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CHAPTER 7.2 RESPIRATORY PROTECTION

7.2.1. Applicability of this chapter

You are required to follow this chapter if you wear a respirator or if you are assigned duties as a Respirator Program Administrator. Paragraph 7.2.13 contains the responsibilities of a Respiratory Program Administrator and Occupational Health.

7.2.2. What this chapter covers

This chapter covers the minimum requirements for using a respirator. This chapter does not meet OSHA requirements for a written Respiratory Protection Program (RPP) plan. You'll find information on the requirements for an RPP and a written RPP plan in paragraph 7.2.12. You'll also find information on respirators designated for emergency use in paragraph 7.2.10.

7.2.3. How to know if you need to use a respirator

7.2.3.1 Respirator use shall follow these requirements:

- a. Employees shall use a respirator if:
 - (1) Their specific job descriptions, work document, or JHA says they need to.
 - (2) The occupational health hazard assessment says they need to.
 - (3) Their supervisor or Respirator Program Administrator says they need to.
 - (4) Applicable regulations or standards require respirator use for the type of work being done.
- b. If their employees need to wear a respirator, an employer shall have a written RPP meeting the requirements of 29 CFR 1910.134, "Respiratory Protection." (See paragraph 7.2.12 below.)
- c. Whenever possible, control air contaminants with engineering controls such as enclosures, ventilation, wet methods, or substitution of less hazardous materials. If these measures don't control the contaminants, or while an engineering fix is being put in place, employees shall use an appropriate respirator to protect themselves. If you suspect that there are airborne contaminants in the work area, have an industrial hygienist evaluate the work area.

7.2.4. Precautions to observe when using a respirator

7.2.4.1 Respirator users shall observe these precautions:

- a. Follow 29 CFR 1910.134(g).
- b. Use a National Institute for Occupational Safety and Health (NIOSH)-approved respirator appropriate for each task and environment as described in paragraph 7.2.5 below.
- c. Don't wear anything that interferes with the face-to-respirator seal. Beards, goatees, long sideburns, and other facial hair shall not come between the face and the respirator facepiece sealing surface. Any job superintendent, a designated competent person, or a Certified Industrial Hygienist who determines if an employee's existing facial hair may prevent the effective use of a respirator shall not allow the employee to work at any job requiring a respirator until the facial hair is removed.

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- d. Employees may wear corrective lenses if they don't interfere with the seal, or get spectacle kits for full-face respirators. Eyeglasses require special mounts inside full-face respirators. Never allow eyeglass temple pieces to penetrate the face seal of the respirator. Contact lenses may be worn when approved by Occupational Health after an evaluation of workplace or task eye injury is conducted per Chapter 5.6, Paragraph 5.6.10.
- e. Use only the respirator assigned. Make sure the respirator is identified as theirs in such a manner that it does not interfere with the respirator's function.
- f. Make sure the work procedure includes a respirator positive and negative pressure check before beginning work. Do positive and negative pressure checks just before entering an area where respirators are required.
- g. Make sure they have a current medical exam and are qualified to wear a respirator as required by 29 CFR 1910.134(e). See Chapter 3.6, "Occupational Healthcare Program," for more requirements on medical exams.
- h. Make sure they have been properly fit-tested for the type of respirator they will use, as described in paragraph 7.2.6 below.
- i. Make sure annual respirator fit-testing and training is current as described in paragraph 7.2.9 below.

