

Cryogenic Concerns

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Because of the use of Artificial Insemination in cattle breeding, the transportation of semen tanks frequently occurs as well as the storage of the tanks at the farm or ranch. Due to this common occurrence, stockmen can become complacent in conducting the proper safety procedures associated with transporting semen tanks. Often the semen tank is put on the back seat of the crew cab pickup or in the wife's SUV and off we go, not realizing how we are putting lives in harm's way.

SILENT KILLER – so as a reminder

When nitrogen is converted to a liquid form; a liquefied gas, it must be kept at an extremely low temperature of -320 degrees F. As a result, the most common hazard is extensive tissue damage or burns from exposure to the liquid nitrogen or the cold vapors.

All cryogenic liquids produce large amounts of gas when they vaporize. Liquid nitrogen will expand to produce 700 times the volume of gas when vaporized. This rapid and extreme expansion leads to oxygen displacement. It takes only a small volume of liquid nitrogen evaporating in a room to result in a dangerous situation.

Because it is odorless and colorless, nitrogen has no warning properties. We are unable to detect the presence of nitrogen, so there is a risk of asphyxiation when nitrogen displaces oxygen to levels below that required to support life. The inhalation of nitrogen in excessive amounts can cause dizziness, loss of consciousness, and even death. Death may result from errors in judgement, confusion, or loss of consciousness that prevents self-rescue. At low oxygen concentration; unconsciousness, and death may occur in minutes and without warning.

CONVENIENCE IS HARMFUL

ABS Global conducted studies because the company was curious about the level of oxygen depletion and because they want to make sure their employees and those in the industry are safe. Producers are often surprised at the results of this information since they likely have already been involved in moving semen tanks around the family operation and have not been taking the extra time to load the tank in the bed of the pickup and strap it down.

Producers can get creative and come up with a system to transport semen tanks in the bed of their pickup. In addition to using straps or ropes to secure the tank, one can use an innertube to set the tank inside it. Some operations have built a wooden box to hold the tank. Securing the tank is also important to prevent it from becoming a projectile in the event of an accident.

RESCUE AWARENESS FROM OXYGEN DEPLETION

- When a person has suffered from lack of oxygen, they need to be moved to fresh air immediately.
- If the person is not breathing administer artificial respiration.
- If breathing is difficult, administer oxygen. Obtain immediate medical attention.
- Do not attempt to rescue an individual that has been overcome due to lack of oxygen in a room. The rescuer then can become the second victim.
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OXYGEN DEFICIENCY

The oxygen level in fresh-outside air is 20.9%; this is a very normal and safe environment. The National Institute for Occupational Safety and Health (NIOSH) describes 19.5% oxygen to be the onset of an oxygen-deficient environment, lower than 19.5%, people immediately begin to feel the effects. The lower the percent of oxygen in the air, the more tragic the outcome. The response by the individual may vary depending on their health, physical activity and the specific environment that they encounter.

TRANSPORTING PRECAUTIONS

ABS Global (ABS), conducted several studies to learn about the hazards of transporting liquid nitrogen semen tanks. In one study, ABS placed two newly filled tanks in the back seat of a crew cab truck. In three minutes, the cab of the pickup was unsafe for human occupancy. One hour later the level of oxygen had depleted to 14.7%. In a similar test, the tank was tipped on its side and in less than one minute the oxygen in the cab had fallen below 18.3%. Ten minutes later, the oxygen level had depleted to 9.7%.

Semen tanks should only be transported securely in the bed of a truck or in a sealed compartment where no passengers are present or may enter.

“Proper transportation methods of the semen tanks are critical to remain safe,” says Ron Zeihen, safety specialist at ABS. Zeihen explains there is continual venting of nitrogen from the tank to prevent an explosion. That’s why the stoppers have slots in them. In an air-tight vehicle, this release of nitrogen can be deadly. “There are just too many risks involved with hauling a semen tank inside the vehicle, rather than in the bed of the pickup truck.”

Undetected leaks, age of the tanks, and the length of time in an enclosed space all affect the risks of hauling a tank inside a vehicle. ABS does not permit any liquid nitrogen tanks inside the passenger compartment of its company vehicles.

BURNS

Liquid nitrogen can burn the skin. Wear the proper clothing and safety equipment when handling it.

REMOVING FROZEN STOPPERS

Should your stopper freeze, remove immediately by using a screwdriver to pry it out. (Be careful of the neck tube.) Keeping the stopper in place and the dustcover closed will reduce the chances of the stopper freezing. However, when using the tank and removing semen every few minutes, it

may be better to leave the stopper outside the tank rather than replacing it in and out each time a unit of semen is removed. If moisture accumulates on the stopper be sure to shake off the water before replacing it in the neck of the tank.

As with any chore that becomes part of a routine, it is easy to slip into habits that overlook managing the risks involved with that task. May this serve as a reminder to be aware of potential hazards involved with semen handling in the use of Artificial Insemination.