

**CHAPTER 16**  
**PERSONAL PROTECTIVE EQUIPMENT**

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## Chapter 16 PERSONAL PROTECTIVE EQUIPMENT

### I. Introduction

Personal protective equipment (PPE) consists of respiratory protection, hearing protection, protective clothing, and other items worn by miners to protect against hazards. (See CHAPTER 15, NOISE, for discussion of hearing protection.) MSHA does not consider PPE to be an engineering or administrative control for enforcement purposes.

During an inspection or investigation, document the use of PPE to ensure that miners are positively and reliably protected. Whenever personal protective equipment is required by an MSHA standard, the inspector should thoroughly evaluate all aspects of the mine operator's program. Common problems observed in the field include:

- Failure to enforce the use of PPE when overexposures or hazards exist;
- Wearing a respirator when facial hair interferes with the facepiece seal;
- Wearing a respirator with expired or incorrect cartridges or filters;
- Wearing the wrong PPE for the contaminant in question; and
- Using PPE that is damaged, contaminated or beyond its service life.

### II. Definitions

**Breakthrough** - A term applicable to protective equipment (respirator cartridge, clothing, gloves, etc.) when contaminant contact overwhelms the ability of the device to filter or resist the contaminant and provide protection. This can be a function of contaminant concentration and/or the duration of exposure.

**Breakthrough time** - the time elapsed from the initial contact of the chemical on the outside surface of the barrier material until detection on the inside surface; the longer the breakthrough time, the greater the protection.

**Escape-Only Respirator** - a respirator designed for use only during escape from hazardous atmospheres. The capacity of the unit must be sufficient to allow escape.

**Immediately Dangerous to Life or Health (IDLH)** – Conditions that pose an immediate threat to life or health, and conditions that pose an immediate threat of severe exposure to contaminants likely to have adverse delayed effects on health (such as radioactive materials).

**Personal Protective Equipment (PPE)** – includes all items or materials worn by a miner to prevent injury or illness from exposure to a chemical or physical agent, or from physical trauma. Examples include (but are not limited to): hard hats, protective footwear, safety glasses, face shields, goggles, respirators, hearing protectors, safety belts, harnesses and lanyards, gloves, chemical resistant clothing, vibration resistant gloves, and clothing or aprons which reflect heat or protect against contact with hot materials.

**Fit Check** – A functional test of a respirator’s integrity and the face-to-facepiece seal performed each time a respirator is donned. Fit check techniques can vary with respirator type. The manufacturer’s guidance should be followed.

**Qualitative Fit-Test** - A pass/fail evaluation of the fit of a respirator using a challenge agent to test the integrity of the components and the face-to-facepiece seal. This test relies on the wearer’s subjective response. If the wearer detects the presence of the challenge agent, then the respirator is inadequate and others must be tested until one respirator proves to be suitable for the wearer. The four most common types of qualitative fit-testing (based on the challenge agent used) are: irritant smoke; isoamyl acetate (banana oil); saccharin (sweet taste); and Bitrex® (bitter taste).

**Quantitative Fit-Test** – Evaluates the effectiveness of the face-to-facepiece seal by comparing conditions inside the facepiece with the atmosphere. This can be a calculated leakage rate or the relative concentrations of particles inside and outside the facepiece. The individual measure of effectiveness is called a fit factor. It does not rely on the wearer’s senses and responses. The lowest expected average fit factor for a group of trained individuals using the same type of respirator is often used to determine the type of respirator need for a particular exposure. With some adjustments for safety, that measure is known as an assigned protection factor.

**Respirator** - A protective device worn on the face or head of the individual to prevent inhalation of harmful substances in the atmosphere. Respirators must be approved by NIOSH under 42 CFR Part 84 or, if manufactured before July 10, 1998, under 30 CFR Part 11 or 42 CFR Part 84.

### III. Respiratory Protection

Respiratory protection is an interim measure used to protect miners from inhaling hazardous airborne contaminants while engineering and administrative controls are being established. Serious injury or illness can occur if a respirator, even though properly selected, is not fitted as required by the standard.

