# Body of Knowledge

Respiratory Protection Program
Administration and Fit Testing

AIHA
*Protecting Worker Health*

# About AIHA®

Founded in 1939, the American Industrial Hygiene Association® (AIHA®) is one of the largest international associations serving the needs of industrial/ occupational hygiene professionals practicing in industry, government, labor, academic institutions, and independent organizations.

*For more information, visit* **www.AIHA.org**

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# Background

AIHA® and its appointed members and volunteers worked collaboratively to develop the technical framework, known as the Body of Knowledge (BoK), that outlines the knowledge and skills a competent person should possess and be able to demonstrate for respiratory protection program administration and respirator fit testing. In October 2014, a panel of subject-matter experts was selected to develop a BoK and a subsequent Job/Task Analysis (JTA) survey to collect input, perspective, and feedback from relevant stakeholders to identify the essential knowledge and skills required for persons using a respirator and conducting fit tests. The subject-matter-expert project team included representatives from the AIHA® Respiratory Protection Committee, the National Institute of Occupational Safety and Health (NIOSH), the occupational hygiene and environmental professions, and respiratory protection equipment and instrument manufacturers.

In January 2015, the JTA survey was made available to external stakeholders, allied professionals, and AIHA® members and volunteers. The survey results were used to finalize the content for the Respiratory Protection Program Administration and Fit Testing BoK.

The BoK document was approved by the subject-matter-expert project team and the AIHA® Board of Directors in April 2015 and May 2015, respectively.

# Respiratory Protection Program Administration and Fit Testing

*Occupational Definition:*

This document provides an organized summary of the collective knowledge and skills necessary for competent respiratory protection program administration and respirator fit testing. This Body of Knowledge (BoK) will be used by AIHA® to establish a framework for the development of training programs and knowledge / skill-assessment tools, as well as for the improvement of the state of professional occupational hygiene (OH) practice at multiple levels of knowledge and responsibility.

This BoK is not intended to define or stipulate employer hiring criteria. It is the employer's responsibility to ensure that each employee understands his or her specific job and has met the minimum criteria established by relevant regulations, standards, and the specific industry, worksite, or project.

*Skills:*

Performance-based training incorporates performance tasks (performance assessments) that build on content knowledge. These demonstrations of knowledge and skills document competence. At a minimum, competent persons at each knowledge level will be able to successfully demonstrate competence at that knowledge level as outlined in Section 1.

*Demonstration of Competence:*

Demonstration of competence for Respiratory Protection Program Administrators (RPPAs) and Fit Testers may take different forms, such as successful performance on a written or computer-based examination or a hands-on demonstration of skills regarding instrument operation and maintenance.

*Knowledge Areas:*

Section 1 describes the knowledge that constitutes competent Respiratory Protection Program (RPP) implementation and fit testing.

*Knowledge Levels:*

As used in this BoK, "knowledge" is the practical understanding of the subject area, while "skill" is the learned capacity to use knowledge in a practical application, to do something that comes from training, experience, or practice. Knowledge and skills combined form the measurable competencies summarized in this document. From employee/user to supervisor to RPPA, the knowledge areas generally illustrate increasing professional experience and responsibility as defined below and in Section 1. The fit tester level is considered separate, outside of the user-supervisor-administrator hierarchy.

> **Employee/User Level** - Works under close supervision with review by supervisor to ensure compliance with proper procedures; uses the proper respiratory protection equipment when and where appropriate and in accordance with the organization's RPP.

> **Supervisor Level** - Has direct contact with and supervises employees who wear respirators. Has working knowledge of the work-area processes, respirator use in the work area, and the supervisor obligations found in the RPP. When using respiratory protection equipment, displays proper use in accordance with the organization's RPP.

> **Respiratory Protection Program Administrator (RPPA) Level** - Administers the organization's RPP in accordance with applicable standards and guidelines; has a high level of knowledge about pertinent standards and workplace-specific hazards or knows where to obtain that information; and has experience and training commensurate with the complexity of the RPP to be administered. At some worksites, the RPPA may function as one component of a larger multidisciplinary team that can include occupational hygiene, safety, operations, maintenance, purchasing, and other pertinent areas.

