

Isoflurane Anesthetic Gas Guidelines for Animal Use

Purpose and Applicability

Isoflurane gas is a commonly used inhalation anesthetic in animal research. It is a clear, colorless, volatile liquid at room temperature and pressure posing potential risks to exposure. This generic chemical safety guidance describes basic prudent safety practice for handling this chemical in research labs. The principal investigator (PI) is ultimately responsible for developing and implementing standard operating procedures (SOPs) for the purchase, storage, and safe handling of this chemical that are specific to the PI’s research. DLAR is able to regulate, facilitate and monitor use of anesthetic gas with animals.

Hazards

Isoflurane is an irritant and can cause problems if not properly scavenged. Long-term exposure may cause chronic or adverse health effects including nausea, dizziness, fatigue, headache, irritability, reduced mental performance, liver and kidney disease, and possible reproductive effects (sterility, infertility, miscarriages, and birth defects). Proper use of Waste anesthetic gas (WAG) scavenging units can ensure low exposure risks.

Potential Exposure Risks:

* Not ensuring a tight seal around the animal’s nose cone;
* Failing to flush the induction chamber with oxygen prior to opening the chamber to transfer animals;
* Extended length of time that anesthesia is delivered during multiple animal surgeries.

Safety Equipment

Approved Scavenging Methods

Waste anesthetic gas (WAG) must be scavenged through active or passive means.  Active scavenging involves an active airflow system that draws WAG away from the researcher into an in-house WAG exhaust line, chemical fume hood, canopy hood or snorkel.  Passive scavenging methods involves passing the WAG through an activated charcoal canister, after which it is discharged into the room.  To reduce the risk of exposure to escaped vapors, one of the following control measures should be in place when administering anesthesia:

* Use of a downdraft surgery table or if space/procedure allows, placement of the entire gas mixing and delivery system within a fume hood or use of an in house WAG exhaust line.
* Installation of local exhaust over the isoflurane delivery system.
* Capture of waste gas using gas-scavenging canisters (When local ventilation is not available). Scavenging canisters must be properly maintained, checked for leaks, and weighed/checked for saturation levels prior to each use.

Spill/Exposure Procedures

**Eyes:** If anesthetic gases/liquids come into contact with eyes, immediately flush them with copious amounts of water for at least 15 minutes in an emergency eyewash.
**Skin:** In the event of skin exposure, remove contaminated clothing and immediately wash the affected area with soap and water. Report to the University of Toledo Medical center for evaluation if needed.

**SIGNS & SYMPTOMS**of Isoflurane Exposure

* Acute Exposure: nausea, vomiting, skin and respiratory irritation, including the nose and throat, headache, dizziness, and drowsiness
* Chronic Exposure: hypotension, tachycardia, respiratory depression, elevated blood glucose

If any of these symptoms appear, seek immediate help from the University of Toledo Medical Center.

Waste Disposal

Disposal of absorbent canisters that contain activated carbon to prevent release of the anesthetic gas to the environment must be managed as hazardous chemical waste.  Contact Environmental Health and Radiation Safety to collect used canisters. Label the canisters as hazardous waste/Chemical Name and store them in a sealed plastic bag or plastic box to avoid off gassing into the room.

Training

The PI is responsible for SOPs specific to use of this chemical in their lab. The PI shall provide the site specific and hands-on training for the use of this chemical in their lab. DLAR staff can help facilitate proper use of equipment. Review the reagent-specific safety data sheets (SDSs).

Resources

[University of Toledo Department of Laboratory Animal Resources](https://www.utoledo.edu/depts/dlar/)

[University of Toledo Environmental Health and Radiation Safety](http://www.utoledo.edu/depts/safety/)

External Links

[OSHA Guidance Document – ANESTHETIC GASES: Guidelines for Workplace Exposures](https://www.osha.gov/dts/osta/anestheticgases/)