7.2.5. Choosing a respirator

7.2.5.1 The Respirator Program Administrator, with the help of an industrial hygienist, shall select the right respirator to use in each situation after a hazard assessment is completed. The selection is based on requirements in 29 CFR 1910.134(d), "Respiratory Protection" and 42 CFR 84. Review work procedures to determine what type respirator to use. Remember:

- a. Never use air-purifying respirators:
 - (1) In oxygen-deficient atmospheres.
 - (2) For hazardous chemicals with inadequate warning properties, unless approved in writing by Occupational Health.
 - (3) In immediately dangerous to life or health (IDLH) atmospheres.
- b. Use only full-facepiece respirators in hazardous areas that irritate eyes.
- c. Employees may voluntarily use an NIOSH-approved disposable dust or mist facepiece filtering respirator only for nuisance dusts in concentrations below OSHA or the American Conference of Governmental Industrial Hygienists (ACGIH) exposure limits. Employees who use them shall follow all aspects of their organization's respiratory protection program. The employer is required to provide 29 CFR 1910.134, Appendix D, "Information for Employees Using Respirators When Not Required Under the Standard."
- d. Make sure to use the appropriate canisters or cartridges for the work environment. Refer to the SDS for the type of hazard and the respirator manufacturer matrix for cartridge selection. Also make sure there is an established changeout schedule for the canisters or cartridges.

7.2.6. Fit testing

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7.2.6.1 Employees shall have a fit test to use a respirator that meets the following requirements:

- a. Performed by Occupational Health or by qualified contractors trained in fit testing procedures. A qualified fit test operator will choose the right-size respirator for the employee.
- b. OSHA protocols in 29 CFR 1910.134(f) and Appendix A.
- c. Is done yearly.

7.2.7. Precautions to take when using a supplied-air respirator

7.2.7.1 In addition to the general precautions listed in paragraph 7.2.4, employees shall follow these requirements for a supplied-air respirator:

- a. Follow 29 CFR 1910.134(i).
- b. All systems providing breathing air for respirators shall be approved by Occupational Health as required in Chapter 6.12, "Safety and Health Requirements for Ground-Based Breathing Gases and Breathing Gas Systems."
- c. Make sure the breathing air meets the requirements for Grade D breathing air as described in the Compressed Gas Association (CGA) Commodity Specification G-7.1 and meets Chapter 6.12
- d. Don't use compressed oxygen in supplied-air respirators or in open-circuit self-contained breathing apparatus (SCBA) that have previously used compressed air. Never use oxygen with air line respirators.
- e. Don't use instrument or utility air supplied by the Central Heating and Cooling Plant for breathing air unless it has been treated, tested, and provided with OSHA-required alarms. Any use of this air requires approval from Occupational Health.
- f. Design air line couplings for use only with breathing air sources. Make sure it is physically impossible to mate air-line couplings with outlets for other non-breathing-air gas systems. Do not use a hose longer than 300 feet. Provide at least 4 cubic feet per minute (CFM) to tight-fitting respirators and 6 CFM for loose-fitting hoods. Make sure the hose will not be in chemicals or crimped by heavy objects such as vehicles or cause a tripping or other safety hazard.
- g. Follow these requirements for compressors:
 - (1) Make sure the compressors are located and installed to keep contaminated air from entering the system.
 - (2) Use suitable in-line air-purifying absorbent beds and filters to further ensure breathing air quality.
 - (3) Make sure the system has a reserve of sufficient capacity to enable employees to escape from a contaminated atmosphere if a compressor fails or overheats.
 - (4) If using an oil-lubricated compressor, make sure it has a high-temperature or carbon monoxide alarm, or both. If it only has a high-temperature alarm, test the air from the compressor for carbon monoxide under 29 CFR 1910.134 and the CGA guidelines.

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- (5) Use manufacturer-recommended lubricants only.
- (6) Make sure the dew point of the air is 10 degrees below ambient temperature to prevent the regulator from freezing.
- h. Follow these requirements when using a supplied-air respirator in an IDLH environment:
 - (1) Use a buddy system when respirators are worn under IDLH conditions.
 - (2) Locate the standby person in a safe area and properly equip him or her with a positive-pressure SCBA to help in case of emergency. Also make sure he or she is in direct contact with emergency response personnel who can help in an emergency.
 - (3) Maintain communication between you and the standby person at all times.
 - (4) For confined spaces, have retrieval equipment so you can be removed from the area if an emergency occurs. See Chapter 6.9, “Entering Confined Spaces and Controlled Areas,” for more information.

