



Anesthesia Vaporizer Preventative Maintenance and Servicing

368.1 Policy

Inhalational anesthetic vaporizers are required to function properly for the administration and use of general inhalational agents on animals at Emory University. The IACUC requires that vaporizers be fully serviced every 3 years by a qualified technician. In addition the IACUC requires preventative maintenance of anesthesia machines be performed and documented annually unless the triennial professional service has occurred within the last 12 months.

368.2 Definitions of Key Terms Specific to this Policy

368.2.1 Preventative maintenance includes the evaluation of each piece of equipment involved in the delivery of inhalant anesthetics and removal of waste gases. Trained laboratory personnel can perform the annual preventative maintenance as opposed to a qualified service technician. Equipment used in the delivery of inhalant anesthetics should be evaluated before each use. In addition, documentation of proper function should be done annually. Refer to appendix A.

368.2.2 Servicing of the machine is to be done by a qualified vendor and includes physical inspection of the anesthesia machine and vaporizer and the performance of necessary cleaning, calibration, lubrication, testing, and adjusting of vaporizer parts.

368.2.3 Documentation of maintenance includes information of preventative maintenance and service. Documentation of service must be affixed to each anesthesia machine or vaporizer that is in service. Documentation of preventative maintenance must be available for review. It should be affixed to the machine or located on the wall or other site within immediate proximity to the machine. Refer to appendix A.

368.2.4 Qualified technician includes licensed personnel who are trained to service anesthesia vaporizers. Please contact the IACUC office or see the IACUC website for list of suggested vendors.

368.2.5 OSHA Health Care Workers Guidelines/Chapter 5b

(<http://origin.cdc.gov/niosh/hcwold5b.html>) states “equipment must be regularly monitored for leakage, improper design, or tubing defects” in order to prevent the possibility of excess volatile anesthetic leakage into the environment. Acute effects of excess volatile anesthetic in the environment include excessive amounts of gases producing feelings of drowsiness, irritability, depression, headache, nausea, fatigue, and problems of judgment and coordination (OHS 5.1.12.2.1). Chronic effects include embryo toxicity, liver and kidney disease, and cancer. There is a suggested relationship between exposure to waste gases and increased cancer rates and adverse effects on reproduction among exposed workers (OHS 5.1.12.2.2).

368.2.6 Training of Personnel: Personnel must be trained in the proper use of anesthetic machines and

vaporizer prior to operation, to assure safe handling of the animals and the anesthetic agent. It is the responsibility of the PI to ensure adequate training of personnel.

368.2.7 Appropriate scavenging methods are important to prevent exposure to anesthetic or waste gases. Contact the EHSO office for further information.

368.3 Applicability

368.3.1 This policy applies to all Emory research animal activities that fall under the IACUC's jurisdiction when using inhalational anesthetic vaporizers to maintain anesthesia.

368.4 Inhalational anesthesia vaporizer maintenance

368.4.1 Preventative Maintenance

368.4.1.1 All equipment pieces involved in the delivery of inhalant anesthetics must be evaluated to assure proper function. This includes examination of tubing, hoses, gas connections, cylinder yoke assemblies, and fittings. While the evaluation should be done at each use, the check list must be completed annually. A specific evaluation check list is attached at the end of the document. See Appendix A.

368.4.1.2 Vaporizers must have documentation of preventative maintenance. Information that must be maintained includes (refer to appendix A):

1. Date of maintenance test
2. Name of person who performed the test
3. Test results

368.4.1.3 Discoloration (yellowish-brown) in the "Fill" sight glass of the vaporizer may be an indicator for the need for service by a qualified vendor. Other indicators might include cracked or damaged hoses, sticking valves or knobs, or animals not responding (as anticipated) to the level of anesthesia provided.

368.4.2 Charcoal Filter Canister Maintenance

368.4.2.1 To be effective it is required that all charcoal/carbon filter F-Air canisters in use be monitored for the level of absorbency of the halogenated waste gases. Monitoring canister absorbent life can be done by following total hours of use or monitoring the weight of the canister.

368.4.2.2 To monitor by total hours, a log indicating the number of hours used must be maintained on the side of the canister. The total hours of F-Air canister in use may not exceed the manufacturer's guidelines as the canister is no longer effective for absorbing waste gases.

368.4.2.3 To monitor by weight of canister, the baseline weight must be recorded directly on the canister. After each use or before next use, the canister must be weighed and value recorded on the canister. Note that manufacturer's guidelines must be followed in regard to weight limits, and that canisters must be discarded once it reaches those limits as it is no longer effective for absorbing waste gases.

368.4.2.4 The canister must be used vertically (do not lay them on their side while in use) and suspended off of the table top or floor if the exhaust ports are in the bottom of the canister.

368.4.2.5 Saturated canisters are considered hazardous chemical waste. Contact the EHSO office for disposal requirements.

368.4.3 Vaporizer Servicing

368.4.3.1 The vaporizer must be serviced every three years by a licensed qualified technician. Servicing can include physical inspection of the anesthesia machine and vaporizer, the performance of necessary cleaning, calibration, lubrication, testing, and adjusting of vaporizer parts. If machines are found to be out of calibration (+/- 10%) per the evaluation of the qualified technician, the machines will need to be sent out for service.

368.4.3.2 Vaporizers must have documentation of service. Information that must be maintained includes:

- Certification of validation including the date of service

368.4.3.3 Documentation of service must be affixed to each anesthesia machine or vaporizer that is in service.

368.5 Document Properties

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Appendix A

Anesthetic Vaporizer Preventative Maintenance Checklist Required to be completed annually

Date completed _____

Person performing unit check _____

Test results _____

1. Physical examination of the vaporizer for mechanical damage
2. Examination of gas connections and cylinder yoke assemblies to ensure appropriate fittings
3. Inspection of the tubing, fittings, and connections for cracks, breaks, loose connections, or jammed fittings. Use the soap bubble test to check for leaks.
4. Inspection of O2 flush valve for appropriate function
5. Check Fill/Drain system to ensure it operates properly and that there are no leaks. Any discoloration in the fill tank reservoir is indication the machine needs servicing
6. Electrical safety inspection and battery replacement if necessary
7. Verify operation of safety interlock if applicable
8. Verify operation of handwheel lock and release button
9. Verify handwheel turns smoothly through entire range