

# Anesthesia reference guides and checklists

Ensure Patient Wellbeing  
in the Surgical Setting



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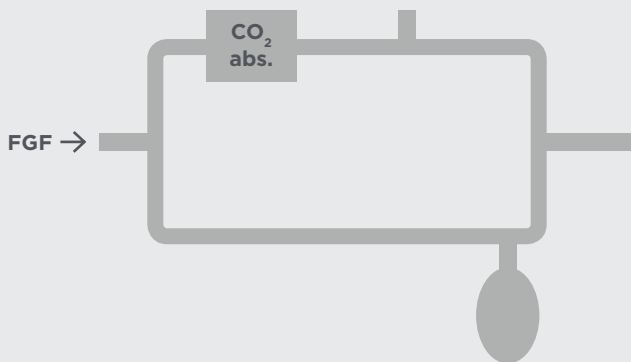
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## RECOMMENDED FLOW RATES FOR ANESTHESIA SYSTEMS

As part of our ongoing commitment to the continual improvement of veterinary anesthesia, we are providing guidelines for fresh gas flow (FGF) rates during anesthesia.

The function of, and therefore requirement for, oxygen flow depends on the type of breathing system used. The main differences are reviewed below, and recommended flow rates are shown on the next page.

### REBREATHING CIRCUITS



#### Method of removing CO<sub>2</sub>

- Chemical; use of absorber crystals (e.g. soda lime/baralyme)

#### Functions performed by O<sub>2</sub> flow

- Carrier gas for inhalant
- Replace metabolized oxygen

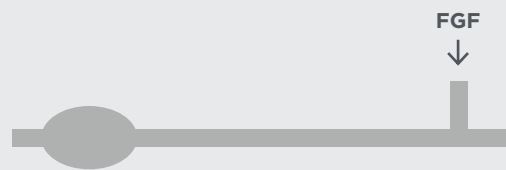
#### Advantages

- Cheaper to run, warms and moistens gases

#### Disadvantages

- Vaporizer changes slower to take effect, higher resistance to breathing

### NON-REBREATHING CIRCUITS



#### Method of removing CO<sub>2</sub>

- Physical; "blown away" by fresh gas flow

#### Functions performed by O<sub>2</sub> flow

- Carrier gas for inhalant
- Replace metabolized oxygen
- Remove expired CO<sub>2</sub>

#### Advantages

- Breath-by-breath response to vaporizer changes, low resistance

#### Disadvantages

- Higher O<sub>2</sub> and inhalant costs, inspired gases are dry and cold

## REBREATHING AND NON-REBREATHING ANESTHETIC CIRCUITS

Anesthetic breathing circuits perform several important functions during anesthesia including:

1. Supply of oxygen and anesthetic agent to the patient
2. Removal of expired carbon dioxide from the patient
3. Facilitation of manual ventilation

Anesthetic breathing circuits may be broadly classified into rebreathing circuits and non-rebreathing circuits depending on how they prevent exhaled carbon dioxide from being rebreathed by the patient. A comparison of the key features of each type of system appears below.

	REBREATHING	NON-REBREATHING
<b>Examples</b>	Circle	T-piece, Bain, Lack
<b>Method of carbon dioxide removal</b>	<b>Chemical</b> Carbon dioxide absorbers	<b>Physical</b> Fresh gas flow
<b>Common fresh gas flow rates</b>	<b>2020 AAHA guidelines</b> 20-40 ml/kg/min, 500 ml/min minimum	200-400 mL/kg/min
<b>Recommended patient size</b>	<b>Over 10 kg</b> (Resistance to breathing may be too high for smaller patients)	<b>Up to 10 kg</b> 2020 AAHA guidelines <3-5 kg
<b>Economy</b>	<b>Good</b> Much of the carrier gas and agent is recycled	<b>Poor</b> No recycling. Some gas does not even enter the patient
<b>Control of patient depth</b>	<b>Slower</b> Effect of vaporizer changes is diluted by existing volume of gas in the circuit	<b>Faster</b> Effect of vaporizer changes is experienced on a breath-by-breath basis
<b>Characteristics of inspired gases</b>	Warmed and moistened by the patient	Cold and dry

## DAILY CHECKLIST FOR ANESTHESIA MACHINES

As part of our ongoing commitment to the continual improvement of veterinary anesthesia, we have provided guidelines for the daily check of anesthesia machines and breathing circuits.

The incorporation of a system check into the daily routine of setting up for surgery can help early detection of equipment problems and potentially avoid emergencies during anesthesia.

