

STANDARD OPERATING PROCEDURES FOR ANESTHETIC GAS USE AND SCAVENGING SYSTEM IN ANIMAL RESEARCH

Use of Precision Vaporizer

Pre Procedure (Preparing for Anesthetic Gas Use)

1. Upon receipt, the scavenging canister must be labeled with the date received and its initial weight.
2. Upon initial use and prior to subsequent use, check expiration date of canister **(if expired, dispose through EHS)**.
3. Upon initial use and prior to subsequent use, weigh and label the scavenge canister with date and current weight **(if it weighs 50 grams more than its initial weight, dispose through EHS)** to evaluate the remaining absorption capacity. If the total increase is close to 50 g, it should be replaced. Immediately following the use of an anesthesia machine, weigh the canister and record the weight on the canister. Canisters that exceed 50 grams of accumulated weight must be removed and placed in a sealed plastic bag and disposed of as a hazardous waste through EHS.
4. Connect a new canister to scavenger line. The charcoal canister should always be upright and below the vaporizer of the anesthesia machine so that the heaviness of the waste gases is exploited. The holes on the bottom of the carbon canister must not be blocked. The charcoal canister should be as far removed from the administering anesthetist as possible.
5. Verify equipment used (i.e. fume hood and vaporizer) are currently certified and in proper working condition.
6. Fill vaporizer using anti-spill bottle adapter or conduct filling in fume hood, closing bottle and reservoir as quickly as possible. Do not permit containers to remain open. Use agent specific, keyed filler system for refilling vaporizers.
7. If using a compressed gas cylinder, ensure that there is adequate oxygen to last the entire procedure.
8. Tighten all tubing connections. Visually inspect hoses, valves, and connections for leaks, defects, and damage in anesthesia equipment and scavenging system
9. Adjust the stop cock on the y-piece tubing so that the isoflurane/oxygen mixture will flow into the induction chamber, returning to the scavenger canister, and not through the tubing going to the nose cone.
10. When possible, the charcoal canister or the entire anesthesia unit should be placed in a non-recirculating fumehood during the administration of anesthesia.

Procedure (The following techniques should be utilized during anesthetic procedures to reduce the amount of waste gas to be scavenged):

1. Place the animal in the clean induction chamber, making sure to close the chamber securely. Note: The induction chamber is functionally air-tight; do not leave animals in the closed chamber without gas flow. Ensure the chamber is equipped with two outlets, one for delivery of the inhalant and one for scavenging.
2. Turn on the oxygen so that flow rate is 1 L/min. Adjust dial for isoflurane delivery to 3-4%. Note: Use the lowest anesthetic gas concentration and oxygen flow rates as needed to maintain anesthesia.
3. When animal loses righting reflex, turn off isoflurane flow and flush induction chamber with oxygen for 20 seconds prior to opening chamber and retrieving anesthetized animal. Quickly replace the lid of the chamber, and continue to run oxygen through the chamber for several minutes to help purge the waste anesthetic gas into the scavenger.
4. Remove animal onto a clean procedure surface; snugly attach a nose cone; dial isoflurane concentration to 1.5 – 2.0% and oxygen flow to 0.8 L/min.
5. Adjust stop cocks so that flow is into tubing attached to nose cone and not in to induction chamber.
6. Thoroughly flush all residual gases out of the breathing system and into the scavenging system.
7. If exhaled air is not returned through the scavenger canister through a separate re-breathing line, all subsequent procedures must be performed inside a clean, certified chemical fume hood or with other local ventilation.

General considerations

- a. Heat loss is rapid in anesthetized rodents. Keep animals warm by wrapping/covering them (e.g., drape or towel), and/or providing a heat source (e.g., heat pad, Grabber® hand warmer) until they have fully recovered from anesthesia. Ensure that all heat sources are thermostatically controlled and/or carefully monitored, so to prevent burns while maintaining thermal support.
- b. Apply sterile ophthalmic lubricant (e.g., Puralube) to eyes once animal is anesthetized.
- c. Ensure adequate depth of anesthesia prior to performing procedures (e.g., monitor pedal withdrawal and palpebral reflexes).
- d. Ensure animal safety: Minimally, monitor respiration, and skin/mucous membrane color. ° For long procedures, or procedures that restrict direct observation (e.g., CT scan) utilize a heart rate monitor or respiratory and/or oxygen saturation monitor.
- e. Anesthetized rodents must not be placed in contact with loose bedding or similar materials. Recover animals in a bare cage or on top of a paper towel (or similar barrier) to prevent aspiration of bedding.
- f. Monitor until fully recovered from anesthesia.