

# RESPIRATORY PROTECTION

OSHA 29 CFR 1910.134



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# *Respiratory Program Goal*

*To ensure that its employees are protected from respiratory hazards through the proper use of respirators when engineering controls are not practical.*



# *Written Program Elements*

- Program responsibilities
- Hazard determination
- Medical evaluation process
- Employee training
- Respirator selection
- Operating procedures
- Fit-testing procedures and protocols
- Recordkeeping



# *Management's Responsibilities*

- Identify workplace hazards and conditions that necessitate a compliance program.
- Select and equip personnel with proper filter for the task.
- Provide quality respirators, components, employee training, and fit-testing.
- Maintain medical evaluation and training records.
- Conduct on-going audits and assessments.



# *Respiratory Hazards*



# *Major Respiratory Hazards*

- Oxygen Deficiency
  - <19.5%
- Particulates
  - Dusts
  - Fibers
- Gases and Vapors
  - Fumes
  - Mists



**DANGER**

# EXAMPLES OF TASKS/OPERATIONS THAT MAY REQUIRE RESPIRATORY PROTECTION

Cutting Concrete  
(Silicosis)



# EXAMPLES OF TASKS/OPERATIONS THAT MAY REQUIRE RESPIRATORY PROTECTION

Roadway  
Construction/Repairs



# EXAMPLES OF TASKS/OPERATIONS THAT MAY REQUIRE RESPIRATORY PROTECTION

Application of  
Chemicals



**What is wrong with this picture?**

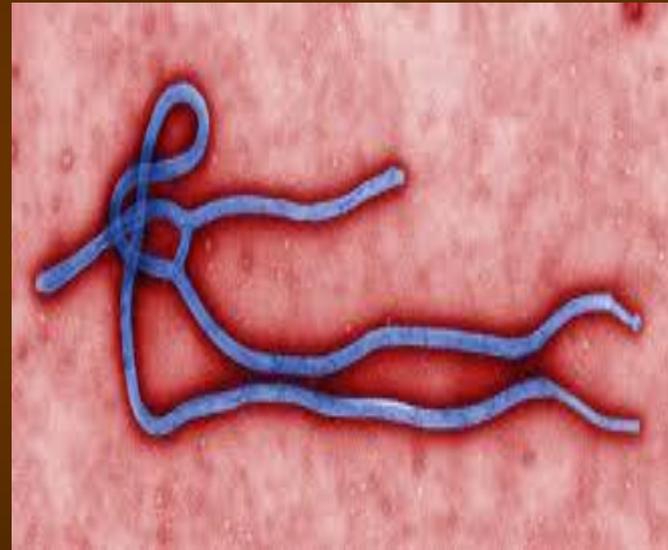
# EXAMPLES OF TASKS/OPERATIONS THAT MAY REQUIRE RESPIRATORY PROTECTION

Welding



# Additional examples

- Communicable disease follow-up (Health Dept.)
  - Tb
  - Ebola
  - Bacterial meningitis
  - Any other aerosol or airborne biological encountered.



