Hydrogen Sulfide/ Respiratory Protection

Course Outline

Prerequisites: This course shall have no formal pre-requisite.

Course Length: 4 hours - Course length shall vary depending on the number of delegates. Total course time includes breaks.

Class Size: The maximum number of delegates that may be trained and tested per instructor shall be thirty–five (35) in the classroom session.

Course Objective

- Provide delegates with the sources, hazards and effects of Hydrogen Sulfide.
- Provide delegates with warning, monitoring and detection systems for H2S.
- Address Emergency Response Planning and H2S.
- Provide delegates with the information needed to successfully wear respirators.
- Provide delegates knowledge about the requirements of a respiratory protection program.
- Address different types of respirators and their use.
- Address inspection, maintenance, and storage requirements.
- Delegates should be able to demonstrate knowledge during written examination.

Course Design

- Power Point© / Lecture / Audio Video / Visual Aids
- Demonstrations

Successful Course Completion

- Requires a minimum score of 75% or better.
- Grades shall be calculated by dividing the number of questions answered correctly by the total number of exam questions.
- Delegates will have no more than thirty (30) minutes to complete the exam.
- Successful completion of all practical sessions is mandatory

Course Content Summary

- Classroom
- Practical

Breaks: 10 minutes (approximately every hour)

Lunch: 1 Hour (if applicable)

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About Hydrogen Sulfide (H2S)

- Regulations
- Key Terms
    - Auto Ignition
    - Flammable Limits
    - Permissible Exposure Limit (PEL)
    - Threshold Limit Value (TLV)
    - Short Term Exposure Limit (STEL)
    - Ceiling
    - Immediate Dangerous to Life and Health (IDLH)
    - National Institute of Occupational Safety and Health (NIOSH)
    - Parts Per Million (PPM)
- What is H2S?
- H2S vs. Other Notable Deadly Gases
- H2S Common Names
- Characteristics
- Disposal method
- H2S Limitations
- Where is H2S found?
- H2S Accumulation
- H2S Reactivity

Effects of Hydrogen Sulfide (H2S)

- Respiratory System Effects
- Respiratory System
    - Diaphragm
    - Trachea
    - Bronchi
    - Alveoli

Hydrogen Sulfide (H2S) Exposure Limits

- H2S Signs and Symptoms of Exposure
    - 0-50 PPM
    - 100-300 PPM
        - Olfactory Nerve Paralysis
    - 300-600 PPM

  - 600-1000 PPM
- Phrenic Nerve Function
- Variables Effecting Symptoms

Hydrogen Sulfide (H2S) Detection

- Methods of Detection (advantages/disadvantages)
  - Colorimetric Tubes
  - Personal Electronic Detectors
  - Fixed Detectors

Respiratory Protection

- Common Effects from Respirator Use
- Why Wear a Respirator?
- Breathing Air Composition
- Employee Control Measures
  - Engineering Controls
  - Administrative Controls
  - Personal Protective Equipment
- Employer Responsibilities
- Respiratory Protection Program Requirements
- Employee Responsibilities
- Types of Respirators
  - Air Purifying
  - Supplied Air
    - Self-Contained Breathing Apparatus (SCBA)
    - Atmospheric Supplied Air
    - Cascade Systems
    - Escape Packs
- Fit Testing
  - Quantitative
  - Qualitative
  - Medical Requirements
- Respirator Usage
- Respirator Inspection
- Respirator Maintenance
- Proper Donning/Doffing
- Respirator Storage

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Hydrogen Sulfide (H2S) Safety

- Arriving at a H2S Location
- Wind Direction Example
- Affected Employee Requirements
- When H2S is Present
- Site Location Condition Flags
    - Green – Possible Danger
    - Yellow – Moderate Danger
    - Red – Extreme Danger
- Other Deadly Gases Associated with H2S
    - Carbon Dioxide (CO2)
    - Sulfur Dioxide (SO2)
- Regular Drills
- Rescue

Practical Session

Practical shall verify that the delegate has acquired the following skills:

- Demonstrate satisfactory operation of personal detection equipment
- Demonstrate proper wearing of detector.
- Explain how to respond to an alarm.
- Select the proper respiratory protection equipment.
- Perform inspection of respiratory protection equipment.
- Explain the process for conducting a user seal check.
- Properly store equipment and PPE.

Additionally, employers commonly include a Respirator Fit test or Pulmonary Function test as a preparatory step prior to deployment of a worker.

Training Center Provided Material

- Course Materials

Delegate Requirements

- None

Reference Material / Documents

BSEE 30 CFR 250.490
OSHA 29 CFR 1910.134
ANSI/ASSE Z390.1—2017 Standard