Protecting the Lungs

Developing a strong Respiratory Protection Program

April 2025

Berkshire Hathaway HOMESTATE COMPANIES
Workers Compensation Division

AGENDA

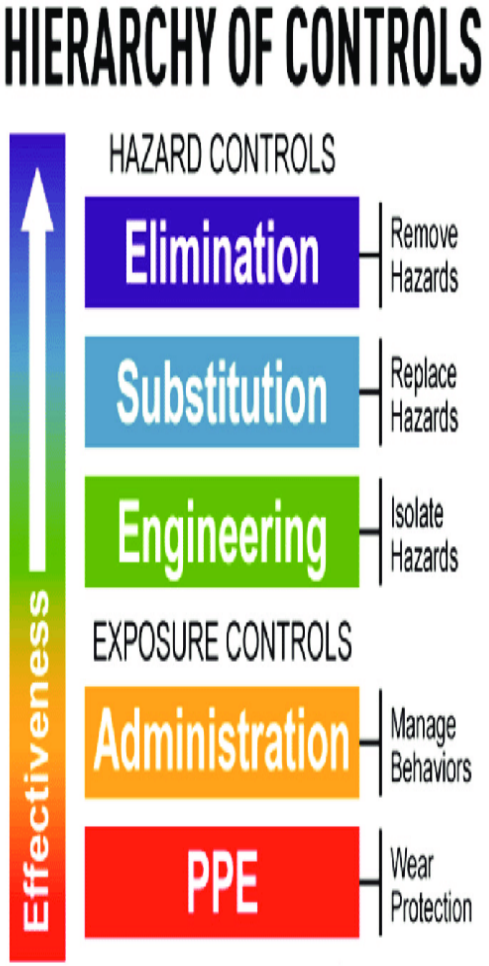
1. Analyze current OSHA standards for respiratory protection
2. Review the purpose and use of respirators
3. Identify and select different types of respirators
4. Identify requirements for the use of respiratory protection

OSHA Standards: 29 CFR 1910.134

- Standard for respiratory protection at the workplace
- Employer provides respirators to employees
- The employer shall be responsible for the establishment and maintenance of a respiratory protection program.

OSHA Standards: 29 CFR 1910.134

- Primary employer safety goal is engineering and administrative controls
- Annual fit test and whenever conditions change
- Must be worn whenever you are working in a hazardous atmosphere



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The Respiratory Protection Program

Toluene vapors
NIOSH-approved respirator with a full facepiece and a high-efficiency filter, powered air-purifying respirator (PAPR) or a self-contained breathing apparatus (SCBA).

Respirator types
Half-mask respirator: Use a high-efficiency cartridge
Full-facepiece respirator: Use a high-efficiency cartridge or canister
PAPR: Use a HEPA filter
SCBA or SAR: Use a positive-pressure demand mode and an emergency escape air cylinder

Other considerations
Use a positive-pressure respirator
Use a pressure-demand respirator

Additional information
The IDLH concentration for toluene is 2,000 ppm
The presence, use, and evaporation of liquids containing toluene in a confined space may create an atmospheric hazard

Procedures for selecting respirators for use in the workplace

- Nature of the hazard, and the physical and chemical properties of the air contaminant;
- Concentrations of contaminants;
- Permissible exposure limit or occupational exposure limit;
- Nature of the work operation or process;
- Length of time the respirator is worn;
- Work activities and physical/psychological stress;
- Fit testing; and
- Physical characteristics, functional capabilities, & limits of respirators.