7.2.8. Maintaining and storing respirators

7.2.8.1 Respirator users shall inspect, maintain, and store their respirators in the following manner:

- a. Clean and disinfect respirators after each use or at the end of the day.
- b. Store respirators so they are protected from damage, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals. The best way to store it is to place it in a plastic bag or other container. Store it on a shelf or in a box to protect the face piece from scratches and:
 - (1) Never store a respirator in a toolbox; it can become contaminated, distorted, or damaged.
 - (2) Always store a respirator with the face seal pointing up. Otherwise the respirator will become distorted and won’t provide an adequate seal.
- c. Never use one manufacturer’s respirator parts in another manufacturer’s respirator. In particular, never switch cartridges.
- d. Inspect the respirator during cleaning and before each use. Make sure it works properly, fits snugly, the connections are tight, and no part is broken or deteriorated. Remove respirators from service if they don’t pass inspection and either replace them or have a competent person repair them.

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7.2.9. Training to use a respirator

7.2.9.1 Training shall follow 29 CFR 1910.134(k) and include:

- a. The following initial training:
 - (1) General respiratory hazards to which employees may be exposed.
 - (2) Engineering or other controls being used and the need for respirators to provide protection.
 - (3) The operation, limitations, and capabilities of the respirator.
 - (4) How to inspect, don, and remove the respirator.
 - (5) How to check the fit and seals when wearing a respirator.
 - (6) How to use your respirator to become thoroughly confident in and familiar with it.
 - (7) How to maintain and store the respirator.
 - (8) How to identify respirator malfunctions.
 - (9) How to recognize medical signs and symptoms that may limit respirator use.
 - (10) What to do if the respirator malfunctions.
- b. The following from the respirator program administrator:
 - (1) Specific respiratory hazards to which employees may be exposed
 - (2) The content and location of the written respiratory protection program
- c. Yearly training in respirator selection, use, and maintenance for supervisors of respirator users.

7.2.10. Special precautions to take with respirators designated for use in emergencies

7.2.10.1 To maintain an SCBA for entering contaminated areas in emergency situations, employees shall:

- a. Have all IDLH respirator usage approved by Occupational Health.
- b. Inspect it monthly as well as before and after each use.
- c. Keep records of monthly inspection dates and findings in a visible location near the SCBA.
- d. Have the SCBA tanks tested and filled by authorized agents only using air meeting Compressed Gas Association CGA-7.1, "Commodity Specification for Air," for Grade D air. Have the SCBAs inspected by an authorized repair agent as required by DOT 49 CFR Part 180.
- e. Ensure cylinders of purchased breathing air have a certificate of analysis from the supplier indicating the breathing air meets the requirements for Grade D breathing air as required by 1910.134(i)(4)(ii).
- f. Maintain pressure-testing requirements for bottle certification.
 - (1) Use only full face-piece pressure-demand supplied air respirators (SARs) with an auxiliary self-contained air supply or SCBA in an unknown, oxygen-deficient, or IDLH atmosphere.

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(2) Make sure each SCBA used in IDLH atmospheres or for emergency entry or fire fighting is certified for a minimum service life of 30 minutes.

- g. Employees who use SARs and SCBAs shall be trained in their use and limitations.
- h. Follow the requirements in subparagraph 7.2.7.1.g.
- i. Employees who use respirators for escape from IDLH atmospheres, such as Emergency Life Support Apparatus shall receive annual training.

