

Anesthetic Equipment Calibration and Maintenance

Because anesthesia is a critical component of the veterinary care program, and the use of anesthetic gases may pose a risk to personnel, anesthetic machines and vaporizers should be evaluated for safe and effective operation. This should follow an established schedule, consistent with the intensity of use and manufacturers' recommendations. Properly functioning gas anesthesia machines and vaporizers are key to the delivery of accurate doses of anesthetic agent to the animal, and to the safety of personnel, avoiding the exposure to waste anesthetic gases.

The precision vaporizer should be maintained according to the recommendations of the manufacturer and may include on-site calibration and/or having the precision vaporizer returned to the manufacturer for more extensive work. Factors that may affect the schedule for service include the type of anesthetic agent used, the frequency of use of the machine, as well as the type of vaporizer used.

The anesthesia machine (what the vaporizer is attached to) can vary in complexity. There are many factors to consider (e.g., frequency of use, age of machine, environmental conditions, etc.) when developing a program for anesthesia machine maintenance and upkeep, and all components need to work properly as an integrated unit.

Several aspects may be considered for the calibration and maintenance program:

- Calibration: ensures that anesthesia machines and vaporizers deliver accurate and consistent doses of anesthetic gases, minimizing the risk of overdose or inadequate anesthesia. Inaccurate calibration can lead to patient harm, and equipment malfunction.
- Flowmeter accuracy: verification to ensure precise control over gas flow rates.
- Leak Testing: to identify and rectify any leaks in the anesthesia delivery system (e.g., hoses and seals/gaskets). This helps prevent personnel exposure to anesthetic gases and ensures accurate animal dosing.
- Scavenging systems:
 - Active scavenging systems may be used to prevent waste anesthetic gas exposure. These systems should be maintained according to manufacture recommendations.
 - Alternatively, carbon adsorption canisters may be used to scavenge anesthetics from waste gas lines. Canisters should be weighed prior to initial and each subsequent use, utilized in accordance with manufacturer's instructions, and replaced when necessary.
- Risk assessment: to be performed with respect to conditions of use (time of exposure, gases used, etc.) and attention to all staff that may be exposed to anesthetic gases.
- Training: of all staff that use the equipment, to identify and check the status of the equipment, and inform of any potential issue.

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- Documentation: for maintaining detailed records of calibration and maintenance procedures, including dates, results, and any adjustments made. A variety of methods can be used to effectively document anesthetic equipment maintenance (e.g., tags on machines, bar codes, spreadsheets, databases, etc.). Regardless of the record keeping method, the information should document that the anesthetic machines are in proper working order. This documentation may also be important for legal compliance.

More detailed guidance on checking anesthetic equipment can be found at:

<https://anaesthetists.org/Home/Resources-publications/Guidelines/Checking-Anaesthetic-Equipment>