> **Fit Tester Level** - Conducts respirator fit testing in accordance with applicable protocols and standards. May or may not have other responsibilities within the RPP. Documents fit test outcomes.

# Competence Levels for Respiratory Protection Program Administration and Fit Testing

## 1.0 | Respiratory Protection Program (RPP) Requirements

*Employee/User Level*

**1.1.** Understands that the organization has an RPP and knows where to go and/or whom to ask for information about that RPP

**1.2.** Knows who is the designated RPP administrator for your assigned facility location

**1.3.** Demonstrates an awareness and understanding of physiological limitations created by the respirator

**1.4.** Understands the functions, capabilities, and limitations of assigned respirators

*Supervisor Level - In addition to Employee/User Level knowledge:*

**1.5.** Ensures compliance with RPP requirements

**1.6.** Demonstrates knowledge of and, where possible, implements the occupational hygiene hierarchy of controls

**1.7.** Demonstrates an awareness of when employees should be included in the RPP

**1.8.** Distinguishes between voluntary and required respirator use and knows RPP requirements in voluntary-use situations

**1.9.** Models/demonstrates behavior consistent with RPP requirements when in the workplace

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**1.10.** Develops and administers the RPP

**1.11.** Interfaces with licensed healthcare providers and other disciplines as related to medical qualification of employees to use respirators and, when appropriate, bioassay and other aspects of medical surveillance that may reflect the adequacy of respiratory protection

**1.12.** Identifies standard requirements for written RPP content, including policies, procedures, and requirements for written-program updates

**1.13.** Identifies all aspects of the site-specific RPP content (all respirators, training, qualification, implementation for use, and program record keeping)

**1.14.** Identifies appropriate place of RPP in the context of hierarchy of controls, feasibility, and employee safety during RPP implementation

**1.15.** Applies knowledge of the procedures and guidelines outlined in the RPP to the worksite

*Fit Tester Level*

**1.16.** Conducts and documents respirator fit testing in accordance with the RPP

**1.17.** Is familiar with the organization's overall RPP content and device options in order to respond to employee questions or refer them to the appropriate source

**1.18.** Knows where to refer fit test subjects with questions that the fit tester cannot answer

# 2.0 | Medical Evaluations

*Employee/User Level*

**2.1.** Understands the need for an initial medical evaluation

**2.2.** Assesses and understands medical evaluation outcome before using a respirator

**2.3.** Communicates to a responsible individual, as identified in the RPP, changing physical conditions that affect the ability to wear a respirator and/or the quality of fit for the respirator

**2.4.** Knows what medical conditions interfere with/prevent respirator use

*Supervisor Level - In addition to Employee/User Level knowledge:*

**2.5.** Assesses current assigned workforce medical evaluation status to allow each employee to wear a specific respirator

**2.6.** Identifies changes in workplace conditions or employee's health that may prompt additional medical evaluations

**2.7.** Understands employee limitations on respirator use related to the medical or workplace conditions in which the respirator will be used

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**2.8.** Complies with the Health Insurance Portability and Accountability Act (HIPAA) for employee medical information

**2.9.** Implements medical-evaluation procedures for voluntary respirator use and training requirements

**2.10.** Directs follow-up examinations within the RPP

**2.11.** Directs use of an Occupational Safety and Health Administration (OSHA) or an international equivalent Respirator Medical Evaluation Questionnaire prior to respirator use

**2.12.** Understands what medical conditions interfere with safe respirator use

**2.13.** Identifies variables that affect burden on employee health

*Fit Tester Level*

**2.14.** Understands what medical changes require an employee to undergo another medical evaluation

**2.15.** Understands requirements for medical evaluations as a prerequisite for fit testing

# 3.0 | Training

*Employee/User Level*

**3.1.**    Attends required respirator training at assigned frequencies

*Supervisor Level - In addition to Employee/User Level knowledge:*

**3.2.**    Ensures employees complete training on all the respiratory protection devices used by employees reporting to the Supervisor

