Anesthesia reference guides and checklists

Ensure Patient Wellbeing
in the Surgical Setting

zoetis

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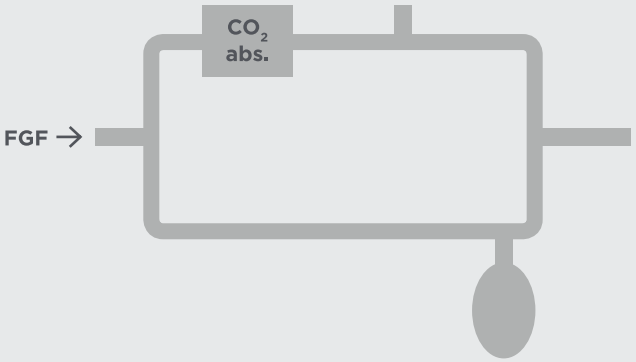
RECOMMENDED FLOW RATES FOR ANESTHESIA SYSTEMS

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



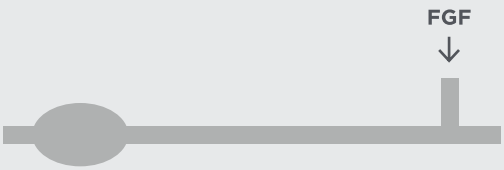
Method of removing CO_2
- Chemical; use of absorber crystals (e.g. soda lime/baralyme)

Functions performed by O_2 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_2
- Physical; "blown away" by fresh gas flow

Functions performed by O_2 flow
- Carrier gas for inhalant
- Replace metabolized oxygen
- **Remove expired CO_2**

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

Disadvantages
- Higher O_2 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
Examples	Circle	T-piece, Bain, Lack
Method of carbon dioxide removal	**Chemical** Carbon dioxide absorbers	**Physical** Fresh gas flow
Common fresh gas flow rates	**2020 AAHA guidelines** 20-40 ml/kg/min, 500 ml/min minimum	200-400 mL/kg/min
Recommended patient size	**Over 10 kg** (Resistance to breathing may be too high for smaller patients)	**Up to 10 kg** 2020 AAHA guidelines <3-5 kg
Economy	**Good** Much of the carrier gas and agent is recycled	**Poor** No recycling. Some gas does not even enter the patient
Control of patient depth	**Slower** Effect of vaporizer changes is diluted by existing volume of gas in the circuit	**Faster** Effect of vaporizer changes is experienced on a breath-by-breath basis
Characteristics of inspired gases	Warmed and moistened by the patient	Cold and dry

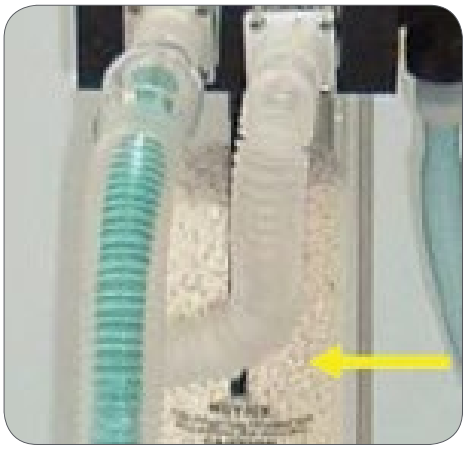
DAILY CHECKLIST FOR ANESTHESIA MACHINES

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.

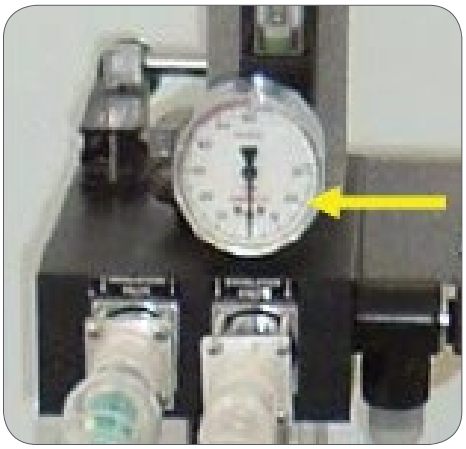
KEY PARTS OF THE MACHINE TO BE CHECKED

VAPORIZER FILL LEVEL

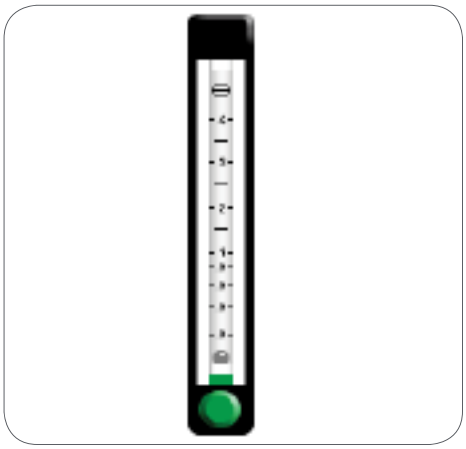


CO_2 ABSORBER CANISTER

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
RESPIRATORY SYSTEM		
Respiratory rate (RR)[1,4]	5-15 bpm	15-20 bpm
	Highly variable. Trends more important than absolute values.	
Hemoglobin saturation (SaO_2)[1]	>95%	
Arterial partial pressure of CO_2 ($PaCO_2$)[1]	35-45 mmHg	
CARDIOVASCULAR SYSTEM		
Heart rate[2]	50-150 bpm AAHA 2020 guidelines lists >150-190 for large and small dogs, respectively as tachycardia	100-180 bpm AAHA 2020 guidelines lists >180 as tachycardia for cats
	Varies with body size as well as with anesthetic agents used.	
Mean arterial blood pressure (MAP)[3]	>60 mmHg	
Systolic arterial blood pressure (SAP)	>100 mmHg	
Central venous pressure (CVP)[2]	2-7 cmH_2O	
Capillary refill time (CRT)[3]	>1.5 seconds	
OTHER BODY SYSTEMS		
Urine output[2]	1-2 ml/kg/hr	
Body temperature[3]	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

