Lunch Box Safety Webinar

Safety Over Sandwiches

May 6: Respiratory Protection

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What is a Respirator?

- Protective device that covers the nose and mouth or the entire face or head to guard the wearer against hazardous atmospheres

Why wear a respirator?

- Working in an area with insufficient oxygen
- Situations where harmful dusts, fogs, smokes, mists, fumes, gases, vapors or sprays are present
- These types of hazards may cause cancer, lung impairment, other disease, or death

When is it Appropriate to Wear a Respirator?

- Where engineering controls, such as ventilation, or administrative controls are not feasible or insufficient
- During the time when engineering or administrative controls are being implemented
- For emergency response

Respiratory Hazards

- Dusts
  - Created when solid materials are broken down into fine particles that can be suspended in air before settling under gravity
- Fumes
  - Created when solid material vaporizes under high heat and then condenses (welding)
  - Vapors condense into small particles that are light enough to be breathable

Respiratory Hazards

- Mists
  - Tiny liquid droplets from liquid materials formed by condensation processes
  - Spraying, mixing, plating, and cleaning operations

- Gases
  - Substances that are similar to air
  - Diffuse and spread freely throughout a container or air
    - i.e. Oxygen, carbon monoxide, nitrogen, helium, etc.

Respiratory Hazards

- Vapors
  - The gaseous state of substances that are either liquids or solids at room temperature. They are formed when solids or liquids evaporate.
    - Paint thinners, solvents, etc.

- Oxygen Deficiency
  - Occurs when the percentage of oxygen in the air falls below 19.5%
  - Can be caused by chemical reaction, fire, or when other chemicals displace oxygen from the air

Respiratory Protection

- Elements of an effective program

Respiratory Protection Program

- Elements of an Effective Program
  - Written Worksite Specific Procedures
  - Program Evaluation
  - Respirator Selection
  - Medical Evaluation
  - Fit-Testing
  - Proper Use
  - Inspection, Cleaning and Maintenance
  - Training
  - Recordkeeping

Worksite Specific Procedures

- Developed to ensure that employees use the respirator safely
- Familiarize employees with procedures and respirators available, and their limitations

Program Evaluation

- Evaluate the effectiveness of the program regularly
- Modify written procedures as necessary to reflect evaluation results

Respirator Selection

- Choosing the Right Respirator:
  - Determine what the hazard is and its extent
  - Consider user factors that affect respirator performance and reliability
  - Select an appropriate NIOSH-certified respirator

Respirator Selection

- Things to consider:
  - Chemical and physical properties of the contaminant
  - Toxicity and concentration of the hazardous material
  - Amount of oxygen present

Medical Evaluation

- Workers assigned tasks that require respiratory use must be physically able to perform work while using the respirator

Medical Evaluation

- Local physician or licensed healthcare professional (LHCP) determine what health and physical conditions are pertinent
- Can be performed by using a medical questionnaire or by a medical examination that contains the same information as the questionnaire
  - Questionnaire – 1910.134 Respiratory Protection Appendix C

Medical Evaluation

- Performed prior to fit-testing
- Employer must obtain a written recommendation from the LHCP for each employee's ability to wear a respirator

What About Voluntary Use?

- Workers may choose to wear a respirator voluntarily in workplaces with no hazardous exposures
- Employers must evaluate the respiratory use to ensure it doesn't harm the employee
- If it could harm the employee, employer must medically evaluate employees.

What about Voluntary Use?

- Employers must inform employees voluntarily using respirators of basic information contained in Appendix D of OSHA's Respiratory Protection Standard. Employees must do the following:

  - "Read and heed all instructions"
  - "Choose respirators certified for use to protect against the contaminants of concern".
  - "Do not wear a respirator into atmospheres containing contaminants for which your respirator is not designed to protect against."
  - "Keep track of your respirator that you do not mistakenly use someone else's respirator.

Fit- Testing

- Performed for tight fitting facepiece respirators including filtering facepiece respirators required to be used.
- No one respirator will fit everyone!
- Two Types:
  - Quantitative
  - Qualitative

Quantitative Fit Testing

- The fit test equipment measures the concentration of microscopic particles that exist in ambient air and those particles that leak into the respirator.

Qualitative Fit Testing.

- Involves introduction of a harmless odoriferous or irritating substance into the breathing zone.
- If no odor or irritation is detected by the wearer, this indicates proper fit.