Inspectors should refer to the Program Policy Manual for instructions on how to combine standards §§56/57.5001 and §§56/57.5005 as one standard when issuing citations and for guidance on enforcement of these requirements. For respirators provided for protection from diesel particulates refer to the specific guidance provided in the compliance directive for that rule.

## A. Respirator Types

Respirators are grouped by the way that they fit to the face, the type of treatment the breathing atmosphere receives, and relation of the pressure inside the facepiece to the atmosphere during inhalation. Components of a respirator include the facepiece, inhalation and exhalation valves, headband(s), and a connection for an air purifying filter or cartridge or a source of supplied air.

1. Facepieces are classed as either:
  - a. **Loose-fitting**, such as hoods or helmets that cover the head completely, or
  - b. **Tight fitting**, including half masks which cover the mouth and chin, and full facepieces which cover the face from the forehead to the chin.

Filtering facepiece respirators or dust masks are considered “tight fitting”. As a general rule, tight fitting units provide more protection than loose fitting facepieces. Full facepieces provide greater protection than half masks.

2. Breathing air is either supplied or filtered:
  - a. **Air purifying respirators** filter contaminants from the air.
  - b. **Supplied air respirators** provide breathable air from an uncontaminated source.

Supplied air is typically selected when the concentration of contaminant is high, unknown, or not appropriate for filters (e.g., oxygen deficiency).

3. Facial movements and the reduction in pressure inside the facepiece during inhalation may allow contaminants to infiltrate into the respirator.
  - a. **Negative pressure respirators** - the pressure inside the respirator during inhalation is less than the pressure outside the respirator.
  - b. **Positive pressure respirators** - the pressure inside the respirator always remains greater than the pressure outside the respirator.

Positive pressure facepieces are less likely to allow any infiltration of contaminant.

**Air-Purifying Respirators (APR)** include negative pressure, tight-fitting respirators and **powered air-purifying respirators (PAPRs)**. These respirators remove contaminants from the outside air prior to inhalation, by passing it through a filter or cartridge containing a solid sorbent such as activated charcoal. Air-purifying respirators do not provide oxygen and must never be used in an oxygen-deficient atmosphere.

**Supplied-Air Respirators (SAR)** may be either positive or negative pressure. There are two types of SARs: the **Air-Line Respirator (ALR)** and the **Self-Contained Breathing Apparatus (SCBA)**. Only SARs are safe for use in oxygen-deficient atmospheres. In IDLH atmospheres, Air-Line Respirators must have auxiliary self-contained breathing capability for escape purposes. Bottled air must be of Grade D (American National Standards Institute – Compressed Gas Association Commodity Specification for Air G-7.1.1989) quality and compressors must be protected from contaminating the air supply with engine exhaust or the thermal decomposition products of lubricating oils (e.g., carbon monoxide). Current NIOSH certifications also limit hose length as a function of approved assemblies.

**Escape-Only Respirators** are intended for use only during escape (emergency exit) from a hazardous atmosphere. No one should use an escape-only respirator to enter or re-enter a hazardous atmosphere for any purpose.

## **B. Respirator Approval**

Respirators must be approved by NIOSH or have a joint MSHA/NIOSH approval\*. Approved respirators bear a certification number on the filter, filter package, respirator box, or some part of the respirator assembly (usually the filtering element, if present).

Any modification to an approved respirator while in use, such as the substitution of another manufacturer's part, voids the approval. Approvals are given to the entire assembly submitted by a manufacturer. Therefore, all of the parts of the assembly must be from the same manufacturer. A respirator can be modified to allow quantitative fit-testing as long as the unit is returned to its original condition prior to use.

