



# Waste Anesthetic Gas (WAG) Scavenging System Guidance

## I. Purpose and Introduction

The intent of this guidance document is to describe waste anesthetic gas (WAG) scavenging systems and safety precautions. Utilizing anesthetic gases for anesthesia in animals presents an occupational health risk through unintended human exposure. Exposure to second-hand anesthetic gases has been associated with concerns for increased potential risk of adverse reproductive outcomes. Cardiovascular and respiratory effects may result from acute exposure and liver and kidney effects may result from chronic exposure to waste anesthetic gases. To reduce the human health risks, it is necessary to prevent WAG from escaping into the workspace, which can be accomplished by using this guidance.

## II. Scope

This guidance document is intended for use by all individuals who administer gas anesthetics to research animals within a facility.

## III. Engineering Controls to Reduce Human Exposure to WAG (Listed in order from most effective to least effective)

### A. Local exhaust ventilation

- i. Chemical Fume Hood
- ii. Ducted Biological Safety Cabinet (BSC)
- iii. Slot Hood/Downdraft Table/Snorkels

### B. Active WAG Scavenging

- i. Building Vacuum System
- ii. Auxiliary Vacuum Pump (WAG tubing from nose cones, induction chambers, etc. should exhaust into a chemical fume hood, hard-ducted biological safety cabinet, or filtered through an adsorptive charcoal canister.)

### C. Passive WAG Scavenging

- i. Activated Charcoal Canisters

**Note:** In addition to the listed engineering controls, WAG should only be used in well-ventilated rooms where there is no recirculation of exhaust air.

## IV. Procedure

- A. Ensure that all individuals responsible for gas anesthesia use are properly trained. Training is provided by the Research Animal Resource and Compliance (RARC).
- B. Maintain equipment in good working order and have it inspected/certified annually. Anesthetic gas vaporizers, chemical fume hoods, hard-ducted biological safety cabinets, and other local exhaust ventilation types should be inspected/certified annually.
- C. Utilize local exhaust ventilation (chemical fume hood, hard-ducted biological safety cabinet, etc.) whenever possible because it is the most effective control method. The induction chamber(s), nose cone(s), gas manifold, and exhaust tubing should all be located in within the containment or capture zone of the local exhaust ventilation device.

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If a building vacuum system is available, these can be used for rebreather-type gas anesthesia systems. Consult the manufacturer's instructions prior to installation and use. Auxiliary vacuum pumps are available for both rebreather and non-rebreather type gas anesthesia systems. Consult with the Environmental & Occupational Health (EOH) Unit prior to installation and use.

Passive scavenging with activated charcoal canisters should only be used when the previously mentioned control methods are not available. Activated charcoal canisters must be used in accordance with the manufacturer's directions. Activated charcoal canister usage logs that track canister weights and usage times must be maintained and kept on file. A template activated charcoal canister tracking log is available from the Research Animal Resource and Compliance (RARC).

**Note:** Activated charcoal canisters only adsorb halogenated anesthetics (e.g. isoflurane). Nitrous oxide cannot be used with these systems.

- D. Work in a well-ventilated area (e.g. rooms with 10-15 air changes per hour) with no recirculation of the room exhaust.
- E. Maintain as much distance as possible between the source of the gas (nose cones, induction chambers, etc.) and yourself.
- F. Intubate animals whenever possible. If nose cones must be used, ensure that the device seals tightly around the face of the animal.
- G. "Drop Method" anesthesia procedures must only be performed within a chemical fume hood or ducted BSC unless otherwise approved by EOH.

## V. Safety and Occupational Health

- A. For medical emergencies: Call 911
- B. Contact the Environmental & Occupational Health (EOH) Unit at 608.890.1992 or [eoeh@uhs.wisc.edu](mailto:eoeh@uhs.wisc.edu) for WAG scavenging system consultation or to schedule exposure monitoring. Website: <http://www.uhs.wisc.edu/eoh/> EOH approaches to eliminate or reduce exposure by following the hierarchy of controls (elimination, substitution, isolation, engineering, administrative, personal protective equipment (PPE)). Although PPE such as respirators equipped with organic vapor cartridges are available, they shall only be considered when other control methods are not feasible.
- C. Personnel who are pregnant or considering pregnancy should consult with their personal physician or UHS Occupational Medicine at 608.265-5610. Website: <https://www.uhs.wisc.edu/eoh/occupational-medicine/>
- D. Contact the Research Animal Resource and Compliance (RARC) at 608.890.0344 or [trainer@rarc.wisc.edu](mailto:trainer@rarc.wisc.edu) for anesthesia system training. Website: <https://www.rarc.wisc.edu/>

## VI. References

Occupational Safety & Health Administration (May 18, 2000). *Anesthetic Gases: Guidelines for Workplace Exposure*. Retrieved from <https://www.osha.gov/dts/osta/anestheticgases/#C2>

University of Wisconsin – Madison Environmental & Occupational Health Unit. *Guidance for the Control and Monitoring of Waste Anesthetic Gases in Animal Research*. Retrieved from <https://www.uhs.wisc.edu/wpcontent/uploads/GuidanceforWasteAnestheticGases062916.pdf>

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