# Additional examples

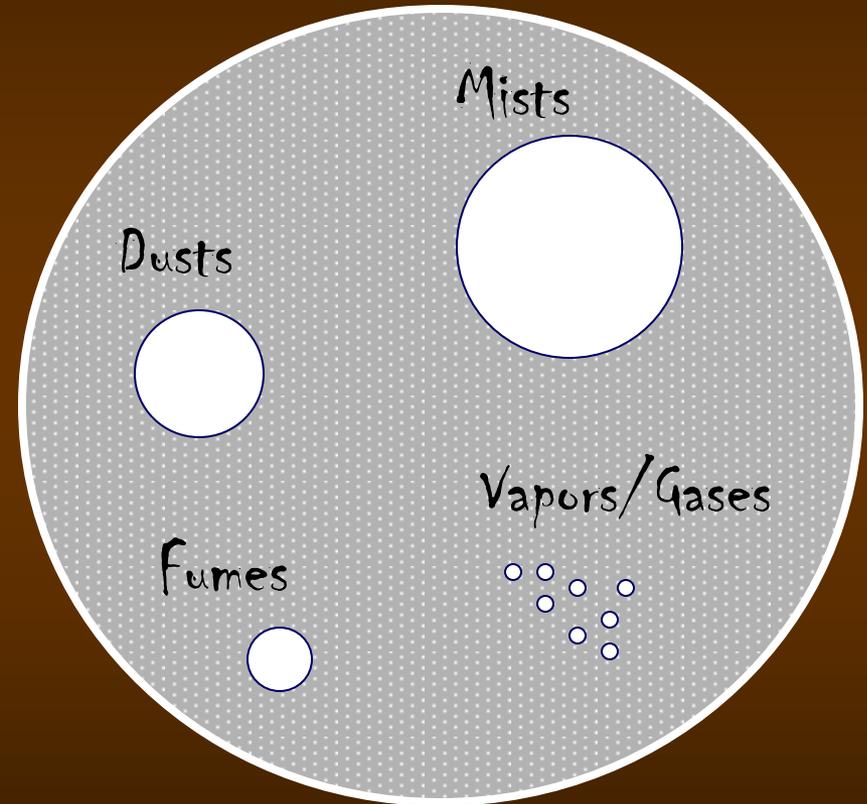
- Operations and Maintenance Asbestos removal
- Filling DE at Jefferson Park Pool



# *What is dust?*

Solid particle introduced into air by mechanically breaking up hard solids (*Sanding, grinding, crushing*)

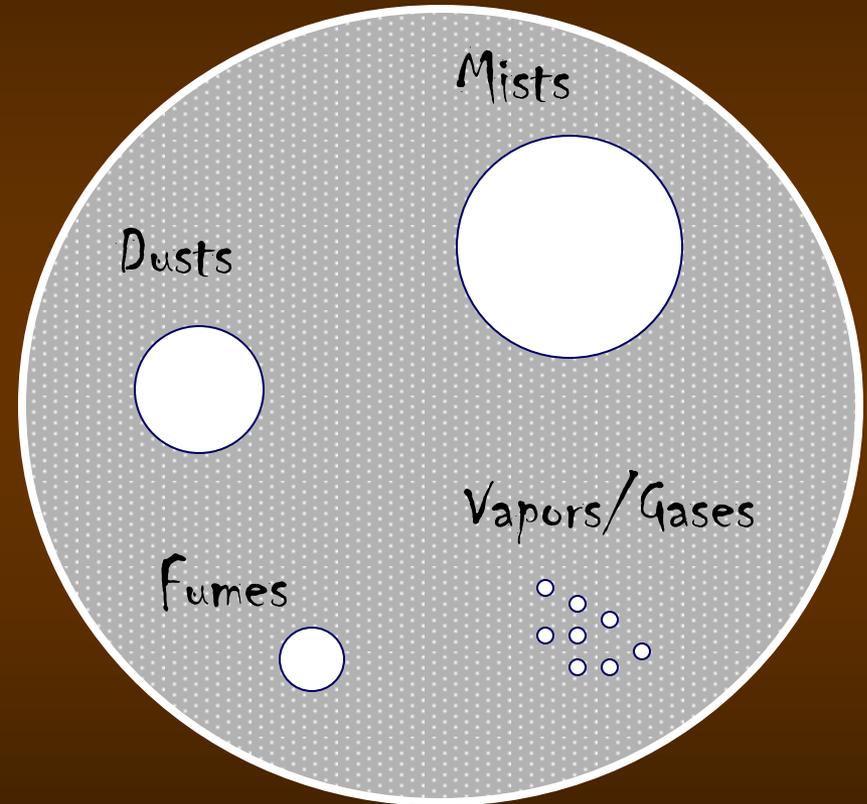
Width of a Human Hair



# *What are fumes?*

Solid particles  
introduced into  
the air from  
molten metal  
*(Welding,  
soldering)*