*\* Prior to June 1995, respirators were tested and approved under 30 CFR Part 11. These respirators were designated as having a joint MSHA/NIOSH*



*approval. After June 1995, the testing and approval function was assumed by NIOSH under 42 CFR Part 84. However, filter self-rescuers (FSRs), self-contained self-rescuers (SCSRs) for mine escape purposes, and self-contained breathing apparatus (SCBAs) for mine rescue purposes, require a joint MSHA/NIOSH approval under 42 CFR Part 84. Operators can use up their inventory of particulate filters approved under 30 CFR Part 11 as long as the filters are appropriate for the contaminant. Respirators having electrical or electronic components are required to be intrinsically safe under 30 CFR Part 18 when used in gassy mines or where approved equipment is required under Part 57, Subpart T, and must be approved by MSHA.*

### **C. Respiratory Protection Programs**

Whenever required under MSHA standards, such as 30 CFR §§ 56/57.5005, § 57.5060 or § 58.610, a respiratory protection program must be established for selection, maintenance, training, fitting, supervision, cleaning, and use. The program must meet the requirements of the “American National Standards Practices for Respiratory Protection ANSI Z88.2-1969.” The following elements of the ANSI standard are considered to constitute a minimally acceptable program; however, not all of the elements may be relevant to the situation at hand.

1. The operator must establish a standard operating procedure (SOP) governing the selection, use, and maintenance of respirators. If respirators are provided or required for protection against different types of contaminants, a written SOP should be developed. The SOP should be written so that anyone reading it will understand how all of the minimum requirements are addressed, including routine and emergency use.
2. The mine operator must select the respirator on the basis of the hazards to which the miner is exposed. The respirator must be approved for the specific hazards. Other factors such as atmospheric oxygen content, anticipated exposure levels, properties of the contaminant, work environment, and other physical factors must be considered. Each respirator has distinct limitations on its use. The manufacturer’s literature will list the limitations.
3. The miner (respirator user) shall be instructed and trained in the proper use of respirators and their limitations. ANSI Z88.2-1969 states:  
  
“Minimum training shall include the following:  
  
(a) Instruction in the nature of the hazard, whether acute, chronic, or both, and an honest appraisal of what may happen if the respirator is not used.

- (b) Explanation of why more positive control is not immediately feasible. This shall include recognition that every reasonable effort is being made to reduce or eliminate the need for respirators.
  - (c) A discussion of why this is the proper type of respirator for the particular purpose.
  - (d) A discussion of the respirator's capabilities and limitations.
  - (e) Instruction and training in actual use of the respirator (especially a respirator for emergency use) and close and frequent supervision to ensure that it continues to be properly used.
  - (f) Classroom and field training to recognize and cope with emergency situations.
  - (g) Other special training as needed for special use.
4. "Training shall provide the miners opportunity to handle the respirator, have it fitted properly, test its face-to-facepiece seal, wear it in normal air for a long familiarity period, and, finally, to wear it in a test atmosphere." The opportunity to wear the respirator in a test atmosphere is the fit test. All miners required to use respirators must be fit-tested prior to initial use of that particular make, model and size of respirator. Periodic re-testing is advisable but not required unless factors affecting the fit such as weight gain or loss, presence or absence of dentures or scarring is observed. Fit-testing may be either quantitative or qualitative.
5. The operator must be able to demonstrate that the proper respirator was issued to the respirator wearer. This is usually accomplished by recording the fit-test date and results for each wearer, and the respirator assigned or issued to each wearer.
6. Respirators must be inspected routinely before and after each use. Worn or deteriorated parts must be replaced to maintain proper approval. Self-contained breathing apparatus must be thoroughly inspected at least once per month and after each use. The mine operator must keep a record of the inspection dates and findings. A record of the inspection tag may be attached to the respirator or respirator storage container.