**3.3.**    Ensures that employees are provided with and attend an adequate training program, as required by applicable standards

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**3.4.**    Identifies necessary training for employees covered by RPP

*Fit Tester Level*

**3.5.**    Observes employees in confirming donning procedures for the respirator and performing user-seal checks

**3.6.**    Attends manufacturers' training for qualitative or quantitative fit test equipment, if applicable

**3.7.**    Complies with manufacturers' guidelines for use of qualitative and quantitative fit test equipment

**3.8.**    Obtains respirator manufacturers' guidance for fit testing their respirators where appropriate

# 4.0 | Respirator Fit Testing

*Employee/User Level*

**4.1.** Understands the need to be medically evaluated and trained in specific respirator use before a fit test

**4.2.** Demonstrates an understanding of requirements for completing an initial fit test and retest at the frequency required by the RPP

**4.3.** Identifies respirator brand, model, material type (e.g., silicone, Hycar®, Ethylene Propylene Diene Monomer [EPDM]), and size with which the employee has previously passed a fit test

**4.4.** Knows what personal protective equipment (PPE) will affect respirator fit

*Supervisor Level - In addition to Employee/User Level knowledge:*

**4.5.** Identifies required training and fit testing for the type of device the employee wears

**4.6.** Understands requirements for fit test status to be current

**4.7.** Understands the physical requirements for employees being fitted with a respirator or tested with a respiratory protection device, as applicable

**4.8.** Recognizes physical changes that would require an employee to be retested (e.g., weight loss/gain, dentures)

**4.9.** Ensures the employee takes his or her PPE along for fit test

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**4.10.** Identifies technical specifications of the fit testing equipment

**4.11.** Recognizes respirator-specific testing protocols to be followed during fit tests

**4.12.** Identifies technical requirements to conduct and document fit using qualitative and quantitative methods, each as applicable

**4.13.** Establishes the fit tester qualification to be capable of operating fit test equipment, interpreting fit test results, and diagnosing / troubleshooting equipment faults

**4.14.** Evaluates fit tester competence

**4.15.** Considers the results of a fit test in selecting the appropriate respirator

*Fit Tester Level*

**4.16.**    Follows quantitative (QNFT) and/or qualitative (QLFT) fit test protocols and knows when each is applicable

**4.17.**    Follows proper protocols when fit testing an employee who wears contact lenses

**4.18.**    Follows proper protocols when fit testing an employee who wears glasses

**4.19.**    Conducts troubleshooting for fit test equipment

**4.20.**    Identifies respirator brand, model, material type, size, and typical fitting characteristic

**4.21.**    Identifies risks posed to employees by irritants used in QLFT, if applicable

**4.22.**    Identifies technical specifications of the fit testing equipment

**4.23.**    Integrates hoods and other personal protective equipment (PPE) to determine whether other PPE affects respirator fit

**4.24.**    Interprets failed fit tests, low overall fit factors, and suspicious high overall fit factors

**4.25.**    Recognize physical changes that would require an employee to be retested (e.g., weight loss/gain, dentures)

**4.26.**    Select or create an appropriate environment for the fit test

**4.27.**    Demonstrates an understanding of proper operation of the fit testing equipment and interpretation of fit test results

**4.28.**    Understands the importance of respirator comfort to ensure effectiveness of the fit test

**4.29.**    Understands the physical requirements of the work assignment for employees being fitted with a respirator or tested with a respirator, as applicable

# 5.0 | Hazard Determination

*Employee/User Level*

**5.1.** Knows whom to contact at the worksite for information regarding hazards and foreseeable emergencies requiring respirator use

*Supervisor Level - In addition to Employee/User Level knowledge:*

**5.2.** Identifies hazard profile for work area

**5.3.** Identifies physical state of hazard agent (particulate, gas, or vapor or some combination thereof)

**5.4.** Evaluates variability of exposures at different times and between different employees so that all employees are protected at all times

**5.5.** Recognizes foreseeable emergencies during respirator use (e.g., loss of air supply actions)

**5.6.** Identifies type(s) of hazard(s) specific to the work environment (e.g., insufficient oxygen or harmful levels of chemical, biological, or radiological contaminants) and effects on the human body

