—Determination of open-circuit self-contained breathing apparatus (SCBA) performance during dynamic testing against chemical agents of sarin (GB) vapor and distilled sulfur mustard (HD) vapor and liquid—*GB live agent testing.*	6,000
# *RCT–CBRN–STP–0200, 0201*—Determination of open-circuit self-contained breathing apparatus (SCBA) performance during dynamic testing against chemical agents sarin (GB) vapor and of distilled sulfur mustard (HD) vapor and liquid—*HD live agent testing.*	6,000
# *RCT–CBRN–STP–0200, 0201—aerosol process TDA–99M only*	600
CET–APRS–STP–CBRN–0301—Determination of CBRN organic vapor (cyclohexane) service-life test	1,000
CET–APRS–STP–CBRN–0302—Determination of CBRN acid gases (cyanogen chloride) service-life test	2,400
CET–APRS–STP–CBRN–0303—Determination of CBRN acid gases (hydrogen cyanide) service-life test	2,400
CET–APRS–STP–CBRN–0304—Determination of CBRN acid gases (phosgene) service-life test	1,400
CET–APS–STP–CBRN–0305—Determination of CBRN acid gases (hydrogen sulfide) service-life test	800
CET–APRS–STP–CBRN–0306—Determination of CBRN acid gases (sulfur dioxide) service-life test	800
CET–APRS–STP–CBRN–0307—Determination of CBRN acid gases (ammonia) service-life test	1,000
CET–APRS–STP–CBRN–0308—Determination of CBRN nitrogen oxide gases (nitrogen dioxide) service-life test.	1,200
CET–APRS–STP–CBRN–0309—Determination of CBRN hydride gases (phosphine) service-life test	1,000
CET–APRS–STP–CBRN–0310—Determination of CBRN formaldehyde service-life test, air-purifying respirators.	1,000
CET–APRS–STP–CBRN–0311—Laboratory durability conditioning process for environmental, transportation and rough handling use conditions on chemical, biological, radiological, and nuclear (CBRN) respiratory protective devices (RPD) standard conditioning procedure (SCP)—*US Army Research Development and Engineering Command (RDECOM) environmental conditioning.*	20,000
CET–APRS–STP–CBRN–0311—NPPTL environmental conditioning	16,000
CET–APRS–STP–CBRN–0311—RDECOM modified environmental conditioning—minus 125 canisters	16,000
CET–APRS–STP–CBRN–0311—NPPTL modified environmental conditioning—minus 125 canisters	8,000
CET–APRS–STP–CBRN–0312—Determination of field of view for full facepiece chemical biological radiological nuclear (CBRN) respiratory protective devices (RPD).	1,000
TEB–CBRN–APR–STP–0313—Determination of communication performance test for speech conveyance and intelligibility of chemical biological radiological and nuclear (CBRN) full-facepiece air-purifying respirator.	5,000
CET–APRS–STP–CBRN–0314—Determination of lens fogging on full facepiece chemical biological radiological nuclear (CBRN) air-purifying respirator.	3,000
CET–APRS–STP–CBRN–0316—Determination of haze, luminous-transmittance, and abrasion-resistance properties of the primary lens system material for full-facepiece respiratory protective devices (RPD).	2,000
# *RCT–CBRN–APR–STP–0350*—Determination of full facepiece, tight-fitting, negative-pressure, air-purifying respirator (APR) performance during dynamic testing against the chemical agent vapor sarin (GB)—*qualifier live agent testing (QLAT) only.*	7,000
# *RCT–CBRN–APR–STP–0350—remainder live agent testing (RLAT)*	6,000
# *RCT–CBRN–APR–STP–0351*—Determination of full-facepiece, tight-fitting, negative-pressure, air-purifying respirator (APR) performance during dynamic testing against chemical agent distilled sulfur mustard (HD) vapor and liquid CBRN—*qualifier live agent testing (QLAT) only.*	7,000
# *RCT–CBRN–APR–STP–0351—remainder live agent testing (RLAT)*	6,000
# *RCT–CBRN–APR–STP–0350 and RCT–CBRN–APR–STP–0351—aerosol process TDA–99M*	600
TEB–CBRN–APR–STP–0352—Determination of laboratory respirator protection level (LRPL) values for CBRN self-contained breathing apparatus (SCBA) facepieces or CBRN air-purifying respirator (APR)—*LRPL.*	20,000
TEB–CBRN–APR–STP–0352—partial laboratory respirator protection level (LRPL) (in cases where failure occurs with less than 50% of subjects tested).	16,000
* *TEB–CBRN–APR–STP–0353*—Weight and diameter	200
CET–APRS–STP–CBRN–0401—Determination of CBRN organic vapor (cyclohexane) service-life test, air-purifying escape respirators.	1,000
CET–APRS–STP–CBRN–0402—Determination of CBRN acid gases (cyanogen chloride) service-life test, air-purifying escape respirators.	2,400
CET–APRS–STP–CBRN–0403—Determination of CBRN acid gases (hydrogen cyanide) service-life test, air-purifying escape respirators.	2,400
CET–APRS–STP–CBRN–0404—Determination of CBRN acid gases (phosgene) service-life test, air-purifying escape respirators.	1,400
CET–APRS–STP–CBRN–0405—Determination of CBRN acid gases (hydrogen sulfide) service-life test, air-purifying escape respirators.	800
CET–APRS–STP–CBRN–0406—Determination of CBRN acid gases (sulfur dioxide) service-life test, air-purifying escape respirators.	800
CET–APRS–STP–CBRN–0407—Determination of CBRN base gases (ammonia) service-life test, air-purifying escape respirators.	1,000