7. ANSI states that cleaning and disinfection shall be done “as frequently as necessary to ensure proper protection is provided to the wearer.” A visibly dirty respirator interior could indicate a bad seal, poor storage or that the user removes it while in the work environment. Skin irritation is possible due to contaminant and bacterial accumulation. Daily cleaning of respirators is recommended. Most filtering facepiece units are discarded after use (i.e., dust masks). If respirators are shared, the used respirator will be thoroughly cleaned and disinfected before being issued to another miner.
8. Respirators shall be stored in a convenient, clean, and sanitary location. The respirators must be stored in a manner that protects them against contamination, temperature extremes, and other potentially damaging conditions. This helps to maintain the respirator’s ability to function properly.
9. One individual shall administer the respiratory protection program. The administrator must have “sufficient knowledge of the subject to properly supervise the program.” The respirator program must include regular inspection and evaluation to determine the effectiveness of the program.
10. Additional sources of information for mine operators regarding respiratory protection program formats, methods for establishing SOPs, and appropriate respirator selection and use criteria include:
  - a. Respirator manufacturers;
  - b. NIOSH Publications (available through NIOSH Publication Dissemination Center at 1-800-356-4674): “Guide to Industrial Respiratory Protection” (Pub. No. 87-116); “NIOSH Respirator Selection Logic 2004”, 2005-100; “Respirator Decision Logic” (Pub. No. 87-108); and “NIOSH Guide to the Selection and Use of Particulate Respirators Certified Under 42 CFR 84” (Pub. No. 96-101);
  - c. American Industrial Hygiene Association “Respiratory Protection - A Manual and Guidelines”; and
  - d. Material Safety Data Sheets (MSDS).

**D. Monitoring Respiratory Protection Programs**

See **Appendix A** of this chapter for a list of review items which can be used to determine the adequacy of a mine operator's Respiratory Protection Program. **Appendix B** of this Chapter includes inspection procedures for half-mask respirators.

If any deficiencies are found in an operator's respiratory protection program, note them in the Health Field Notes and take appropriate action in accordance with the Program Policy Manual. Specific information on individuals who are evaluated should include the full-shift exposure limit to document the hazard to which they were exposed, respirator manufacturer and model, NIOSH or MSHA/NIOSH certification number, type of cartridge or filter, fit-testing information, job description, and duties.

**E. Use in Atmospheres Immediately Dangerous to Life and Health (IDLH)**

Under 30 CFR §§ 56/57.5005(c), when respirators are used in atmospheres that are immediately harmful to life, at least one person with back-up equipment and rescue capability must be present in case of failure of the respiratory equipment.

**F. Abrasive Blasting**

30 CFR § 58.610 requires that only respirators approved by NIOSH under 42 CFR Part 84 for abrasive blasting be used. These airline respirators (Type CE) are designed to protect the wearer from the impact of the abrasive material as well as toxic exposure. A special hood or shroud protects the wearer's head and neck, and shielding material protects the viewing windows of the head enclosure. When abrasive blasting is performed, all exposed miners must be protected.

**IV. Self-Rescue Devices for Emergency Escape Only**

According to 30 CFR § 57.15030, a 1-hour self-rescue device approved by MSHA and NIOSH under 42 CFR Part 84 must be made available to each miner working in an underground mine. The device is designed to permit safe egress from a contaminated atmosphere and must be maintained in good condition. Additionally, 30 CFR §57.15031 requires that the self-rescue device be worn or carried on the miner. However, it may be located on the mobile equipment the miner is operating in a readily accessible place, or if wearing or carrying the self-rescuer would create a hazard to the miner, it may be located a distance no greater than 25 feet from the miner.

Single-use filter self-rescuers (FSRs) are the most common type found in metal and nonmetal mining. The FSR will have 14G in its NIOSH certification number. It is

designed to provide respiratory protection against carbon monoxide (resulting from mine fire and explosions) for approximately 60 minutes in atmospheres containing up to 1 percent (10,000 ppm) carbon monoxide. The FSR does not provide protection from an oxygen-deficient atmosphere or from other mine fire gases. Self-contained self-rescuers (SCSRs) that chemically generate oxygen or use compressed oxygen may also be found underground; those units will carry a 13F in the NIOSH certification.

- While the detection and reporting by miners of defective self-rescuers is a part of the training program required under 30 CFR §57.18028, the operator has the final responsibility to see that all self-rescue devices are fully operable and to replace them immediately if they are defective. This responsibility can be discharged successfully only through a regular inspection program conducted by the operator, supplemented by the training of each miner to recognize and report defective self-rescue devices. Items to consider when monitoring a mine operator's self-rescuer program include:
  - Determining approval (NIOSH/MSHA certification should contain 13F or 14G);
  - Availability to miners underground;
  - Examination of devices for defects;
  - Check of the "shelf life" and "service life" of devices;
  - Records of periodic weighing (if applicable), maintenance, replacement;
  - Training given to miners;
  - Records of training; and
  - Frequency of weighing and/or removal from service criteria.