**5.7.** Identifies engineering and administrative controls being applied for the atmospheric hazard(s) and communicates the necessity of respiratory protection

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**5.8.** Assesses reasonable determination of employee exposures from all available risk assessment data

# 6.0 | Respirator Selection

*Supervisor Level*

**6.1.** Identifies the types of respirators that have been issued to employees

**6.2.** Identifies type(s) of respirator(s) to be used in a specific work environment

**6.3.** Recognizes when a negative-pressure air-purifying respirator is inadequate and supplied air-respiratory protection is required

**6.4.** Determines the combination of respirator and cartridge or filter to be deemed appropriate for a given task and hazard profile

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**6.5.**   Understands the relationship between monitoring data and respirator selection

**6.6.**   Selects the appropriate type of respirator that provides adequate protection for each contaminant present or anticipated

**6.7.**   Understands how workplace and employee factors such as environmental temperature affect respirator performance and reliability in order to properly align respirator use with the specific work situation

**6.8.**   Identifies the respirator(s) to be used in Immediately Dangerous to Life or Health (IDLH) atmospheres

**6.9.**   Identifies the respirator(s) to be used in non-IDLH atmospheres

**6.10.**   Accesses additional technical resources on respirator certifications for unique applications (e.g., confined space rescue); investigations of defects or circumstances of respirator failure; or certification status (U.S. and non-U.S. certification bodies) as appropriate

*Fit Tester Level*

**6.11.**   Selects a respirator that will likely fit the employee from a selection of brands, models, and sizes

**6.11.**   Ensures an appropriate fit factor is obtained by the employee when tested with the specified respirator

# 7.0 | Respirator Maintenance and Care

*Employee/User Level*

**7.1.**   Conducts proper procedures for cleaning and disinfecting respirator facemasks

**7.2.**   Communicates respirator problems found during inspection or use

**7.3.**   Ensures that manufacturers' recommended maintenance procedures are performed

**7.4.**   Performs required inspections and cartridge or filter changes based on an established schedule or another indicator, such as end-of-service-life indicators (ESLI) or noticeable changes when breathing through filter

**7.5.**   Ensures proper procedures for respirator storage are implemented per manufacturers' recommendations

# 7.0 | Respirator Maintenance and Care
*...continued*

**7.6.** Demonstrates an understanding of ESLI and its limitations

**7.7.** Recognizes when to remove a respirator from service

**7.8.** Evaluates individual respirator maintenance and condition

**7.9.** Understands replacement requirements for disposable respirators

*Supervisor Level - In addition to Employee/User Level knowledge:*

**7.10.** Ensures compliance with worksite's RPP requirements

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**7.11.** Ensures that the RPP requirements address respirator storage for emergency use

**7.12.** Identifies requirements for and limitations of end-of-service-life indicators (ESLI) for certified respirators

**7.13.** Ensures that the RPP requirements address the schedules for maintenance and cartridge changes

**7.14.** Identifies requirements for manufacturer and/or certifying body notifications for component or respirator failure

**7.15.** Understands degrading effects of oils and solvents on respirators and filters

**7.16.** Identifies requirements for self-contained breathing apparatus (SCBA) maintenance technicians to have necessary certifications

*Fit Tester Level*

**7.17.** Recognizes when to remove a respirator from service

**7.18.** Evaluates individual respirator maintenance and condition

**7.19.** Performs manufacturers' recommended maintenance procedures, if established as a duty in the RPP

# 8.0 | Proper Use of Respirators

*Employee/User Level*

**8.1.**    Assesses conditions that require emergency exit from the work area

**8.2.**    Dons the respirator properly

**8.3.**    Understands personal medical conditions that interfere with respirator use

**8.4.**    Locates "safe area" where respirator can be removed

**8.5.**    Performs a user-seal check at each donning

**8.6.**    Properly disposes of used cartridges, filters, and canisters

**8.7.**    Recognizes when to leave work area to monitor integrity of respirator

**8.8.**    Demonstrates proper use of a respirator in Immediately Dangerous to Life or Health (IDLH) environments, if applicable (including requirements for Standby personnel, emergency response and rescue assistance, when to enter IDLH environment, etc.)

