# Working with confined manure spaces: always think safety first

Imagine a regular day on the farm. You are going about your chores as usual until the pump in the manure transfer pit under the barn breaks. You go down in the pit to fix it, but suddenly you are overcome by manure gas. No one ever expects a manure-related incident to happen, yet they do all too frequently.

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Here are a few facts on manure-related incidents:

- Nearly 150 people have died from manure gas incidents in confined spaces since the 1960s in the US.
- About half of these incidents occurred on dairy farms.
- Almost 25% involved someone under the age of 16.
- Making repairs or performing maintenance on manure equipment accounted for 34% of deaths.
- Trying to rescue another person entrapped or overcome by gases in manure storage or a reception pit resulted in 22% of deaths.

Two to three deaths per year may not seem like a lot, but it is more than should have happened. Safety precautions for working in confined manure spaces can help prevent these incidents from occurring. Remember they may just save the life of you, one of your family or your hardworking employees.

## STEP 1: Know confined space standards

Confined spaces are areas that are large enough for someone to enter and perform work but are restricted to enter or exit. They are not designed for continuous occupancy.

In many industries, confined spaces are regulated by the US Department of Labor's Occupational Safety and Health Administration (OSHA) Standard 1910.146, permit-required confined spaces. While agriculture is exempt, by following the standard you can employ the best safety practices to reduce risk of a manure-related incident on your farm.

## STEP 2: Identify potential hazards

Review and identify confined spaces around your farm that could be hazardous. Manure storage tanks, pits, manholes and tankers all fit into this category. Hazards for these confined spaces include lack of oxygen, toxic and flammable gases and drowning.

While only a few employees might work around these spaces, all employees should know the dangers of manure gas exposure and how to reduce their risk.

Warn people of potential hazards in these areas by posting warning signs. Make sure these areas have protective fences or locked gates and always barricade entry to the area when in use. These practices are important for anyone who steps foot onto your farm.

**Never work alone and always make sure you have the appropriate equipment and safety measures in place before getting inside a confined manure space.**

## STEP 3: Employ safe steps for confined space entry

Reduce exposure to manure gas by putting safety steps in place for entering confined spaces. Complete a written entry plan for each space and review it annually with all farm staff.

Use the following as a guideline for creating your entry plan:

- **Test air quality**

Before entering a confined space, use gas detection equipment to determine concentrations of hazardous gases and oxygen levels. A four-gas meter can detect oxygen deficiency and three additional hazards – typically flammability, carbon monoxide and hydrogen sulphide. They can be purchased or rented relatively inexpensively.

Always test and monitor air quality before entry. Stay outside of the space when taking the initial measurements. If dangerous or questionable concentrations are present, do not enter the space until it has been properly ventilated. Once the space is safe to enter, continue monitoring air quality for the duration of time you are in the space.

Manure storage pits, empty or full, are common places for high concentrations of manure gas to accumulate. Keep in mind manure gas can also be present outside of these spaces.

- **Ensure proper ventilation**

Make sure the space has proper ventilation to reduce the risk of asphyxiation, poisoning or explosion. Use extra caution for manure storage, reception or transfer pits where manure gas can accumulate faster.

Ventilation requirements vary by space dimensions and design. Forcing fresh air into the space using a mechanical ventilation system reduces the possibility of fire or explosion that could occur when gas comes in contact with electric fan motors. Fans should be able to move an air volume equal to half the volume of the space every minute.

Use the ANSI/ASABE S607 standard, provided by the American National Standard Institute (ANSI) and American Society of Agricultural and Biological Engineers (ASABE), for guidance on ventilation capacity and ventilation time before entry and during occupancy. Your local manure equipment dealer can also help determine proper ventilation based

*Continued on page 20*

*Continued from page 19*
on your manure storage. If it is not possible to ventilate the area, wear a correctly fitted and approved self-contained breathing apparatus (SCBA) respirator. Know you are still at risk from an explosion without proper ventilation. Test respirators annually to ensure they are functioning properly .

● **Never work alone**
Always have a minimum two people at the confined space site. The person who enters the space must be knowledgeable about the space itself, the hazards that exist and what to do if something goes wrong. The second employee must remain outside the space in case an emergency occurs. Both employees need to be able to communicate visually, by phone or two-way radio to ensure safety.

● **Lock out power sources**
Always use lockout/tagout (LOTO) practices when you are working on electrical-powered manure equipment. LOTO ensures the power is shut off and no one can turn it back on while you are making repairs or maintenance.

Just shutting the power off is not enough because it does not prevent someone else from coming along and turning it back on. LOTO practices are a simple and effective way to ensure a safe working environment although few farms use them. A basic electrical or breaker kit can be implemented with minor investment.

**It is important to measure air quality.**


● **Use safety equipment**
Use appropriate safety equipment for the job. If you must enter a confined space, always wear a body harness attached to a fall arrest and retrieval system. While falling is typically not an issue for most manure storage emergencies, the ability to be safely retrieved is crucial. Always have rescue equipment such as ropes, ladders, lifts and SCBA-equipped respirators available at the site.

## STEP 4: Create an emergency action plan

Make sure you have an emergency action plan for quick removal of the entrant if necessary. Remember, 22% of manure-related deaths have been the result of trying to rescue someone.

Never attempt to rescue someone who has been overcome by manure gas, unless you have been trained, have assistance from a backup crew using a lifeline and are wearing an SCBA-equipped respirator. Outline emergency procedures for all employees and local responders. Communicate the plan to your employees, post it at all confined space locations and ensure it is reviewed and updated regularly.

These life-saving steps can ensure you, your family members and employees stay safe when working around confined manure spaces.

Always be aware of your surroundings and think safety first. ■