Reference sources include "MSHA IG 2 - Filter Self-Rescue Devices" and NIOSH "Guide to Industrial Respiratory Protection" (Pub. No. 87-116).

## **V. Personal Body Protection**

Personal body protection, as required under 30 CFR Parts 56/57 Subpart N - Personal Protection, includes items or materials worn by a miner to prevent a non-respiratory and non-auditory injury or illness resulting from exposure to a chemical/physical/biological agent or physical trauma. Examples of personal body protection include, but are not limited to, hard hats, protective footwear, safety glasses, face shields, goggles, safety belts and lanyards, harnesses, gloves, chemical-resistant clothing, vibration-resistant gloves, and heat-reflective clothing or aprons.

**A. MSHA Standards**

Safety standards requiring the use of personal protective equipment (PPE) include:

1. 30 CFR §§ 56/57.15002 Hard hats (protection against falling objects);
2. 30 CFR §§ 56/57.15003 Protective footwear;
3. 30 CFR §§ 56/57.15004 Eye protection;
4. 30 CFR §§ 56/57.15005 Safety belts and lines (fall protection);
5. 30 CFR §§ 56/57.15006 Protective equipment and clothing for hazards and irritants;
6. 30 CFR §§ 56/57.15007 Protective equipment or clothing for welding, cutting, or working with molten metal;
7. 30 CFR §§ 56/57.15014 Eye protection when operating grinding wheels; and
8. 30 CFR §§ 56/57.15020 Life jackets and belts.

**Note** - Where chemical hazards are present it is not necessary to demonstrate that an exposure could occur or has occurred. It is only necessary to clearly identify the potential hazard.

**B. Chemical Protection for Skin and Eyes**

Miners must have suitable body protection to prevent/minimize absorption of toxic substances through the skin and eyes as well as prevent damage to the skin and eyes.

1. **Identifying Chemical Hazards** - In order to determine if skin and eye protection is needed, a careful review of the chemicals and process must be conducted. Sources of information include:
  - a. ACGIH TLV<sup>®</sup> Booklet - 'SKIN' notation for material absorbed through the skin as well as characteristics of the hazards;
  - b. NIOSH Pocket Guide to Chemical Hazards;
  - c. Mine operator's process flow sheets; and
  - d. Material Safety Data Sheets.

**Note:** It is important to consider pH in the mining process since both high (i.e., “caustic”) and low (i.e., “acidic”) pH materials can cause damage to the skin and eyes. Very high and very low pH materials can cause permanent, irreversible injury. Physiological reactions to acids and caustics may occur immediately, and/or may become more severe over time (i.e., hours post-exposure). Additionally, once the tissue is damaged, absorption of other chemicals and/or susceptibility to infection can occur more rapidly through the damaged skin.

2. **Analyses of Parts of the Body at Risk** - Identify the parts of the body that need to be protected as well as the extent of time the protection is needed. Since the purpose is to prevent injury, anticipate the accidents that could most likely occur. For example, if a miner's task is to repair chemical lines for two hours per day, it would be reasonable to assume that some protection to the hands would be needed during the entire two hours. It would also be reasonable to expect that a splash could occur which could affect the eyes, face, and front part of chest, legs and feet.
3. **Identification of Equipment Needed** - Once the hazards are analyzed, the necessary equipment can be identified. For example, in the case of the miner who repairs chemical lines for two hours per day, protective materials resistant for at least two hours would be selected, and would be used for long gloves, aprons, and footwear. A face shield would be necessary to protect the face and eyes. Glove selection must consider both chemical protection and the need for finger dexterity. It may be necessary to wear several different types of gloves at the same time to protect against multiple hazards.
4. **Selecting Suitable Chemical-Resistant Protective Equipment** - There is no such thing as totally impermeable clothing or materials. An item simply has a longer (or shorter) breakthrough time for a specific chemical. There is also no single material that is a barrier against all chemical exposures.