**8.9.**    Performs proper exit procedures when using air-supplied respiratory protection equipment if air supply is disrupted during use

*Supervisor Level - In addition to Employee/User Level knowledge:*

**8.10.**    Ensures no interference with face-piece seal or valve functions

**8.11.**    Ensures employees perform a user-seal test before every use

**8.12.**    Knows the physical requirements for employees when wearing a negative-pressure air-purifying respirator

**8.13.**    Integrates all aspects of PPE ensemble with respirator

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**8.14.**    Creates appropriate exit procedures to be used if air delivery is terminated to air-supplied respiratory equipment during use and ensures employees are trained on such procedures

**8.15.**    Knows the impact of workplace and employee factors on respirator performance and reliability to be able to monitor for appropriate and effective use of respirators

# 9.0 | Breathing Air Quality and Use

*Employee/User Level*

**9.1.** Performs proper procedures when using and maintaining air-supplied respirators

**9.2.** Knows the importance of specifying that the compressor air intake must be located in an area free of contaminants when supplied air is employed to prevent the entry of contaminants into the breathing air supply

**9.3.** Understands how work-area air-supply system operates in order to recognize failure mode (specifically alarms associated with failure of air-quality parameter such as high temperature/high carbon monoxide)

**9.4.** Understands the specifications for breathing air couplings to ensure incompatibility with other worksite gas systems

*Supervisor Level - In addition to Employee/User Level knowledge:*

**9.5.** Establishes proper procedures on use and management of supplied air hoses

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**9.6.** Understands specifications for breathing air (i.e., American National Standards Institute (ANSI) / Compressed Gas Association
Commodity Specification for Air, G-7,1-1989 or an equivalent international standard)

**9.7.** Understands specifications for cylinder use and testing (i.e., US Department of Transportation (DOT) 49 CFR, parts 173 and 178 or an equivalent international standard)

**9.8.** Understands requirements for inline air purification

**9.9.** Understands requirements for high temperature or carbon monoxide alarm and frequency of monitoring

**9.10.** Understands restrictions on moisture content of compressed air

**9.11.** Follows performance standards for selection, operation, and maintenance of breathing air compressors

# 10.0 | Regulatory Framework

*Employee/User Level*

**10.1.** Complies with regulations applicable to employee's worksite and work area

**10.2.** Fulfills employee qualification (medical evaluation, respirator fit testing, training) obligations

*Respiratory Protection Program Administrator - In addition to Employee/User Level knowledge:*

**10.3.** Understands the relationship of regulatory requirements of the RPP

**10.4.** Directs implementation of applicable respiratory protection regulatory criteria and alternate hazard-specific regulatory criteria

**10.5.** Identifies responsibilities to implement and enforce RPP in workplace

*Fit Tester Level*

**10.6.** Understands requirements for compliance with applicable regulations (i.e., 29 CFR 1910.134, Appendix A, at a minimum in the U.S. or an equivalent international standard)

# 11.0 | Documentation

*Supervisor Level*

**11.1.** Establishes a change management procedure that documents revisions to hazard profile and resulting respiratory protection decisions (cartridge change schedules)

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**11.2.** Ensures required regulatory and non-regulatory documentation is complete

**11.3.** Ensures records are recorded according to required retention schedule

*Fit Tester Level*

**11.4.** Understands and complies with record-keeping requirements for fit test outcome, size, and model of respirator(s) to be issued to each tested employee

# 12.0 | Program Evaluation

*Supervisor Level*

**12.1.** Conducts regularly scheduled informal field assessment based on routine observation of work practices and monitoring site conditions

*Respiratory Protection Program Administrator - In addition to Supervisor Level knowledge:*

**12.2.** Ensures that the Respiratory Protection Program (RPP) is regularly evaluated

**12.3.** Implements formal program-assessment requirements per applicable standards and industry best practices

# Resources:

The following resources, reviewed by designated Subject-Matter Experts, are provided as one means to gain knowledge in respiratory protection program administration, respirator use, and fit testing:

- ANSI/AIHA Z88.10-2010 *Respirator Fit Testing Methods.* An American Industrial Hygiene Association publication by the ANSI/AIHA Z88.10 Subcommittee; 2010.