### KEY PARTS OF THE MACHINE TO BE CHECKED



VAPORIZER FILL LEVEL



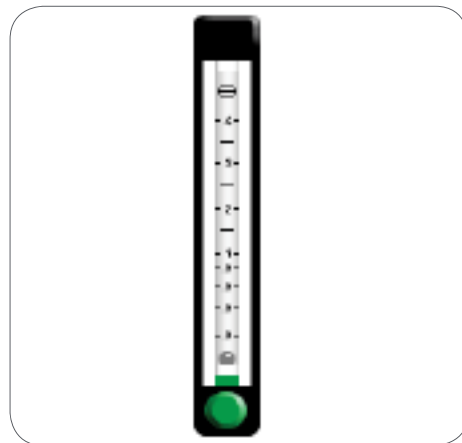
CO<sub>2</sub> ABSORBER CANISTER



POP-OFF VALVE  
(PRESSURE RELIEF VALVE)



PRESSURE GAUGE



OXYGEN FLOWMETER



SYSTEM PRESSURE TEST

# PHYSIOLOGICAL PARAMETERS DURING ANESTHESIA

Because inhaled anesthetics depress the cardiovascular and respiratory systems, the anesthetist must monitor these systems and be prepared to intervene when necessary.

CLINICAL PARAMETER	ACCEPTABLE VALUES DURING ANESTHESIA	
	CANINE	FELINE
<b>RESPIRATORY SYSTEM</b>		
Respiratory rate (RR) <sup>1,4</sup>	5-15 bpm Highly variable. Trends more important than absolute values.	15-20 bpm
Hemoglobin saturation (SaO <sub>2</sub> ) <sup>1</sup>	>95%	
Arterial partial pressure of CO <sub>2</sub> (PaCO <sub>2</sub> ) <sup>1</sup>	35-45 mmHg	
<b>CARDIOVASCULAR SYSTEM</b>		
Heart rate <sup>2</sup>	50-150 bpm AAHA 2020 guidelines lists >150-190 for large and small dogs, respectively as tachycardia  Varies with body size as well as with anesthetic agents used.	100-180 bpm AAHA 2020 guidelines lists >180 as tachycardia for cats
Mean arterial blood pressure (MAP) <sup>3</sup>	>60 mmHg	
Systolic arterial blood pressure (SAP)	>100 mmHg	
Central venous pressure (CVP) <sup>2</sup>	2-7 cmH <sub>2</sub> O	
Capillary refill time (CRT) <sup>3</sup>	>1.5 seconds	
<b>OTHER BODY SYSTEMS</b>		
Urine output <sup>2</sup>	1-2 ml/kg/hr	
Body temperature <sup>3</sup>	Recommended 97-104 °F (re-evaluation if 3-4 degree elevation above starting temperature) Rationale: do not want to overlook malignant hyperthermia)	

References:

1. Thurmon JC et al, Lumb and Jones' Veterinary Anesthesia, 3rd edition. Published by Williams
2. Muir et al, Handbook of Veterinary Anesthesia, 3rd edition. Published by Mosby
3. Hall LW et al, Veterinary Anesthesia, 10th edition. Published by WB Saunders
4. Tamara Grubb DVM DACVA, Personal communication

# ANESTHETIC RECORD

## PATIENT DETAILS

Date: \_\_\_\_\_ Animal Name: \_\_\_\_\_ Owner Name: \_\_\_\_\_

Species: \_\_\_\_\_ Breed: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: \_\_\_\_\_ Weight: \_\_\_\_\_ Procedure: \_\_\_\_\_

Anesthetist: \_\_\_\_\_ Surgeon: \_\_\_\_\_

## PRE-OPERATIVE DETAILS

Previous Anesthetic History: \_\_\_\_\_

Pre-anesthetic Disposition:  Alert  Excited  Depressed  Recumbent  Aggressive  Nervous  Other

**Clinical Data:** Pulse Rate or HR: \_\_\_\_\_ Respiratory Rate: \_\_\_\_\_ Temp: \_\_\_\_\_ MM/CRCT: \_\_\_\_\_

PCV: \_\_\_\_\_ TP: \_\_\_\_\_ BUN: \_\_\_\_\_ Breathing Circuit: \_\_\_\_\_

Creatinine: \_\_\_\_\_ Glucose: \_\_\_\_\_ Bag Size: \_\_\_\_\_ Other: \_\_\_\_\_

Pain Assessment: \_\_\_\_\_

## DRUGS & MEDICATION RECORD

<b>Pre-Medications:</b>	1. _____ Dose: _____ Route: _____ Time: _____
	2. _____ Dose: _____ Route: _____ Time: _____
	3. _____ Dose: _____ Route: _____ Time: _____
	4. _____ Dose: _____ Route: _____ Time: _____
	5. _____ Dose: _____ Route: _____ Time: _____
<b>Induction:</b>	1. _____ Dose: _____ Route: _____ Time: _____
	2. _____ Dose: _____ Route: _____ Time: _____
<b>Intraop Medications:</b>	1. _____ Dose: _____ Route: _____ Time: _____
	2. _____ Dose: _____ Route: _____ Time: _____
	3. _____ Dose: _____ Route: _____ Time: _____