Standard Test Procedure	Fee ($)
CET–APRS–STP–CBRN–0408—Determination of CBRN nitrogen oxide gases (nitrogen dioxide) service-life test, air-purifying escape respirators.	1,200
CET–APRS–STP–CBRN–0409—Determination of CBRN hydride gases (phosphine) service-life test, air-purifying escape respirators.	1,000
CET–APRS–STP–CBRN–0410—Determination of CBRN formaldehyde service-life test, air-purifying escape respirators.	1,000
CET–APRS–STP–CBRN–0411—Laboratory durability conditioning process for environmental, transportation and rough handling use conditions on chemical, biological, radiological and nuclear (CBRN) (air-purifying or self-contained) escape respirator—*RDECOM environmental conditioning*.	22,000
CET–APRS–STP–CBRN–0411—NPPTL environmental conditioning	20,000
* *CET–APRS–STP–CBRN–0414*—Fogging	4,000
* *CET–APRS–STP–CBRN–0417*—Flammability, heat resistance	14,000
# *CET–APRS–STP–CBRN–0450*—Determination of chemical agent permeation and penetration resistance performance against sarin (GB) vapor of chemical, biological, radiological, and nuclear (CBRN) air-purifying escape respirator—*qualifier live agent testing (QLAT) only.*	7,000
# *CET–APRS–STP–CBRN–0450—remainder live agent testing (RLAT)*	6,000
# *CET–APRS–STP–CBRN–0451*—Determination of chemical agent permeation and penetration resistance performance against sulfur mustard (HD) liquid and vapor of the chemical, biological, radiological, and nuclear (CBRN) air-purifying escape respirator—*qualifier live agent testing (QLAT) only.*	7,000
# *CET–APRS–STP–CBRN–0451—remainder live agent testing (RLAT)*	6,000
# *CET–APRS–STP–CBRN–0450 and CET–APRS–STP–CBRN–0451—aerosol process TDA–99M*	600
TEB–CBRN–APR–STP–0452—Determination of laboratory respirator protection level (LRPL) values for CBRN air-purifying escape respirator—*LRPL*.	20,000
TEB–CBRN–APR–STP–0452—partial LRPL	16,000
CET–APRS–STP–CBRN–0454—Determination of human subject breathing gas (HSBG) concentrations (carbon dioxide and oxygen) for chemical, biological, radiological and nuclear (CBRN) air-purifying escape respirator.	3,500
* *CET–APRS–STP–CBRN–0455*—Human subject breathing gas test	6,000
CET–APRS–STP–CBRN–0456—Determination of practical performance level for chemical, biological, radiological and nuclear (CBRN) (air-purifying or self-contained) escape respirator.	([1])
CET–APRS–STP–CBRN–0499—Determination of donning effectiveness of chemical, biological, radiological and nuclear (CBRN) (air-purifying or self-contained) escape respirator.	([1])
TEB–CBRN–STP–0501—Determination of CBRN organic vapor (cyclohexane) service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,000
TEB–CBRN–STP–0502—Determination of CBRN acid gases (cyanogen chloride) service-life test, tight-fitting powered air-purifying respirators (PAPR).	2,400
TEB–CBRN–STP–0503—Determination of CBRN acid gases (hydrogen cyanide) service-life test, tight-fitting powered air-purifying respirators (PAPR).	2,400
TEB–CBRN–STP–0504—Determination of CBRN acid gases (phosgene) service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,400
TEB–CBRN–STP–0505—Determination of CBRN acid gases (hydrogen sulfide) service-life test, tight-fitting powered air-purifying respirators (PAPR).	800
TEB–CBRN–STP–0506—Determination of CBRN acid gases (sulfur dioxide) service-life test, tight-fitting powered air-purifying respirators (PAPR).	800
TEB–CBRN–STP–0507—Determination of CBRN base gases (ammonia) service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,000
TEB–CBRN–STP–0508—Determination of CBRN nitrogen oxide gases (nitrogen dioxide) service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,200
TEB–CBRN–STP–0509—Determination of CBRN hydride gases (phosphine) service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,000
TEB–CBRN–STP–0510—Determination of CBRN formaldehyde service-life test, tight-fitting powered air-purifying respirators (PAPR).	1,000
TEB–APR–STP–0511–CBRN—Determination of CBRN organic vapor (cyclohexane) service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,000
TEB–APR–STP–0512–CBRN—Determination of CBRN acid gases (cyanogen chloride) service-life test, loose-fitting powered air-purifying respirators (PAPR).	2,400
TEB–APR–STP–0513–CBRN—Determination of CBRN acid gases (hydrogen cyanide) service-life test, loose-fitting powered air-purifying respirators (PAPR).	2,400
TEB–APR–STP–0514–CBRN—Determination of CBRN acid gases (phosgene) service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,400
TEB–APR–0515–CBRN—Determination of CBRN acid gases (hydrogen sulfide) service-life test, loose-fitting powered air-purifying respirators (PAPR).	800
TEB–APR–STP–0516–CBRN—Determination of CBRN acid gases (sulfur dioxide) service-life test, loose-fitting powered air-purifying respirators (PAPR).	800
TEB–APR–STP–0517–CBRN—Determination of CBRN base gases (ammonia) service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,000
TEB–APR–STP–0518–CBRN—Determination of CBRN nitrogen oxide gases (nitrogen dioxide) service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,200
TEB–APR–STP–0519–CBRN—Determination of CBRN hydride gases (phosphine) service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,000
TEB–APR–STP–0520–CBRN—Determination of CBRN formaldehyde service-life test, loose-fitting powered air-purifying respirators (PAPR).	1,000