- Respiratory Protection Resource Page, Occupational Safety and Health Administration, U.S. Department of Labor. *Includes general guidance, training videos, standards, compliance directives, and links to additional resources.* (https://www.osha.gov/SLTC/respiratoryprotection/guidance.html)

- OSHA Bulletin: General Respiratory Protection Guidance for Employers and Workers. (2011). (https://www.osha.gov/dts/shib/respiratory_protection_bulletin_2011.html)

- OSHA Guidebook: Small Entity Compliance Guide for the Respiratory Protection Standard, OSHA Publication No. 3384 [3384-09]; 2011. (https://www.osha.gov/Publications/3384small-entity-for-respiratory-protection-standard-rev.pdf)

- OSHA Technical Manual (OTM) - TED 01-00-015 [TED 1-0.15A], Section VIII: Chapter2. Respiratory Protection. (https://www.osha.gov/dts/osta/otm/otm_viii/otm_viii_2.html)

- Respirator Trusted-Source Information Page, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. *Includes multiple resources related to selection of NIOSH-approved respirators, cleaning and maintenance, respirator standards, and links to other resources.* (http://www.cdc.gov/niosh/topics/respirators)

- Respiratory Protection. 29 CFR 1910.134, Occupational Safety and Health Administration, U.S. Department of Labor. (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716)

- Use of individual respiratory protection equipment. 10 CFR 20.1703, U.S. Nuclear Regulatory Commission; 2002. (http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-1703.html)

- Comparable non-U.S. standards, as applicable.

- Annex A1, "Evaluation Form for Respiratory Fit Test Operator" of ANSI/AIHA Z88.10-2010, *Respirator Fit Testing Methods.*

- Assigned Protection Factors for the Revised Respiratory Protection Standard OSHA 3352-02-2009. (https://www.osha.gov/Publications/3352-APF-respirators.pdf)

- NIOSH Respirator Selection Logic, Nancy Bollinger, US DHHS / CDC, October 2004. (http://www.cdc.gov/niosh/docs/2005-100/pdfs/05-100.pdf)

- Respiratory Protection Guidelines, American Thoracic Society, *American Journal of Respiratory and Critical Care Medicine*, Vol 154, pp 1153-1165, 1996. (http://www.thoracic.org/statements/resources/eold/resp1-13.pdf)

- NIOSH Fact Sheet – What's Special About Chemical, Biological, Radiological, and Nuclear (CBRN) Air-Purifying Respirators (APR)? 2013. (http://www.cdc.gov/niosh/docs/2013-157/pdfs/2013-157.pdf)

- Respiratory Protection – A Manual and Guideline, AIHA, 3rd ed., 2001.

- Manual of Respiratory Protection Against Airborne Radioactive Material, NUREG/CR-0041; January 2001. (http://pbadupws.nrc.gov/docs/ML0103/ML010310331.pdf)

- USNRC Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection, October, 1999. (http://pbadupws.nrc.gov/docs/ML0037/ML003739512.pdf)

- US Department of Energy, The Department of Energy Respiratory Protection Acceptance Program for Supplied-Air Suits, DOE-STD-1167-2003. (http://www.directives.doe.gov/invoked_standards/doe-std-1167-2003-the-department-of-energy-respiratory-acceptance-program-for-supplied-air-suits)

- National and International Industry Consensus Standards, as Applicable, e.g.:

    ~ ANSI Z88 series standards on respiratory protection

    ~ ISO/TC 094/SC 15 series standards on respiratory protective devices

    ~ NFPA 1404, Standard for Fire Service Respiratory Protection Training

    ~ NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)

    ~ NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services

    ~ NFPA 1989, Standard on Breathing Air Quality for Emergency Services Respiratory Protection