



THE UNIVERSITY OF TOLEDO

SUBJECT: IACUC Standard Operating Procedure for Vaporizer Calibration and Maintenance

DATE: November 19, 2025

The University of Toledo Standard Operating Procedure on Vaporizer Calibration and Maintenance

1. Introduction

Anesthesia machines and vaporizers must be in good working condition to reduce anesthetic gas leaks, to ensure the best performance of scavenging equipment, and to provide the appropriate percentage of anesthetic delivery. The proper operation of these units is essential to minimize potential pain and suffering, to ensure the maintenance of reliable and safe anesthesia, and to minimize the potential of human health risks due to inadvertent exposure to anesthetic vapors.

2. Procedure

- a. Accuracy of anesthetic agent output from a precision vaporizer must be verified annually by a professional service. If the vaporizer has not been in use for more than a year, it must be verified prior to reinstating its use.
- b. If the concentration of gas delivered is $> \pm 15\%$ from the value setting, the unit must be professionally serviced and certified for calibration verification.
- c. Documentation of equipment validation must be affixed to each anesthesia machine or vaporizer indicating the most recent verification date.
- d. Calibration and maintenance of vaporizers located within the Department of Laboratory Animal Resources (DLAR) will be managed by DLAR. However, principal investigators will be responsible for any service fees required on PI-owned vaporizers located within DLAR. For vaporizers located outside of DLAR, it is the responsibility of the PI to schedule annual service and pay service fees as applicable.
- e. The vaporizer must be maintained in an upright position to indicate liquid levels accurately.
- f. Vaporizers manufactured for isoflurane may not be used for any other inhalant anesthetic.
- g. Supply gas should be compressed oxygen (99.99% pure oxygen) or medical grade air (~78 % nitrogen, ~21 % oxygen). Exceptions to this must be approved in the IACUC protocol.
- h. Waste anesthetic gas (WAG) must be scavenged through active or passive means. Active scavenging involves an active airflow system that draws WAG away from the researcher into an in-house WAG exhaust line, chemical fume hood, canopy hood or snorkel. Passive scavenging methods involve passing the WAG through an activated charcoal canister, after which it is discharged into the room.
- i. If charcoal canisters (e.g.F/air are used for scavenging, the initial canister weight must be recorded, as well as the weight after each use, on the canister. Follow manufacturer's

recommendations for duration of canister use (based on weight). Charcoal canisters position must be maintained in a vertical position, so that the gas exhaust flows from the top of the canister to the bottom. Canisters in use should be checked regularly and spent canisters may be disposed of in the regular trash stream.

- j. Personnel must be trained in the proper use of anesthetic machines and vaporizers prior to use. Consult the DLAR website for training information. (<https://www.utoledo.edu/depts/dlar/training.html>).