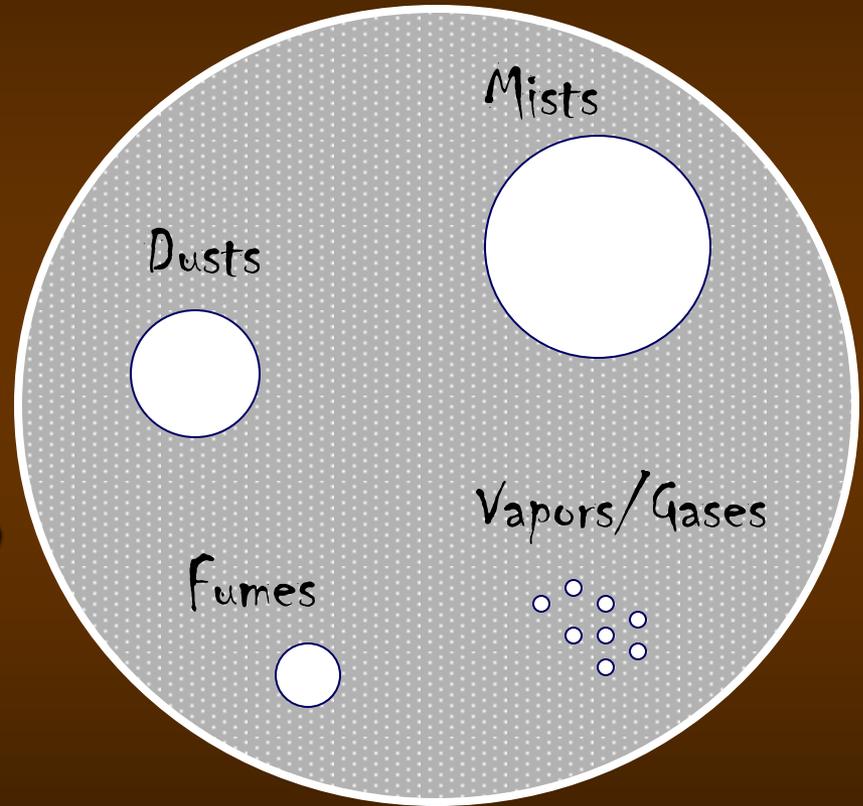
Width of a Human Hair



# What are mists?

Airborne droplets of a substance which is a liquid at room temperature and pressure (*Pesticide spraying, spray finishing*)