Exposure and Selection

Table 1 - Assigned Protection Factors[5]

Type of respirator[1,2]	Quarter mask	Half mask	Full facepiece	Helmet/hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3]10	50		
2. Powered Air-Purifying Respirator (PAPR)		50	1,000	[4]25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode		10	50		
• Continuous flow mode		50	1,000	[4]25/1,000	25
• Pressure-demand or other positive-pressure mode		50	1,000		
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode		10	50	50	
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)			10,000	10,000	

Assigned protection factor (APF)

- Workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Exposure and Selection

Maximum use concentration (MUC)

- The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance

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The Respiratory Protection Program

Physician or other Licensed Health Care Professional (PLHCP) must consider:

- The burden imposed by the respirator itself
- Musculoskeletal and cardiopulmonary stress
- Limitations on hearing, sight, or smell
- Isolation from the workplace environment.
- Type and weight of the respirator to be worn
- Duration & frequency of respirator use
- Physical work effort
- Use of protective clothing and equipment
- Temperature and humidity extremes

Required to be submitted with questionnaire

The Respiratory Protection Program

Medical evaluations of employees required to use respirators

- Employees assigned to tasks that require the use of a respirator must be physically able to perform the work
- Employees must be able to tolerate the physical and psychological stress, as well as the physical stress
- Provided free of charge to the applicant or employee. Failure to meet the required physical and medical qualifications will be considered disqualifying

OSHA Says…

The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

- The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.
- The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, part A of appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

OSHA Says…

Medical determination. In determining the employee's ability to use a respirator:

- 1910.134(e)(6)(i) - Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:
- 1910.134(e)(6)(i)(A) - Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
- 1910.134(e)(6)(i)(B) - The need, if any, for follow-up medical evaluations; and
- 1910.134(e)(6)(i)(C) - A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.
- 1910.134(e)(6)(ii) - If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

Starts with Medical Questionnaire

Medical Questionnaire

Employees must complete a mandatory medical questionnaire or undergo an equivalent medical examination.

Review by a Healthcare

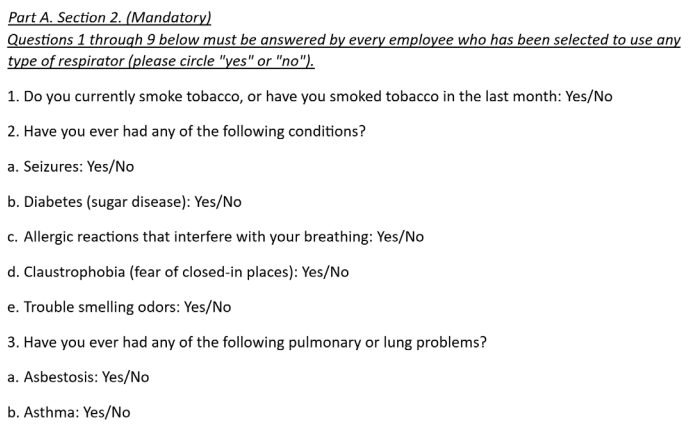
Professional: The completed questionnaire or exam results must be reviewed by a licensed healthcare professional to assess the employee's health status.

Follow-Up Medical Exam

If the initial review indicates potential health issues, a follow-up medical examination is required.

Additional Medical Evaluations

These are necessary if the employee reports medical signs or symptoms related to respirator use, workplace conditions change significantly, or if the healthcare professional recommends it.



Part A. Section 2. (Mandatory)
Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?

a. Seizures: Yes/No

b. Diabetes (sugar disease): Yes/No

c. Allergic reactions that interfere with your breathing: Yes/No

d. Claustrophobia (fear of closed-in places): Yes/No

e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?

