



MANURE PIT GAS HAZARDS

OSHA Manure Pit Gas Hazards
Course: Hours Instruction
Hours: Class Room
Hours: Field Instruction

Regulation 1910.146
Prerequisites:
Fee:
CE Credits:

The hazards of manure storages are well-documented which may include a lack of oxygen, toxic and flammable gases, and exposure to drowning. Entering a manure pit without an adequate supply of contaminant-free air, without a safety harness with a lifeline attached to a rescue lifting device, or without using atmospheric testing devices, violates best safety practices for entering manure pits. Once a person has entered a confined space manure storage, it is often too late to mitigate the associated hazards. The human senses of smell and sight are not helpful since the gases being generated by the manure are colorless, may be odorless, and are easily masked by other common farm smells.

Who Should Take This Course: Farmers, farm operators, farm employees, producers, building installers.

Course Objectives: The purpose of this course is to set forth existing known practices on manure storages that help:

- Minimize the hazards of manure gases to livestock and humans
- Minimize the potential for drownings at manure storage sites
- Reduce risk from asphyxiation, poisoning and explosions when entering confined space manure storages
- Specify the positive pressure, forced ventilation requirements, including ventilation system layout, air exchange rates, and minimum ventilation times
- Evacuation of contaminant gases from, and replenishment of oxygen into, empty or nearly empty covered or partially covered confined-space, on-farm, manure storages, reception tanks, agitation tanks and other similar containers that hold/contain manure prior to entry

The OSHA general duty clause says, in part, that each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.

Confined Space: Includes most below ground manure storages, above ground tanks and transfer structures:

- Is large enough and so configured that a worker can enter and perform work
- Has limited or restricted means for entry or exit
- Is not designed for continuous human occupancy

Considerations for Detection of Gas:

- Monitoring Gas Levels - Hand-held, portable gas detection monitors

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- Mechanical Ventilation Systems - Positive pressure mechanical forced air ventilation system forces air into the storage to replenish oxygen levels and mitigate a buildup of dangerous levels of manure gas.
- Planned Entry into a Confined Space Manure Storage - Entails risk and should be avoided if possible
- Confined Space Manure Gas Monitoring - A gas monitor with remote sampling
- Gas Detection Equipment - Equipment should display reliable measurements of toxic gas levels
- Fixed Gas Detectors
- Gas Detection Badges
- Gas Detection Tubes
- Electronic Single- and Multi-Gas Monitors
- Measuring Containment Manure Gas Levels
- Calibrating Gas Detection Equipment
- Maintaining Gas Detection Equipment
- Calibration - Best Practices

Manure gases, especially hydrogen sulfide, are particularly critical at higher levels and any delay in detecting or accurately measuring these dangerous levels is life-threatening. Of primary concern for safety:

- Odor
- Color
- Density
- Health effects
- Precautions

Hydrogen Sulfide

- Highly toxic gas
- Heavier than air
- Dizziness
- Unconsciousness
- Death
- At low concentrations it may smell like rotten eggs
- At higher concentrations it deadens the sense of smell; no odor can be detected.

Carbon Dioxide

- Odorless
- Tasteless
- Heavier than air
- Displaces the oxygen supply in the bloodstream
- Can cause unconsciousness and death

Ammonia

- Lighter than air
- Pungent smell
- Irritation to the eyes and respiratory tract

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- Displaces oxygen in the bloodstream

Methane

- Lighter than air
- Can create an explosive atmosphere
- Displaces oxygen

Hydrogen sulfide

- One of the most dangerous manure gases
- Has an odor but it is often not detectable because it deadens the sense of smell

Prevention Strategies -Safety Guidelines:

- Hazard Signs - No Trespassing
- Never enter a manure pit alone
- Obtain and use monitoring equipment to determine the level of gases present in the manure storage area
- Prepared entry plan
- Test for toxic or explosive gases or oxygen deficiency
- Ventilation
- Understand the hazards
- Fencing
- A self-contained breathing apparatus must be worn when entering a manure storage area by a person trained in its use
- A safety body harness should also be worn and personnel should be available outside the storage area to monitor the entrant's progress with a Life Line
- Buddy system
- Rescue Equipment
- Move Slowly to prevent sparks
- No smoking or open flames / sparks
- Review hazards with others
- Phone 911 in an emergency

United Safety Solutions Course Covers:

- Safety equipment
- Management suggestions on safety
- Manure gases: Hydrogen Sulfide, Methane, Ammonia, Carbon Dioxide
- Maximum safe gas concentrations
- Related standards and practices
- Pertinent references

Certification:

Successful completion requires 80% on both classroom and practical skills.

Upon successful completion, participants receive a wallet card, documentation to satisfy OSHA.