Once the chemical hazard has been identified, selection of an adequate chemical-resistant material can be made. Guidance in making appropriate fabric selection may be found in the following:

- a. NIOSH “*Recommendations for Chemical Protective Clothing*” - available over the Internet links from the MSHA home page, the NIOSH *Pocket Guide to Chemical Hazards* CD-ROM, or Chapter 3 in this Health Manual;

- b. Material Safety Data Sheets (MSDS) (Caution: In many cases MSDS are very general or only offer PPE recommendations for emergency use. Do not rely on them as a sole source of information.);
- c. Equipment manufacturer selection tables; and
- d. Other texts such as “*Guide to the Selection of Personal Protective Clothing*” by Arthur D. Little.

It is important to note that several materials may be suitable as a resistant material, depending on the length and type of exposure.

(ANSI Z87.1-1989(R1998) provides guidance for appropriate protection from specific hazards.

5. **Maintenance Programs** - Once items are selected to provide body protection, they must be maintained to ensure adequate protection. Items do not remain resistant forever. Chemicals gradually permeate and degrade the material, allowing possible chemical contact with the skin. Proper cleaning increases the useful life of equipment. Items that are worn and damaged will not provide adequate protection to the user. Equipment maintenance programs must be tailored to the particular equipment, its usage and mine conditions. Maintain the equipment according to the manufacturer’s instructions.

### C. **Physical Agents Protection**

Physical agents, such as ultraviolet radiation and high and low temperatures, can injure the skin and eyes, as well as cause other injuries and illness.

1. **Identifying the Hazard** - Review the process to identify any physical agent hazards which may be encountered. Information sources include:
- a. ANSI Z87.1- 1989(R1998) Practice for Occupational and Educational Eye and Face Protection (especially for welding hazards to the eyes)
  - b. American Welding Society publications
  - c. Encyclopedia of Occupational Hazards
  - d. Equipment manufacturer
  - e. Any operator hazard assessments



2. **Evaluating Protective Equipment** - Review the equipment manufacturer's information to ensure that the equipment being used by the miner provides the necessary protection. Contact the equipment manufacturer if you have technical questions regarding their product and its use.

If you need help in identifying suitable PPE or in evaluating the PPE in use, contact your district health specialist or industrial hygienist.

3. **Maintenance Programs** - As with other personal body protection, protective equipment for physical agents must be maintained to ensure adequate protection to the user. The maintenance program must be tailored to the equipment and use. Review the manufacturer's information on the product and interview the mine operator and miners as necessary to determine actual maintenance practices.

#### **D. Inspection Procedures**

Record all information concerning the need, selection, and use of personal body protection in the general field notes. Also note any deficiencies. Write any citations in accordance with the Program Policy Manual.

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**CHAPTER 16**  
**APPENDIX A:**  
**(NON-MANDATORY)**  
**Evaluating a Mine Operator's**  
**Respiratory Protection Program**

**Chapter 16**  
**Appendix A (NON-MANDATORY)**  
**Evaluating a Mine Operator's**  
**Respiratory Protection Program**

Whenever respirators are in use, whether on a voluntary basis, as part of a company policy, or required by an overexposure, the following items should be reviewed when evaluating a mine operator's respiratory protection program. **The following is a non-mandatory guideline:**

**I. Program Administration**

- Is the program in writing?
- Is there acknowledged employer responsibility?
- Does the program assign:
  - program responsibility?
  - accountability?
  - authority?
- Is program responsibility vested in one individual who is knowledgeable and who can coordinate all aspects of the program at the job site?
- Can feasible engineering controls or work practices eliminate the need for respirators?
- Are feasible engineering controls or work practices being established?
- Are these controls specified?
- Are there written procedures/statements covering the various aspects of the program, including:
  - designation of an administrator?
  - respirator selection?
  - respirators that are MSHA/NIOSH certified?
  - medical evaluations of respiratory users? (**Note:** NIOSH and more recent versions of ANSI Z88.2 recommend medical evaluations of respirator users prior to issuance.)
  - issuance of equipment?
  - fit-testing?
  - training?
  - maintenance, storage, repair?
  - inspection?
  - use under special conditions?
  - work area surveillance?