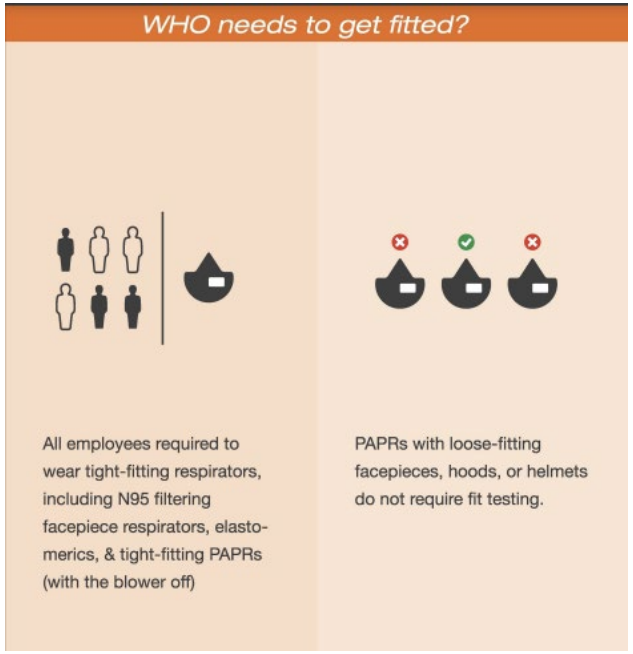
a. Asbestosis: Yes/No

b. Asthma: Yes/No

The Respiratory Protection Program

Fit testing procedures for tight-fitting respirators

- Before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used
- Employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT)
  - Appendix A provides various fit testing approaches
  - Can be completed by your Respirator Vendor in many cases
  - Must be done annually
  - Must be done when there are “changes” to wearer, environment or equipment



Is facial hair ok?

Any Obstructions to the Seal

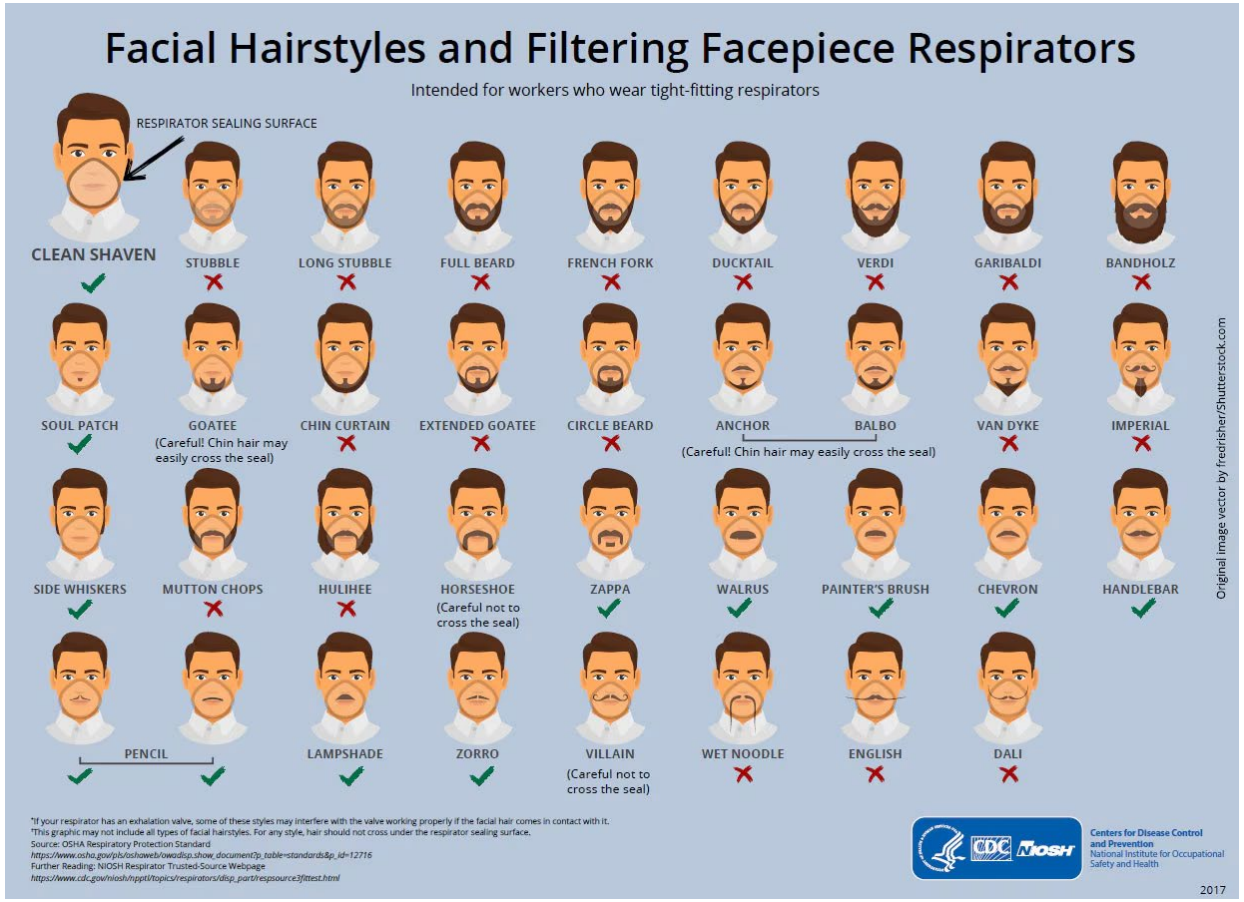
Any obstruction to the seal of the respirator is cause for no use.