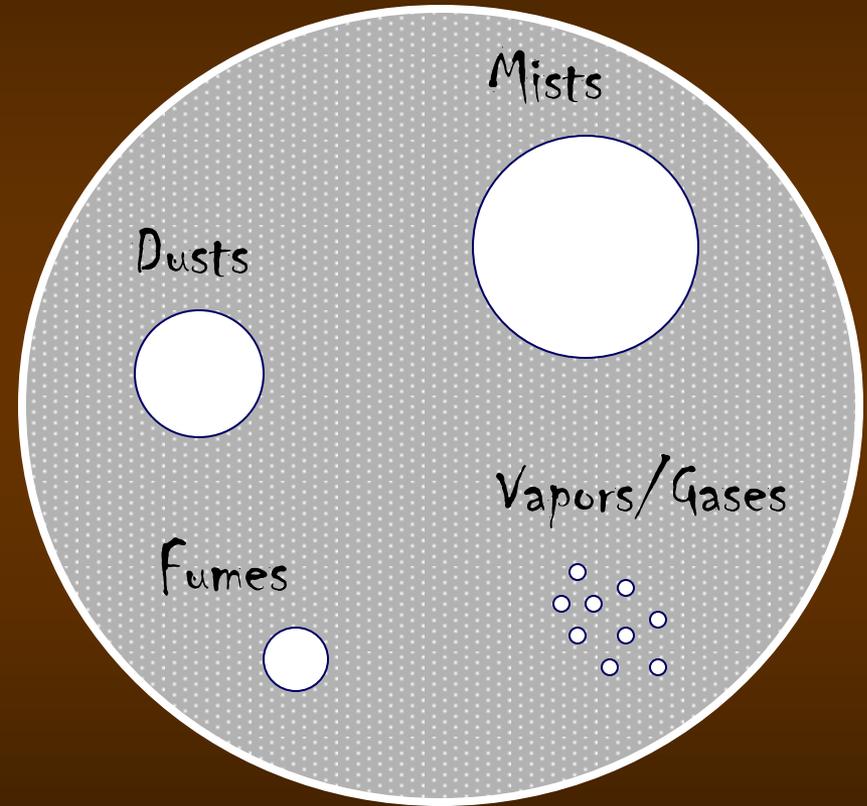
Width of a Human Hair



# *What is a vapor?*

Gaseous form  
of materials  
which are  
liquids or solids  
at room  
temperature  
and pressure  
(gasoline  
vapor)

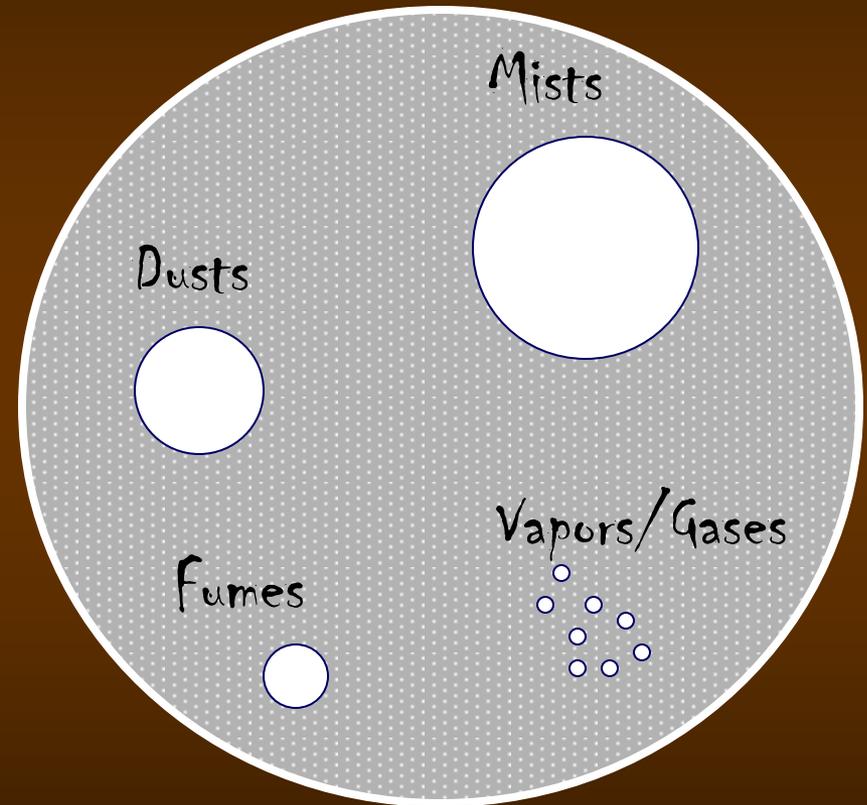
Width of a Human Hair



# *What are gases?*

Width of a Human Hair

A fluid that has  
neither  
independent  
shape nor volume  
and tends to  
expand  
indefinitely



# *How are air contaminants measured?*

## ● *Gases and Vapors*

- Parts of contaminant per million parts of contaminated air by volume - Measured in ppm

## ● *Particulates*

- Milligrams of contaminant per cubic meter of air - Measured in mg/m<sup>3</sup>

*Respirator  
Selection,  
Maintenance,  
Care, Storage,  
Use and  
Limitations*



# *Respirator Selection Criteria*

*City or village MUST select and provide ....*

- Respirators based on respiratory hazards and workplace conditions.
- Only NIOSH-certified respirators.
- Sufficient number of respirators for personal assignment.
- Variety of sizes for correct fit.