7.2.11. For more information on respirators and their use

- a. 29 CFR 1910.134, [Respiratory Protection](https://www.osha.gov/respiratory-protection) at URL: <https://www.osha.gov/respiratory-protection>
- b. ANSI/AIHA Z88.6-2006, “Respiratory Protection-Respirator Use-Physical Qualifications for Personnel,” 2006
- c. ANSI/AIHA Z88.7-2010, “Color Coding of Air Purifying Respirator Canisters, Cartridges, and Filters,” 2010
- d. ANSI/AIHA Z88.10-2010, “Respirator Fit Test Methods,” 2010
- e. *Department of Transportation Emergency Response Guidebook*, latest edition
- f. CGA-G7.1, “Commodity Specification for Air,” Compressed Gas Association
- g. Part 11, “Asbestos Control Requirements”
- h. NIOSH Respirator Selection Logic 2004, Publication DHHS (NIOSH) Pub. No. 2005–100
- i. NIOSH Guide to Industrial Respiratory Protection, DHHS (NIOSH) Publication No. 87–116, 1987
- j. NIOSH Pocket Guide to Chemical Hazards, DHHS (NIOSH) Publication No. 2005-149, 2005
- k. NIOSH – The [National Personal Protective Equipment Laboratory](https://www.cdc.gov/niosh/npptl/) at URL: <https://www.cdc.gov/niosh/npptl/>
- l. NIOSH [Certified Equipment List](https://www.cdc.gov/niosh/npptl/topics/respirators/cel/default.html) at URL: <https://www.cdc.gov/niosh/npptl/topics/respirators/cel/default.html>

7.2.12. Requirements for a written RPP

7.2.12.1 Each employer or contractor at JSC requiring employees to wear respirators shall:

- a. Appoint a Respirator Program Administrator:

Note: The program administrator for JSC civil servants is a member of Occupational Health.

- b. Establish and implement a written RPP plan meeting all requirements of 29 CFR 1910.134 and have the plan reviewed and approved by Occupational Health, Email to jsc-dl-occ-health@mail.nasa.gov. The plan shall include:

- (1) Responsibilities of the program administrator, respirator user, and other people involved in the respirator program.

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- (2) Identification of all covered workers if they are not actually “employees” of the employer implementing the plan; for example, subcontractors or JSC civil servants following a contractor’s plan.
- (3) Procedures for selecting respirators.
- (4) A list of the activities or hazards for which respirators will be worn and the type of respirator selected.
- (5) A changeout schedule for all air-purifying respirators used for protection against gases and vapors.
- (6) Voluntary respirator use.
- (7) Medical evaluations of employees wearing respirators.
- (8) Fit-testing procedures for tight-fitting respirators.
- (9) A list of who will provide medical evaluations and fit testing if not done by in-house staff.
- (10) Procedures for proper use of respirators in routine and foreseeable emergencies.
- (11) Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.
- (12) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators.
- (13) Training employees on respiratory hazards to which they are potentially exposed.
- (14) Training employees on the proper use of respirators and limitations on their use, on how to put on and remove respirators, on user seal checks, and on the care and maintenance of respirators.
- (15) Procedures for evaluating the effectiveness of the respirator program.

7.2.13. Responsibilities for the respirator protection program

- a. As a Respirator Program Administrator, you are responsible for:
 - (1) Arranging for hazard assessment of work operations by Occupational Health or qualified health and safety professionals.
 - (2) Arranging for employees to be fit-tested, trained, and medically examined through Occupational Health or qualified health providers.
 - (3) Making sure that employees correctly use and maintain their respirators.
 - (4) Providing respirators and training specific to the work area for employees.
 - (5) Maintaining a written RPP with work-site-specific procedures and information. (See paragraph 7.2.12 for the requirements of a written program.) Contact Occupational Health, x36726 or Email jsc-dl-occ-health@mail.nasa.gov, for assistance in preparing a written program.
- b. Occupational Health is responsible for:
 - (1) Providing hazard assessments and recommendations when requested by supervisors.

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- (2) Helping employees or supervisors write respirator procedures.
- (3) Reviewing and monitoring JSC's respiratory protection program.
- (4) Reviewing and approving employers' written RPPs.
- (5) Providing appropriate surveillance of work area conditions and degree of employee exposure or stress.
- (6) Providing fit testing, training, and consultation services for on-site respirator users as requested.