Mustaches that Do Not Obstruct

Mustaches that do not obstruct the seal may be worn, but daily seal checking should be completed

Stubble is a NO GO

Employees with fast facial hair growth may need to shave mid day to maintain seal



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The Respiratory Protection Program

4 Use of respirators in routine and reasonably foreseeable emergency escape situation

- Establish and implement procedures for the proper use of respirators
  - Prohibiting conditions that may result in facepiece seal leakage (facial hair for example)
  - Preventing employees from removing respirators in hazardous environments
  - Taking actions to ensure continued effective respirator operation throughout the work shift
  - Establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting

5 Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, and otherwise maintaining respirators

- Provide each respirator user with a respirator that is clean, sanitary, and in good working order.
  - Ensure that respirators are cleaned and disinfected using the procedures in appendix B-2 or procedures recommended by the respirator manufacturer

The Respiratory Protection Program

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Procedures to ensure adequate air quality, quantity and flow of breathing air for self-contained breathing apparatus (SCBA) and SAR

Air Quality

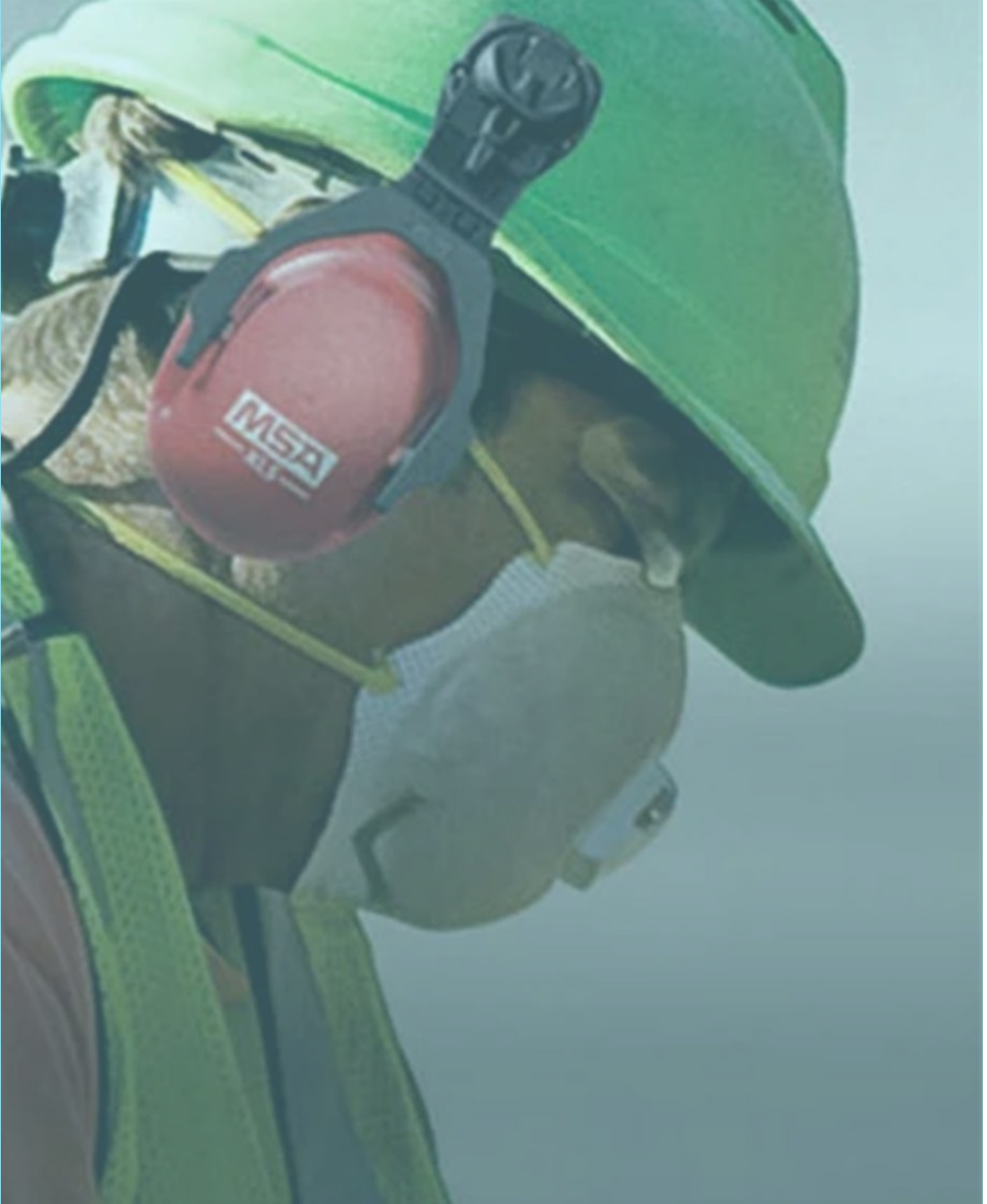
Breathing air must meet the requirements for Grade D breathing air, which includes specific limits on oxygen content, hydrocarbons, carbon monoxide, carbon dioxide, and lack of noticeable odor.

Moisture Content

The moisture content in the SCBA cylinder must not exceed a dew point of -50°F (-45.6°C) at one atmosphere pressure.

Air Quantity and Flow