# Types of Respirators

- **Air-Purifying Respirators (APRs)**

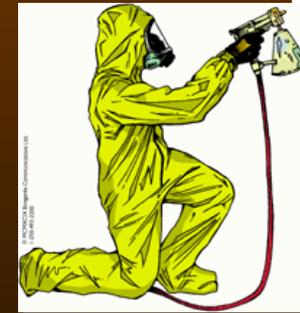
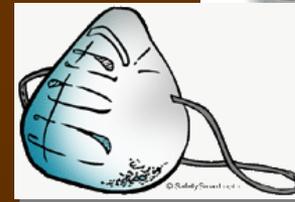
*Respirators used when there is enough oxygen but there are air contaminants in the air that can be effectively filtered out (19.5 – 23.5%)*

- Dust/Particulate Respirators
- Half-mask Cartridge Respirators
- Full-Facepiece Cartridge Respirators
- Powered Air- Purifying Respirators

- **Supplied-Air Respirators (SARs)**

*Respirators that supply breathing air because there is not sufficient oxygen or when the hazard is immediately dangerous to life and health (IDLH) (<19.5% and >23.5%)*

- Air-line Respirators
- Self-contained Breathing Apparatus (SCBA)



# *Air-Purifying Respirators*

**N - Not resistant to oil** - Approved for non-oil particulate contaminants (Dusts, fumes, mists)

**R - Resistant to oil** – Approved for particulate contaminants including those with oil (Dusts, fumes, mists)

**P - Oil Proof** – Approved for all particulate contaminants including those containing oil (Dusts, fumes, mists)

## Filter efficiency levels

95%      99%      99.97%

\*8-hour use limit....



# *Use and Limitations*

- No facial hair where “the rubber meets the road” (beard, mustache, or long sideburns).
- Contact lenses are not recommended with positive pressure respirators.
- Glasses with temple pieces can not be worn when wearing a respirator with a facepiece.
- You can't use a respirator until a medical evaluation has been done and you have been cleared to wear a respirator.
- If required use, you must be fit tested for your make, model, and size respirator.

# *Use and Limitations*

- You can't use an issued respirator until you are properly trained and certified.
- You must perform a personal negative and positive user seal test before using an air-purifying respirator (*Follow the manufacturer's recommended procedures*).
- Respirators selected and used must be matched to the potential hazard and conditions.
- Immediately leave the respirator use area when your breathing becomes difficult, or you feel dizzy or nauseous .

# *Use and Limitations*

- You can't use an air-purifying respirator in an oxygen deficient atmosphere (<19.5% oxygen).
- Change out both cartridges and/or pre-filters at the same time.
- Always change out cartridges and/or pre-filters outside of the respirator use area.
- Consider changing out cartridges and pre-filters when switching from one chemical to another.
- Store cartridges and pre-filter in original sealed packages.
- Always leave the respirator use area when breakthrough, changes in resistance, or facepiece leakage occurs.
- Modifying or altering respirators is prohibited.

# *Proper Cleaning, Care and Storage*

- Remove cartridges and pre-filters and store in a separate sealed bag.
- Disassemble facepieces, inhalation valve, exhalation valves, diaphragms before cleaning. Discard defective components.
- **DO NOT** use rubbing alcohol .... use soapy warm water.
- Air or hand dry ... do not use a hair dryer.
- Thoroughly clean respirator before storing.
- Store in areas where there is no dust, direct sunlight, extreme temperatures, excessive moisture and/or damaging chemicals.
- Store respirator in sealed plastic zip-lock bags.
- **DO NOT** hang respirators by their straps (*distortion, warping*).