Pre-Medications:

1. Dose: Route: Time:
2. Dose: Route: Time:
3. Dose: Route: Time:
4. Dose: Route: Time:
5. Dose: Route: Time:

Induction:

1. Dose: Route: Time:
2. Dose: Route: Time:

Intraop Medications:

1. Dose: Route: Time:
2. Dose: Route: Time:
3. Dose: Route: Time:

ANESTHETIC RECORD, CONTINUED

MAINTENANCE RECORD

ET Tube

Size:

Time In:

Time Out:

Start Anesthesia:

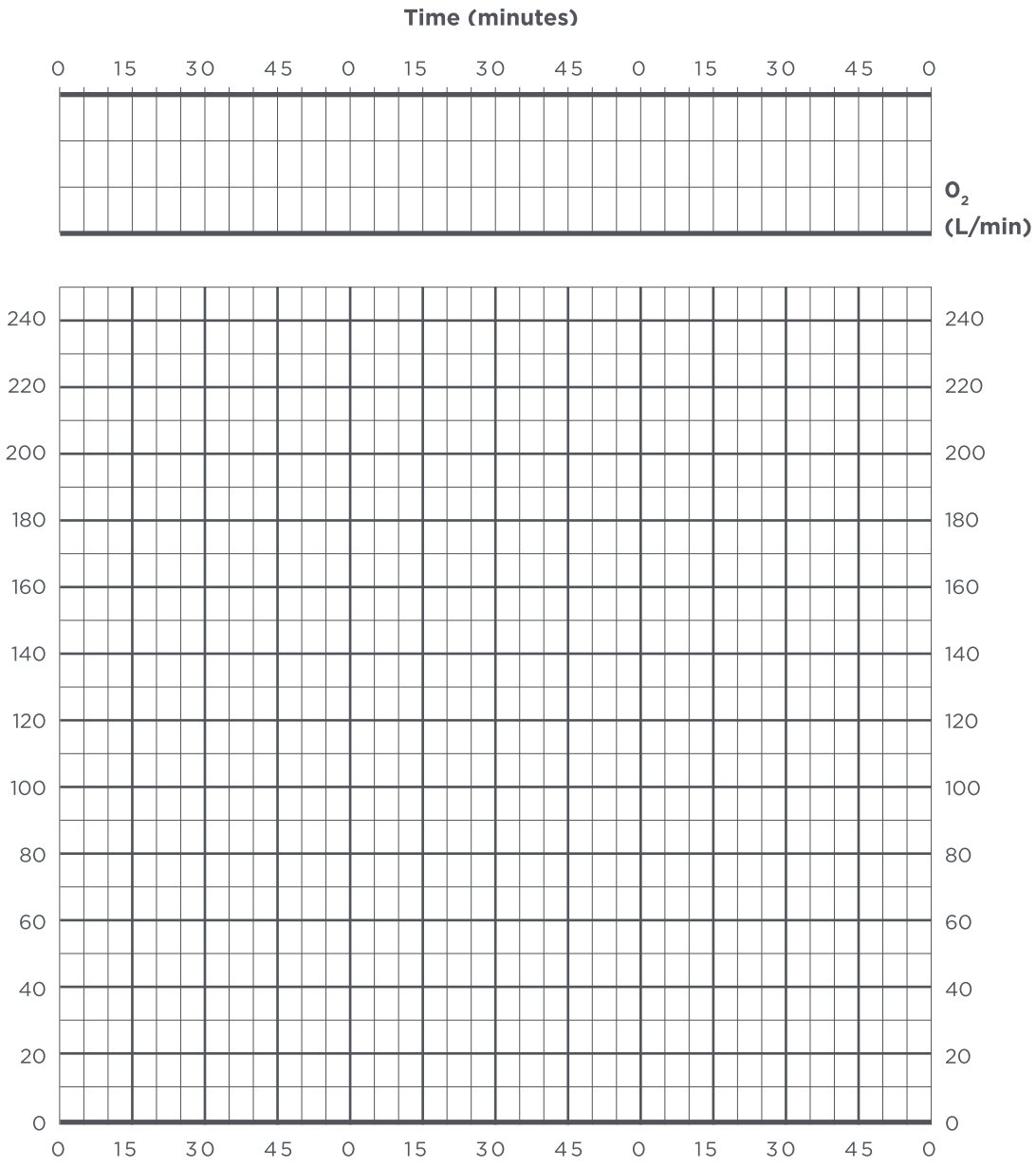
Start Surgery:

End Surgery:

End Anesthesia:

Agent(s) Used (%)

Notes:



Emergency Drug Calculation: