

INSTITUTIONAL ANIMAL CARE AND USE POLICY

Anesthetic Vaporizers and Gas Scavenging

Previous Review Date(s): 1/6/2020

Approval Date: 3/6/2023

Next Review Date: 3/6/2026

PURPOSE

- To assure the safe and effective use of gas anesthesia equipment.
- Anesthetic vaporizers and gas anesthesia units are designed to deliver an accurate level of anesthetic vapor in a controlled and safe manner to animals to induce and reliably maintain an appropriate depth of anesthesia with minimal exposure to personnel.
- Proper operation is essential to maintaining an appropriate plane of anesthesia while minimizing the potential of human health risks from inadvertent exposure to waste anesthetic gas vapors.

This policy offers direction on the following topics:

- Anesthetic Equipment
- Scavenging Equipment
- Certification
- Exposure Monitoring
- Training

ANESTHETIC EQUIPMENT

- Because inhalant anesthetics have different vapor pressures, precision vaporizers should only be used for the anesthetic agent for which they are manufactured.
- Vaporizers may be converted for use with another anesthetic agent by a certified vendor.
- Before each use, inspect vaporizers and other components (e.g., tubing, flow meters, valves, gaskets, scavenging system) to ensure that all components are correctly set-up and functioning properly without leaks in the system.
- SUNY Downstate Environmental Health & Safety (EH&S) will review the safety data Sheets (SDS) to determine what health effects are expected.
- Medical concerns associated with use of or exposure to inhalational anesthesia should be directed to SUNY Downstate Student Employee Health Services. If symptoms, such as headaches, nose or throat irritation, dizziness, or drowsiness persist, seek medical attention by calling Public Safety at 718-270-2626 or going to the University Hospital Emergency Department. Explain carefully what chemicals were involved.

SCAVENGING EQUIPMENT

Waste anesthetic gas scavenging systems must be properly maintained in accordance with manufacturer's instructions and/or institutional policies to ensure health and safety of personnel.

The following are examples of scavenging methods:

- Charcoal Canisters

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- may be used to adsorb halogenated waste gases according to the manufacturer's instructions,
 - should be dated when put into use,
 - should be weighed prior to the first use and then monitored after each use once put into service to assure they have not reached full saturation,
 - should not have exhaust ports blocked when in use, and
 - should be oriented according to manufacturer recommendations.
- Fume Hoods & Ducted Biological Safety Cabinets (BSC)
- The use of a fume hood or ducted BSC to capture waste gas is acceptable depending on amount of the agent being used.
 - Induction chambers and anesthetic circuit exhaust tubing (but not the surgical field) may be placed inside the functioning unit.
 - Do not use a hood or BSC for any function for which it was not intended.
 - Fume hoods and BSCs must be surveyed annually; EH&S has a contracted vendor for this purpose. If the unit is past due or has failed inspection sticker, please contact EH&S (718-270-3389).
 - Bio-safety cabinets MUST not be used if they have a failed inspection sticker.
- Dedicated Exhaust:
- A dedicated exhaust or zone capture exhaust is preferred for removal of waste gases from a surgical area or procedure space. Dedicated exhaust, other than fume hoods and ducted BSCs, is only available within the DCM animal facility.

EQUIPMENT MAINTENANCE/CALIBRATION

- Anesthesia machines must be maintained in good working condition to ensure optimal agent delivery in a safe manner.
- It is the responsibility of the owner of the equipment (Principal Investigator (PI), department, or DCM) to contact an authorized service vendor, pay for the service, and to maintain service records and certification for all anesthesia equipment.
- Full service calibration includes replacement of gaskets, wicks, seals and 'O' rings, performing leak tests, and calibration to ensure accurate delivery of anesthetic.
- Validation (*E-Z Anesthesia*®), efficacy testing (*VetEquip, Inc.*), and metering (*Ronco Technical Services*) is only a measurement of the anesthetic outflow relative to the vaporizer setting to assess of the accuracy of delivery.
- Anesthetic vaporizers should be serviced according to the manufacturer recommendations or based upon the following criteria:
 - Full service calibration is required:
 - At least every 3 years
 - When validation, efficacy testing, or metering indicates $> \pm 15\%$ variation from the vaporizer dial setting.

Institutional Animal Care and Use Committee (IACUC)

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Validation, efficacy testing, or metering is required at least annually when the vaporizer has been out of service for more than once year.

- Vaporizers past due for service or not in service should be labeled 'NOT IN SERVICE' and be serviced based upon the above criteria before used.

Based on use there are several different vendor and servicing options. Price quotes are available but subject to change. Please contact iacuc@downstate.edu for approximate pricing or the company directly for specific quotes.

Servicing Company	Contact Information	Servicing Options
E-Z Anesthesia®	1-877-559-0159 info@ezsystemsinc.com	Full Service Calibration Validation Exchange Service
Vet Equip Inc.	1-800-466-6463 service@vetequip.com	Full Service Calibration Efficacy Test Exchange Service
Ronco Technical Services	1-800-635-2006 customerservice@roncotech.com Vaporizer Service Policy	Full Service Calibration Metering Exchange Service

Documentation of anesthetic machine maintenance should be kept on file in the laboratory near the machine and should include the following information:

1. Date of last service, and type of service performed.
2. Name of person or company that performed the test.
3. Test results.
4. A sticker with the date of service and/or duration of certification affixed to the vaporizer.

During IACUC semi-annual site visits vaporizers are reviewed for compliance with this policy.. EH&S will also check for expired inspection stickers when performing laboratory audits.

EXPOSURE MONITORING

- When necessary, the IACUC Office coordinates with EH&S to conduct exposure monitoring according to established industrial hygiene practices.
- Based upon monitoring results, periodic air sampling may be scheduled and modifications made to the environmental conditions if possible.

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TRAINING

- Personnel must be trained in the proper use of anesthetic machines, vaporizers, and scavenging systems prior to operation.
- For additional guidance and training in the use of anesthesia equipment, please contact DCM for training at DCM-training@downstate.edu.

REFERENCES: [AAALAC FAQ E.1](#); [Guide for the Care and Use of Laboratory Animals, 8th Edition](#) (p. 21, 145); [OSHA Health Care Workers Guidelines/Chapter 5b](#); SUNY DMC [Laboratory Safety Manual](#) & [Chemical Hygiene Plan Manual](#), January 2017.

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