**II. Program Operation**

**General**

- Are working conditions and miner exposures properly surveyed?
- Are selections made by individuals knowledgeable of proper selection criteria?

- Are selections based on the contaminants to which miners are exposed?
- Do the respirators provide adequate protection for the specified hazard and concentration of the contaminant?
- Is fit-testing being conducted?
- Are users fit-tested on an as-needed basis (for example, after loss of teeth)?
  
- Are required corrective lenses considered in fit-tests?
- Are approved fit-testing protocols being used?
- Is the fit-test appropriate for the required level of protection?
- Is the face piece-to-face seal tested in a test atmosphere?
- Are users prohibited from wearing respirators in designated work areas when they have facial hair or other characteristics which may cause leakage?
- Are respirators being worn correctly?
- Are respirators that are not individually assigned cleaned and disinfected regularly?
- Are respirators that are issued to individual users cleaned and disinfected as often as necessary?
- Are respirators stored in a manner so as to protect them from dust, sunlight, heat, excessive cold or moisture, or damaging chemicals?
- Are users inspecting respirators before and after wearing and during cleaning?

**Emergency Use Respirators:**

- Are devices designed as “emergency use” inspected at least monthly (in addition to after each use)?
- Are replacement/repair parts those of the manufacturer?
- Are repairs made by experienced individuals?

**IDLH Atmospheres:**

- Has a procedure been developed for usage in atmospheres that are immediately dangerous to life and health (IDLH)?
- Are users trained in the basis for selection of respirators?
- Are users trained in the proper routine and emergency use applications, cleaning, and inspection?

**Recordkeeping:**

- Are records kept (and up-to-date) on:
  - Individual issuance of respirators by model, name, and date?
  - Training (which includes names, dates, topics, etc.)?
  - Fit testing?

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**CHAPTER 16**  
**APPENDIX B:**  
**Visual Inspection of**  
**Half-Mask Respirators**

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## **Chapter 16**

### **Appendix B**

### **Visual Inspection of**

### **Half-Mask Respirators**

This is a sample list of review items which applies only to half-mask, non-powered, tight-fitting, negative pressure air-purifying respirators provided to miners by mine operators and respirators supplied by MSHA to inspectors. It does not apply to full-face respirators, self-contained breathing apparatus (SCBA), supplied air respirators, powered air-purifying respirators, filter-type self-rescuers (FSRs), or self-contained self-rescuers (SCSRs). For other than half-mask respirators, follow the respirator manufacturer's instructions.

#### **A. Facepiece**

1. No excessive dirt or chemicals
2. No cracks, tears, holes or distortion
3. For rubber or plastic face pieces, face piece is soft, flexible and pliable
4. No broken or cracked holders for cartridges or canisters
5. No missing seals or gaskets
6. No broken or cracked valves

#### **B. Head Straps**

1. No breaks, tears or missing straps
2. No loss of strap elasticity
3. No broken or malfunctioning strap buckles
4. Straps are securely attached to face piece

#### **C. Valves**

1. No dust, dirt, or debris in or under seals
2. No cracked, torn, perforated, distorted, or missing valves, valve membranes, or valve covers
3. Valves inserted and seated properly in face piece

#### **D. Air Purifying Elements (cartridges, canisters)**

1. Cartridge, canister, or filter is appropriate for the hazard
2. Connections are tight, with no cross threading
3. Cartridge or canister not cracked, damaged, or missing
4. Cartridge or canister not expired; shelf life and service life conditions not exceeded, for example, cartridges that are to be used for only one shift are discarded at the end of the shift.
5. Proper cartridge, canister manufacturer, and model for respirator

**E. Respirator Use**

1. Persons in occupations required to wear respirators are wearing respirators while in their work place.
2. Respirators are inspected and fit-checked before use, and worn properly:
  - a. Good face seal (subject is clean-shaven everywhere respirator touches face);
  - b. Straps (the proper number of straps are being worn over the head and not over the hard hat, and that they are not too tight, or too loose); and
  - c. Glasses don't interfere with respirator fit or face seal.