Use of Respirators

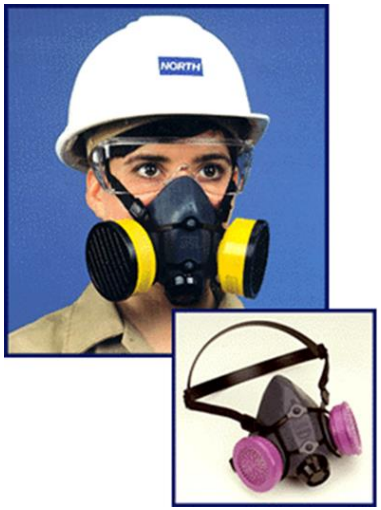
- Factors that can affect the seal/fit of the respirator:
  - Facial hair
  - Corrective glasses
  - Facial scarring
  - Broken jaw
  - Changes in weight
  - Dentures

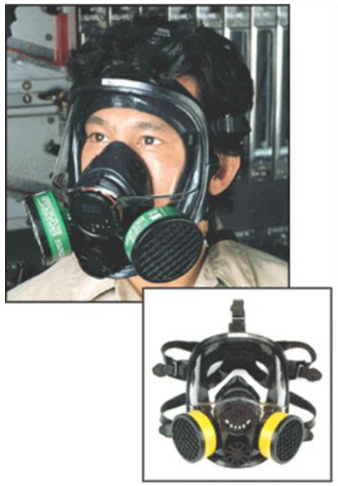
Respirators

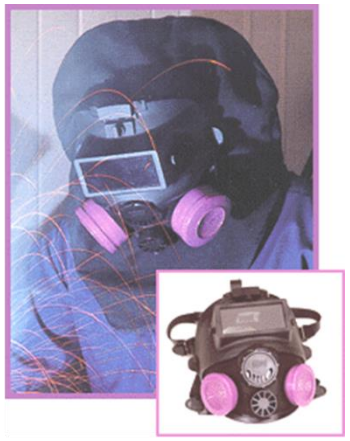
- Types

Types of Respirators

- Tight Fitting – half masks which cover the mouth and nose and full facepieces which cover the face from the hairline to below the chin.







Types of Respirators

- Loose Fitting
  - Hoods or helmets that cover the head completely.

Two Major Classes of Respirators

- Air Purifying
  - Remove contaminants from the air
- Atmosphere Supplying
  - Provide clean breathable air from an uncontaminated source

Respirator Selection

- Immediately Dangerous to Life and Health
  - Atmosphere that poses an immediate threat to life, cause irreversible adverse health effects, or would impair a persons ability to escape from a dangerous atmosphere.
    - Use only SCBA, Supplied Air, or escape respirator.
- Non-IDLH
  - Use particulate filters or chemical filter media.

Supplied Air and SCBA

- Breathing air must be of high purity.
  - Breathing air must meet at least the requirement for Grade D breathing air described in Compressed Gas Association Commodity Specification G7.1
  - Compressors for supplying air must have:
    - Safety devices and alarms
    - In-line filters
    - Sorbent Beds
    - CO Alarms
    - High temperature alarms

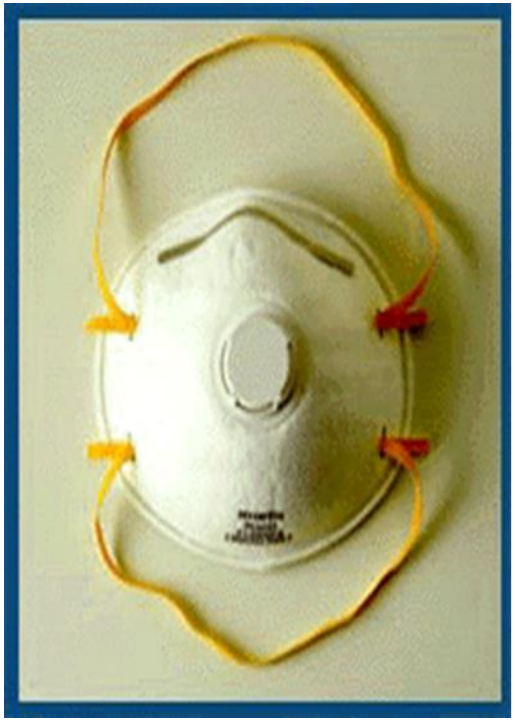
Filtering Media

- Three common types of filter media:
  - Particulate
    - Removes particles from the air
  - Organic Vapor
    - Removed chemicals from the air by using solvents
  - Acid Gas
    - Removes acid based gases from the air.

Limitations of Air Purifying Respirators

- Do not protect against oxygen deficiency
- Do not use when:
  - Performing abrasive blasting
  - In atmospheric concentrations above the IDLH
  - For Firefighting

Filtering Face-Piece



Particulate Filter Media

Respirator Filter Media Ratings:

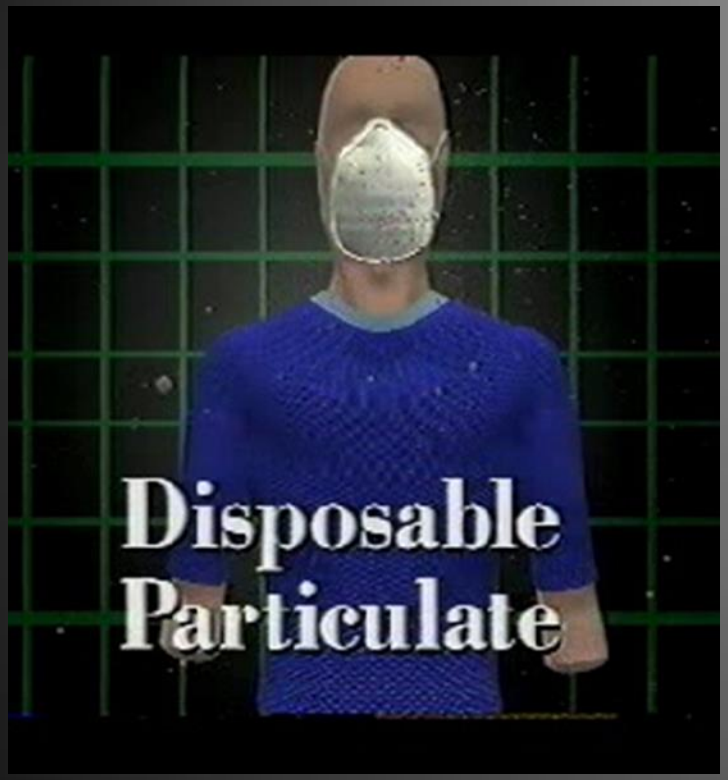
- **"N"** if they are ***n****ot* resistant to oil
- **"R"** if somewhat ***r****esistant* to oil, and
- **"P"** if strongly resistant (*oil* ***p****roof*)

Disposable Particulate Facepieces

There are nine types of disposable particulate facepieces:

- **N-95, N-99, N-100**
- **R-95, R-99, R-100**
- **P-95, P-99, P-100**

Disposable Particulate Respirator



- 95-99.97% efficiency rating
- Lightweight
- Easy to wear
- Do not require cleaning
- Usually come in three sizes
- Can be obtained with or without an exhalation valve

Disposable Particulate Respirator

- Does not filter out chemical gases or vapors
- Does not provide a seal to prevent gases and vapors from being inhaled

Respirator Usage

- Protect Yourself

Pre-Use Inspection

- Inspect the following:
  - Facepiece
  - Headband
  - Valves
  - Connections
  - Fittings
  - Cartridges, canisters, or filters

- SCBA's inspected monthly
  - Air cylinders charged
  - Regulator
  - Warning devices

Pre-Use Inspection

- Before using a tight fitting respirator
  - Positive Pressure Test – cover exhalation valve with hand and exhale. Mask should bulge, but seal should remain.
  - Negative Pressure Test – Cover inhalation cartridges with hands and inhale, mask should collapse, but seal should remain.
- If either test fails, adjust and try again.

Cleaning & Inspection

- Use warm soap and water
- Do not use harsh chemicals (bleach, etc.)
- Respirator wipes available

Cleaning & Inspection

- Disposables cannot be cleaned or sanitized, however routine inspection is still necessary
- Determine whether the straps hold the facepiece tightly against the face; if not, dispose of it; never attempt to tighten a facepiece by knotting the straps
- Inspect the facepiece to determine if it is soiled or damaged; if so, dispose of it

Care and Maintenance

- Properly store all respirators to protect from
  - Damaging chemicals
  - Sunlight
  - Extreme Temperatures/Moisture

- Do not store respirators in:
  - Areas where they can become contaminated
  - Open air environments
  - Toolboxes

Change-Out

- Chemical cartridges must be equipped with an “end of service life indicator”
  - Changes color when time to replace, or
- Employer must develop a change schedule based on reliable information
  - Several Tools available on OSHA website

Proper Storage

- Clean dry location
- Storing in a plastic bag when damp may prevent drying and encourage microbial growth. Allow respirator to dry prior to storing

- Label respirators with the user's name or other identifier

Training

- Training must be provided to employees required to wear a respirator
  - Prior to use
  - Annual refresher

Training

- Training should include an explanation of:
  - Why respirator use is necessary
  - Nature of the respiratory hazard and consequences of not fitting, using, and maintaining the respirator properly
  - Capabilities and limitations of the selected respirator
  - How to inspect, put on and remove, and check the seals of the respirator

Training

- Continued:
  - Proper maintenance and storage
  - How to use the respirator effectively in emergency situations
  - How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator

Recordkeeping

- Employer must establish and retain written information concerning:
  - Respirator program
  - Medical recommendations from a licensed physician
  - Fit Test Records
  - Training

Additional Information – osha.gov

- OSHA Respiratory Protection Handbook
- 1910.134 Respiratory Protection
- Appendix A – Fit Testing Procedures
- Appendix B-1 – User Seal Check Procedures
- Appendix B-2 – Respirator Cleaning Procedures
- Appendix C – Medical Questionnaire
- Appendix D – Information for Employees Using Respirators When not Required Under the Standard.

Additional Information – osha.gov

- Wide range of training videos:
  - Respiratory Protection in General Industry
  - Respirator Types
  - Respirator Fit Tests
  - Maintenance and Care of Respirators
  - Medical Evaluations for Persons Who Wear Respirators
  - Voluntary Use
  - Respirator User Seal Checks Donning
- OSHA Occupational Chemical Database
- Subpart Z – Toxic and Hazardous Substances

Additional Information

- Brief Quiz
- Supervisor Talking Points

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Questions?

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