# *Inspection Practices*

- Respirators must be inspected before each use and during the cleaning process.
- Emergency use respirators must be inspected at least monthly.
- Facepieces:
  - ✓ Excessive dirt
  - ✓ Cracks, tears, holes, distortion
  - ✓ Rubber elasticity
  - ✓ Scratched lenses (if applicable)
  - ✓ Cartridge threads
- Exhalation/Inhalation Valves:
  - ✓ Rubber elasticity
  - ✓ Distortion
  - ✓ Cracked or ripped
  - ✓ Correct valves
  - ✓ Missing or defective valve cover
- Head straps, head harness:
  - ✓ Cracks, tears, holes, distortion
  - ✓ Rubber elasticity
  - ✓ Buckles

# *Changing out Cartridges and/or Pre-Filters*

- Prior to expiration date.
- Manufacturer's recommendations for the specific application or environment.
- After each use .... or when changing to a different chemical.
- When deemed appropriate by employee.
- When breakthrough occurs: odor, smell, taste, etc.
- Air flow becomes restricted.
- Air-purifying respirators must have:
  - ESLI (end-of-service life) indicator certified by NIOSH for that contaminant, or
  - A change out schedule for cartridges/filters

# *What can shorten the cartridge and pre-filter life and/or cause a "breakthrough"?*

- Wrong cartridge and/or pre-filter for hazard or chemical.
- Humidity levels.
- Temperature in workplace.
- Atmosphere.
- Condition of cartridge and/or prefilter (previous usage level – poor storage).
- Physical activity levels.
- Pulmonary ability.
- Level of air contaminants in work environment.

# *Medical Evaluations*



# *Medical Evaluations*

- Employer must provide a medical evaluation to determine the employee's ability to use a respirator:
  - Before employee is fit tested, or
  - Required to use the respirator in the workplace
- Must be performed by physician or licensed health care professional (PLHCP).
- Medical questionnaire and exam is:
  - Confidential
  - Conducted during normal working hours
  - OSHA's questionnaire for validity (Appendix C)
  - An opportunity to discuss results with PLHCP

# *Medical Evaluations*

- Supplemental information is provided to the PLHCP before the PLHCP conducts medical review and makes a recommendation about an employee's ability to use a respirator
  - Type and weight of respirator
  - Duration and frequency of respirator use
  - Expected physical work effort
  - Additional protective clothing and equipment to be worn
  - Temperature and humidity extremes to be encountered
  - A copy of the city's written respiratory protection program and a copy of OSHA 29 CFR 1910.134
  - Job descriptions (if requested)
  - MSDS of chemicals used

# *Medical Evaluations*

- PLHCP sends a written recommendation. The recommendation includes the following:
  - Any limitations on use, related to medical conditions of employee or workplace conditions in which respirator is to be used.
  - Whether or not the employee is medically able to use the respirator.
  - If needed, follow-up medical evaluation (ie chest x-ray and/or pulmonary test).
  - A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendations.

# *Fit-Testing (Certification)*



# Fit-Testing

- Must be fit-tested with the same make, model, style and size respirator that will be used.
- Fit-testing must occur:
  - Prior to initial use.
  - Whenever a different respirator (size, style, make, or model) is to be used.
  - At least annually.
  - Changes in the employee's physical condition that could affect fit (i.e., facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight).
- Methods used (Per Appendix A in Respiratory standard):
  - User seal checks (*self-checks*)
  - Qualitative (QLFT) (*subjective*)
  - Quantitative (QNFT) (*objective*)

# *Fit-Testing – User Seal Checks*



## **Negative Pressure User Seal Check**

The inlet opening of your respirator's canister(s), cartridge(s), or filter(s) is closed off by covering with the palm of your hand(s) or by squeezing a breathing tube or blocking its inlet so that it will not allow the passage of air.

Inhale gently and hold your breath for at least 10 seconds. If the facepiece collapses slightly and no inward leakage of air is detected, the respirator has been properly donned and the facepiece is not leaking.



## **Positive Pressure User Seal Check**

The exhalation valve or breathing tube, or both, is closed off and you exhale gently.

If a slight positive pressure can be built up inside the facepiece (e.g., facepiece bulges slightly outward) without detecting any outward leakage of air between the sealing surface of the facepiece and your face, the respirator has been properly donned.

# Any Questions .....

[Click Here](#) to submit that you have completed the Respiratory Protection Training.