Ensure that the SCBA provides a continuous flow of air at the required pressure and volume to meet the user's needs during use.



The Respiratory Protection Program

Training employees

- The respiratory hazards they are potentially exposed to
- Proper use of respirators
- Putting on and removing respirators
- Limitations on their use
- Maintenance procedures
- Replacement

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The Respiratory Protection Program

Check Effectiveness

Procedures for regularly evaluating the effectiveness of the program.

- Audits of Programs
- Annual training with knowledge checks
- Observations of Employees
- Annual Fit Testing
- TALK TO YOUR EMPLOYEES

What do Respirators do?

Purpose of Respirators

- Protects against airborne contaminants
- Filters harmful particles and gases
- Ensures safe breathing in hazards
- Enables work in environments dangerous to workers
- Provides emergency air in the event of a workplace disaster

Use of Respirators at Work

- Worn during hazardous material handling
- Used in confined spaces with poor ventilation
- Essential for protection in dusty environments
- Increases safety when working with volatile liquids
- Provide air in environments that are immediately dangerous to life and health
- Provide protection from exposure to occupational health pathogens

Types of Respiratory Protection

Air Purifying Respirators

- Filtering Facepiece Respirators (FFRs): Disposable masks that cover the nose and mouth - N95 masks.
- Elastomeric Half Mask Respirators: Reusable masks that cover the nose and mouth, equipped with replaceable filters or cartridges
- Elastomeric Full Facepiece Respirators: Reusable masks that cover the entire face, providing eye protection as well.
- Powered Air-Purifying Respirators (PAPRs): Use a battery-powered blower to pull air through filters, often featuring a hood or helmet.