Standard Test Procedure	Fee ($)
NPPTL–STP–CBRN–PAPR–0550—Determination of CBRN powered air-purifying respirator (PAPR) performance during dynamic testing against the chemical agent vapor sarin (GB) chemical, biological, radiological and nuclear (CBRN) standard testing procedure (STP).	7,000
NPPTL–STP–CBRN–PAPR–0551—Determination of CBRN, powered air-purifying respirator (PAPR) performance during dynamic testing against chemical agent distilled sulfur mustard (HD) vapor and distilled sulfur mustard (HD) liquid chemical, biological, radiological, and nuclear (CBRN) standard testing procedure (STP).	7,000
TEB–CBRN–APR–STP–0552—Determination of laboratory respirator protection level (LRPL) values for CBRN tight-fitting powered air-purifying respirator (PAPR).	20,000
TEB–CBRN–APR–STP–0553—Determination of laboratory respiratory protection level (LRPL) values for CBRN loose-fitting powered air-purifying respirator (PAPR).	20,000
New and Unspecified Tests	
This category is to be used for new, on-going, tests which are developed between revisions of the test fee schedule or for special, one-time tests which are required for respirators with unique features (per 42 CFR 84.63).	([2])

*Draft test procedure in place, but final STP has not been published.
#Test is conducted by U.S. Army Research, Development and Engineering Command Edgewood Chemical Biological Center (ECBC).
[1]No Fee, done as part of LRPL (TEB–CBRN–APR–STP–0452).
[2]$500/day + the actual cost of non-NPPTL staff (typically medical staff and test subjects).

[80 FR 3908, Jan. 26, 2015]

PART 85—REQUESTS FOR HEALTH HAZARD EVALUATIONS

Sec.
85.1 Applicability.
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85.3 Procedures for requesting health hazard evaluations.
85.3–1 Contents of a request for health hazard evaluations.
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85.11 Notification of determination to employers, affected employees, and Department of Labor.
85.12 Subsequent requests for health hazard evaluations.

AUTHORITY: Sec. 8(g), 84 Stat. 1600; 29 U.S.C. 657(g) and sec. 508, 83 Stat. 803; 30 U.S.C. 957.

SOURCE: 37 FR 23640, Nov. 7, 1972, unless otherwise noted.

§ 85.1 Applicability.

This part 85 applies to health hazard evaluations requested by any employer or authorized representative of employees under section 20(a)(6) of the Occupational Safety and Health Act of 1970 or section 501(a)(11) of the Federal Mine Safety and Health Act of 1977. This part is not intended to preclude the use of other channels of communication with the National Institute for Occupational Safety and Health to obtain information and technical assistance concerning toxic substances or physical agents.

[45 FR 2652, Jan. 14, 1980]

§ 85.2 Definitions.

Any term defined in the Occupational Safety and Health Act of 1970 or the Federal Mine Safety and Health Act of 1977 and not defined below shall have the meaning given it in the respective Acts. As used in this part:

OSH Act means the Occupational Safety and Health Act of 1970 (29 U.S.C. 651, *et seq.*).

FMSH Act means the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801, *et seq.*).

Authorized representative of employees means any person or organization meeting the conditions specified in § 85.3–1(e) (1), (2), or (3).

Employee has the same meaning as stated in the OSH Act and for the purposes of this part includes *miner* as defined in the FMSH Act.

Employer has the same meaning as stated in the OSH Act and for the purposes of this part includes *Operator* as defined in the FMSH Act.