

COMPARATIVE MEDICINE  
LABORATORY ANIMAL FACILITIES

STANDARD OPERATING PROCEDURES  
For  
ANESTHETIC MACHINE AND VAPORIZER MAINTENANCE AND  
CALIBRATION

1.0 Purpose

This procedure outlines proper anesthetic machine and vaporizer maintenance and calibration. Proper maintenance of anesthetic machines and vaporizers is necessary to assure the health and well being of animals receiving inhalational anesthesia, and to assure the occupational health and safety of persons operating anesthesia machines. *The Guide for the Care and Use of Laboratory Animals* and the National Institute of Occupational Safety and Health (NIOSH) both require that anesthetic machines be properly maintained to minimize personnel exposure to anesthetic waste gases. Additionally, AAALAC International requires that anesthetic machines and vaporizers be evaluated for safe and effective operation on an established schedule, consistent with the manufacturer's recommendations.

2.0 Scope

This procedure applies to all CMLAF owned anesthesia machines and to all anesthesia machines maintained by PI's.

3.0 Procedure

- 3.1 Anesthesia machines and vaporizers should be maintained in good working order to assure that the anesthetic agent is delivered in a safe manner.
- 3.2 The gold standard for anesthesia machine and vaporizer maintenance is the manufacturer's recommendation. Manufacturer recommendations for frequency of anesthetic machine and vaporizer maintenance generally vary from every 1 - 3 years. If the manufacturer's recommendation of scheduled maintenance is chosen, then a copy of the manufacturer's service manual should be kept in the laboratory, as a reference, to be used during IACUC or other regulatory agency inspections.
- 3.3 If no manufacturer recommendation is available, then the anesthetic machine and vaporizer should be serviced on an annual basis, by a qualified service person, as outlined below:
  - A. Anesthetic machines, which contain a vaporizer, flowmeter, and rebreathing bag or ventilator, maintained by PI's that experience heavy use (more than 10 hours per week), and all anesthetic machines owned by the CMLAF, should have the following annual maintenance:

1. Inspection and testing of all parts of the anesthesia machine, including: high and low pressure components, flow meter and oxygen flush valve, breathing circuits, all tubing, and the gas scavenging circuit.
  2. Vaporizer cleaning and calibration, in which the vaporizer is disassembled, inspected, cleaned and recalibrated.
- B. Anesthetic machines maintained by PI's that experience lighter use (less than 10 hours per week), should have the following annual maintenance:
1. Inspection of all parts of the anesthesia machine, as detailed above, in part 3.3.A.
  2. Vaporizer efficacy testing, in which the output of the vaporizer is verified at all dial settings. Any vaporizer that is found not to be properly calibrated should undergo cleaning and recalibration, as detailed in section 3.3.A.2. Additionally, all vaporizers should be fully cleaned and calibrated at least once every 3 years.
- C. "Rodent" anesthetic machines, consisting of only a vaporizer and flowmeter, but not containing a rebreathing bag or ventilator, should have the following annual maintenance:
1. Vaporizer efficacy testing, in which the output of the vaporizer is verified at all dial settings. Any vaporizer that is found not to be properly calibrated should undergo cleaning and recalibration, as detailed in section 3.3.A.2. Additionally, all vaporizers should be fully cleaned and calibrated at least once every 3 years.
- 3.4 Any anesthetic machine that does not appear to be working properly (i.e., animals not responding as anticipated to level of anesthesia provided), or that has obvious damage (sticking knobs, cracked or damaged hoses, yellow-brown discoloration in the "fill" sight glass of the vaporizer), should be serviced as soon as possible.
- 3.5 Documentation of anesthetic machine maintenance should be kept on file in the laboratory, and should include the following information:
- A. Date of last service, and type of service performed.
  - B. Name of person or company that performed the test.
  - C. Test results.
  - D. A sticker with the certificate of the calibration date should be affixed to the vaporizer after each service.
- 3.6 Vaporizer servicing and maintenance can be arranged for PI's through the CMLAF.