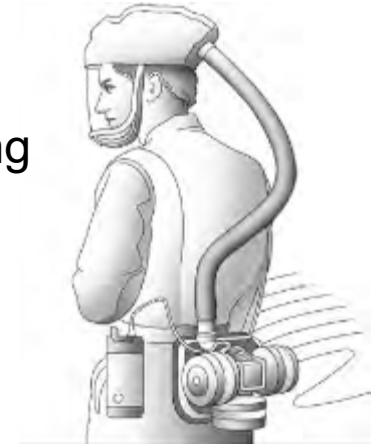
Air Purifying

Dust Mask

Half Mask

Full Face

Loose Fitting Powered



Hood Powered

Types of Respiratory Protection

Atmosphere-Supplying Respirators (ASRs)

- Supplied-Air Respirators (SARs): Deliver air through a hose connected to a stationary source of clean air.
- Self-Contained Breathing Apparatus (SCBA): Provide air from a portable tank, commonly used in firefighting and confined space entry

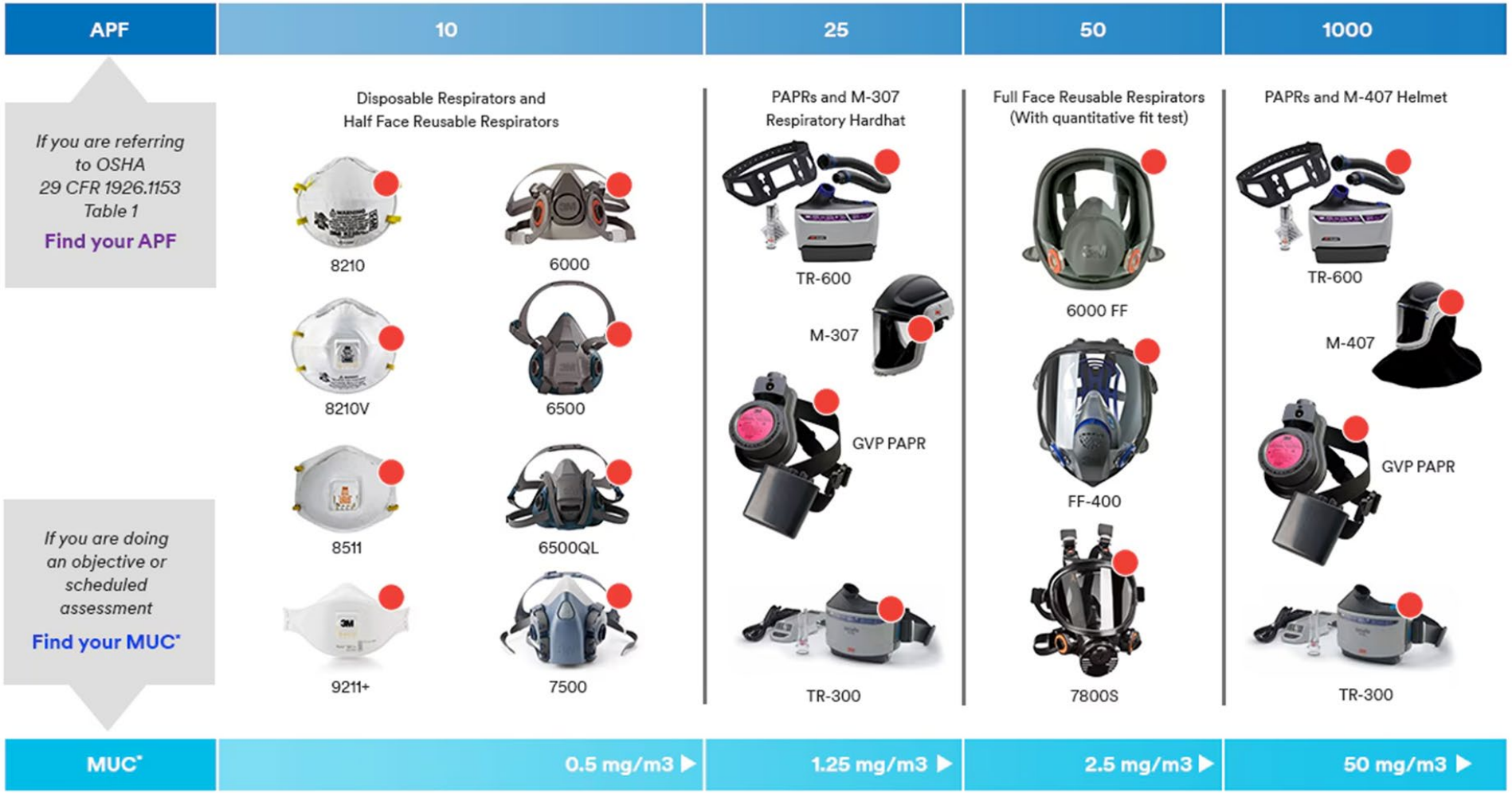
Atmosphere Supplying

Supplied Air Respirator

Abrasive Blasting
Continuous flow

Self Contained
Breathing Apparatus
(SCBA)

Respirator Selection



*Maximum Use Concentration

Respirator Selection

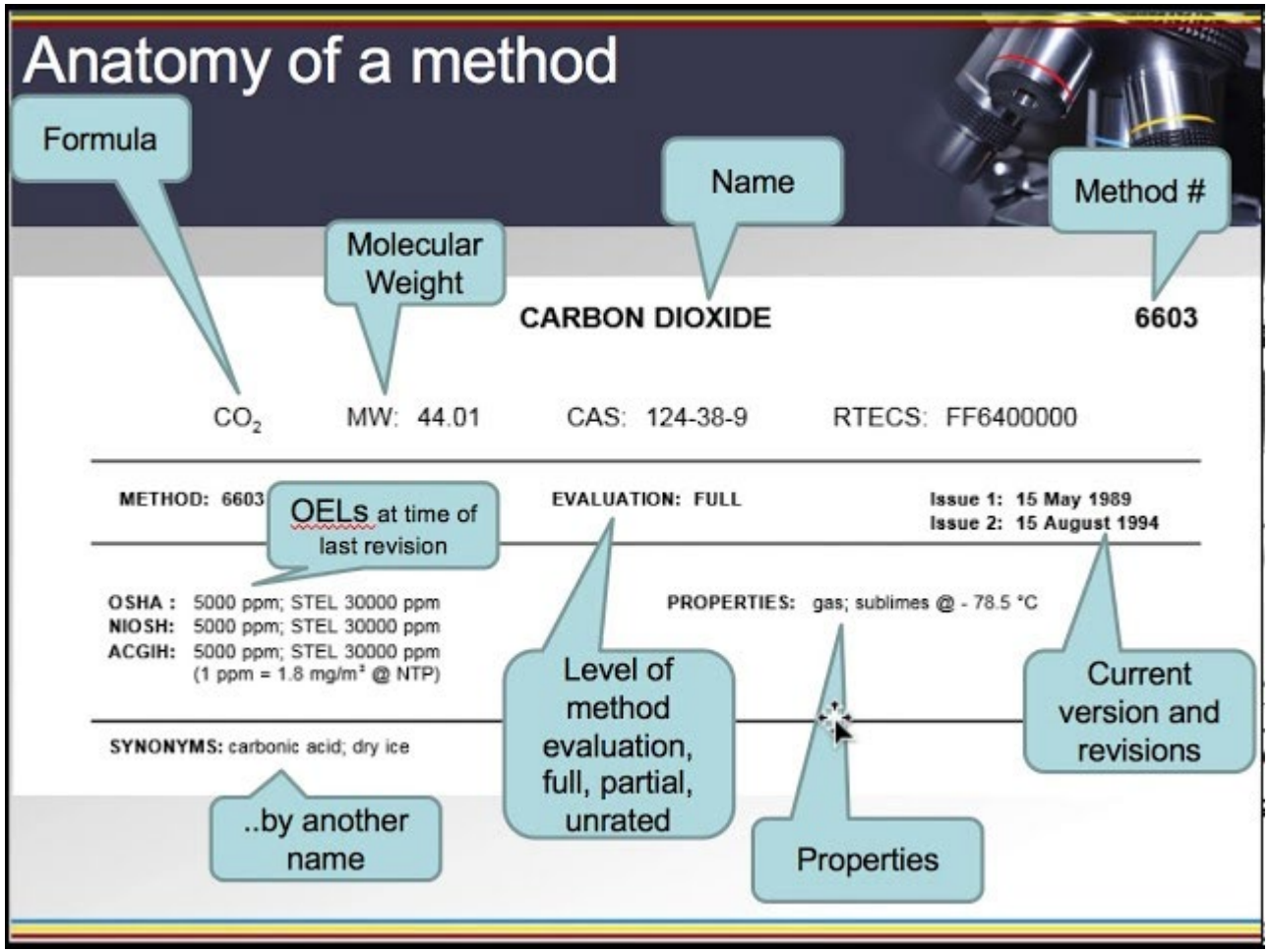
Six Questions to ask when selecting Respirators:

- What type of contaminant the employee must be protected against
- The form of the contaminant (dust, vapor, gas)
- How toxic the contaminant is (often based on exposure limits)
- The concentration of the contaminant (in air or at the source)
- The employee's duration of exposure to the contaminant
- The employee's individual sensitivity to the contaminant

CONTAMINATE	COLOR CODING ON CARTRIDGE/CANISTER
Acid gases	White
Hydrocyanic acid gas	White with 1/2 inch green stripe completely around the canister near the bottom
Chlorine gas	White with 1/2 inch yellow stripe completely around the canister near the bottom
Organic vapors	Black
Ammonia gas	Green
Acid gases and ammonia gas	Green with 1/2 inch white stripe completely around the canister near the bottom
Carbon monoxide	Blue
Acid gases and organic vapors	Yellow
Hydrocyanic acid gas and chloropicrin vapor	Yellow with 1/2 inch blue stripe completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases	Brown
Radioactive materials, except tritium and noble gases	Purple (magenta)
Pesticides	Organic vapor canister plus a particulate filter
Multi-Contaminant and CBRN agent	Olive
Any particulates – P100	Purple
Any particulates – P95, P99, R95, R99, R100	Orange
Any particulates free of oil – N95, N99, or N100	Teal

Safe Respirator Use

Respiratory Hazards



- Must be evaluated by supervisor
  - When First Hired
  - If you are a New user
- Working with new chemicals

If any conditions changed, stop and contact supervisor

Safe Use Procedures

- **Proper Selection:** Choose the right type of respirator based on the specific hazards present in the workplace.
- **Fit Testing:** Ensure that each respirator fits the user properly by conducting fit tests.
- **Inspection and Maintenance:** Regularly inspect and maintain respirators to ensure they are in good working condition.
- **Storage:** Store respirators in a clean, dry place to protect them from damage and contamination.
- **Use in Accordance with Instructions:** Follow the manufacturer's instructions for proper use and care of the respirator.
- **Monitor Work Environment:** Continuously monitor the work environment to ensure that the respirator provides adequate protection.

SUMMARY

1. Analyze current OSHA standards for respiratory protection
2. Review the purpose and use of respirators
3. Identify and select different types of respirators
4. Identify requirements for the use of respiratory protection