Anesthetic Machine/Isoflurane Vaporizer Certification

Notice: TNMC Biomed will no longer offer vaporizer certification service for UNMC. CM will now be working with PENLON to have their anesthetic machines and vaporizers certified annually.

- PENLON will be on campus on August 3-6 and available for appointments. If you are due for your annual recertification you may contact:
  - Dave Griffith – (515)490-6510
  - Cost – 155.00 + Shared trip fee of 75.00 (Trip fee will be divided by the number of labs that are serviced during his visit 8/3-8/6).

- You may obtain services through another company, but please be advised that your machine and vaporizer must be certified annually.
UNMC/UNO Policy on the Use of Anesthetic Gas

(Approved 7/2008)

I. Introduction Inhalant anesthetic gases (i.e. isoflurane) are commonly used for the purposes of anesthesia and euthanasia. Scientific literature contains conflicting evidence about the effects of personnel exposure to trace levels of anesthetic gases. Genetic mutation, cancer, hepatic and renal disease, immunological effects, spontaneous abortions, and psychomotor changes have been linked to exposure to trace anesthetic gases. Even though potential for serious effects on human health is minimal, exposure to waste anesthetic gases should be minimized. To minimize exposure, proper maintenance of anesthesia equipment and the use of appropriate waste scavenging systems must be employed.

II. Policy

Equipment Maintenance/Calibration. Anesthesia machines, ventilators, breathing systems and scavenging systems should be checked and maintained in good working condition to assure that they do not leak anesthetics into the atmosphere of the workplace.

1. The primary standard for vaporizer calibration/certification is the manufacturer’s recommendations. If the manufacturer’s recommendation for service is implemented, then a copy of the manufacturer’s manual or instructions should be available for review.

2. If no manufacturer recommendation is available, the machine must be serviced annually or any time the vaporizer has not been in use for more than a year. Annual service consists of certification (inspection of all the mechanics associated with the vaporizer and anesthesia machine) and calibration (analysis of the emitted gas to insure the accuracy of the concentration settings).

3. All equipment is to be serviced by qualified personnel (authorized service center).
4. Indicators of the need for service by an authorized service center include cracked or damaged hoses, sticking valves or knobs, animals not responding to the level of anesthesia provided, and/or discoloration (yellowish-brown) in the “fill” sight glass of a vaporizer.

B. **Waste Gas Scavenging System.** Waste anesthetic gases must be scavenged and equipment must be maintained in good working order to ensure a safe working environment. There are various acceptable methods of scavenging waste gases:

1. **Dedicated Exhaust System.** An exhaust system such as a central vacuum system provides a source of negative pressure to remove the waste anesthetic gases. This is the preferred system of scavenging waste anesthetic gases.

2. **F-Air Canisters.** Canisters containing activated charcoal can be used to absorb waste gas. These canisters are not effective for capture of nitrous oxide. The canister must be weighed PRIOR to its initial use and again at each use thereafter. The canister must be discarded when there is a 50 gm increase in the initial weight.

3. **Fume Hoods:** A vented chemical fume hood or vented biosafety cabinet may be used to capture waste gases. The fume hood must be certified Bal-Con (or any authorized contractor) every 12 months. Contact Comparative Medicine for additional information on the certification process.

C. **Documentation of Equipment Service.**

1. Vaporizers must have documentation of calibration/service. Information that must be affixed to the vaporizer includes:
   a. Date of last service
   b. Initials of service technician
   c. Test results

2. Documentation of service must be affixed to each anesthesia machine.
D. **Special Consideration-The Open Drop System.** The open drop system is the most basic type of anesthetic delivery system. It involves the application of the anesthetic gas to an absorbent material that is then placed in the bottom of an anesthetic chamber or nose cone device. The advantage of this system includes low cost of equipment and minimal rebreathing to expired gases by the patient. The disadvantages include personnel exposure due to difficulty in scavenging waste gas and patient concerns due to difficulty in controlling anesthetic concentration and risk of mucus membrane/skin irritation due to contact with the liquid. To minimize the risks, the following must be implemented:

1. A vented chemical fume hood or vented biosafety cabinet must be used during the procedure. The anesthetic must be added to the absorbent material only inside the hood.
2. A chamber with a tight-fitting cover must be used. The cover must stay on the chamber except when the animals is being placed into or removed from the chamber.
3. Prior to placement into a jar, a barrier such as a mesh grid must be placed into the jar to prevent local skin and eye irritation of the animal by direct contact with the liquid anesthetic.

### III. References

Anesthetic Gases: Guidelines for Workplace Exposure, OSHA, May 18, 2000

AVMA Guidelines on Euthanasia, June 2007

Commentary and recommendations on control of waste anesthetic gases in the workplace, American Veterinary Medical Association, JAVMA, 209 (1) July 1, 1996, pg. 75-77

Criteria for a Recommended Standard: Occupational Exposure to Waste Anesthetic Gases and Vapors. DHHS (NIOSH) Publication No 77-140, 1977

If you need assistance or have any questions pertaining to the use of animals in research please contact CM, PAL, or the IACUC at any time.

✈ **UNMC Appreciates Your Help in Promoting a Responsible, Safe, & Compliant Animal Research Environment.**