



A simple guide to using the Cyclo-Flo small animal circle system

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Introduction

The Cyclo-Flo is a 'vaporiser out of circuit' circle system, specifically designed for use with small animal patients. Opinion varies as to the appropriate minimum patient weight for use with circles. The Cyclo-Flo has been designed to produce the minimum resistance possible. It should be noted that the 'respiratory condition' and tidal volume as well as patient weight are also significant factors and monitoring equipment such as a capnograph is recommended, particularly if small patients (below 10kg) are to be anaesthetised.

As a rebreathing circuit the Cyclo-Flo generally makes more economic use of anaesthetic gases and volatile agents compared to non-breathing systems.

Factors that affect the safe use of a circle system:

- i) The need to supply sufficient oxygen to support the patients metabolism.
- ii) The need to supply sufficient volatile agent to maintain anaesthesia.
- iii) The need to denitrogenise the system after first connecting a patient that was previously breathing air.
- iv) The ability to raise and lower inspired concentrations of volatile agent, thereby deepening or lightening anaesthetic depth, quickly.
- v) The desire to minimise wastage of oxygen and volatile agent.

These factors are all inter-related. The suggestion offered here represents a compromise, which achieves patient safety above all else and reasonable economy. The described technique is low flow and semi-closed.

Setting Up

- 1) Attach the fresh gas supply hose of the Cyclo-Flo to the fresh gas outlet of the anaesthetic machine.
- 2) Check that the knob on the scavenging valve is turned fully anti-clockwise i.e. FULLY OPEN and attach it to your scavenging pipe work.
- 3) Ensure that the sodalime canister is securely fitted and filled with fresh sodalime (total capacity of canister 1.3 kg approx.). Do not proceed with the canister showing less than 50% fresh sodalime is present, as indicated by the colour.

Induction

- 4) Follow routine premeditation induction and endotracheal tube intubation; attach the patient's endotracheal tube to the Y piece of the patient tubing of the Cyclo-Flo.
- 5) Turn on the oxygen to deliver 3-4 LPM.
- 6) Turn on the out-of-circuit vaporiser to 3.5%-4.5% for Isoflurane / 3%-4% for halothane. Higher settings should generally not be required and are not recommended.

Monitor the patient closely over the next 3-5 minutes as anaesthesia deepens towards an acceptable level appropriate for surgery.

- 7) After 3-5 minutes, reduce the vaporiser setting in steps, over 2-3 minutes, to 1.5%-2.5% for isoflurane / 1%-2% for halothane, leaving the oxygen fresh gas flow unchanged.

Continue to monitor the patient closely. By the end of this stage the patient will have been prepared and will be ready for surgery.

- 8) As soon as surgery commences, and provided stable surgical anaesthesia is established, reduce the oxygen fresh gas flow to 0.5 - 1.0 LPM, according to patient size. **LOWER FRESH GAS FLOW RATES ARE NOT RECOMMENDED.** Intermittent flow techniques are not recommended since they result in swinging levels of general anaesthetic.

Continue to monitor the patient closely.

9) Changing levels of anaesthesia

Circle systems generally respond sluggishly to changes in vaporiser settings. It is important to anticipate the need for lighter or deeper anaesthesia wherever possible.

To lighten anaesthesia:

Maintain oxygen fresh gas flow rates, but reduce the vaporiser setting in appropriate 0.5% or 1% increments.

Speed of response can be increased by increasing oxygen fresh gas flow rate to 3-4 LPM.

To deepen anaesthesia:

Maintain oxygen fresh gas flow rate, but increase the vaporiser setting in appropriate 0.5% or 1% increments.

Speed of response can be increased by increasing oxygen fresh gas flow rate to 3-4LPM.

Continue to monitor the patient closely.

Once the desired level of anaesthesia has been achieved, return the vaporiser setting and oxygen fresh gas flow rate setting (if changed) back to maintenance values.

Recovery

10) Switch off the vaporiser 5 minutes before the end of surgery, but maintain oxygen fresh gas flow rate.

Once surgery is completed, increase oxygen fresh gas flow rate to 3-4 LPM until the patient is ready for disconnection and extubation.

Continue to observe and monitor the patient until fully recovered.

Notes

- 1) The scavenging valve should always be in the fully open position.
- 2) There is normally no need to squeeze out / flush out the rebreathing bag whenever you change the level of anaesthesia.
- 3) The standard 2 litre rebreathing bag may be satisfactorily used with patients between 10 - 50 kg body weight. A 3 or 4 litre may be used with patients over 50kg.

Safety Considerations

- 1) The Cyclo-Flo must be adequately scavenged to prevent pollution of the working environment.
- 2) The scavenge valve should always be set in the fully open position.
- 3) The concurrent use of nitrous oxide gas is not recommended with the use of the Cyclo-Flo unless it is possible to measure the inspired oxygen concentration continuously and that it is at least 33% oxygen.
- 4) Change the soda-lime in the system regularly to ensure maximum absorption of exhaled carbon dioxide. Expired soda-lime can over time revert to its original colour, keep note of the date of each change as a reminder. Always check the canister gasket is not distorted or damaged. Ensure granules are not embedded into the canister gasket as this will prevent the gasket from sealing.
- 5) Always check the circuit for signs of damage / leaks before each use, particular attention should be paid to the condition of the patient tubing.

- 6) Have your anaesthetic machine regularly serviced, preventative maintenance ensures both your patients and your safety.
- 7) Pulse oximeters measure oxygen saturation, not carbon dioxide retention, and do not detect rebreathing when the rebreathed mixture is severely hypoxic
- 8) To further enhance your patient monitoring consider using a Capnograph in conjunction with the Cyclo-flo and indeed all breathing systems. A Capnograph will monitor end tidal carbon dioxide , inspired carbon dioxide as well as inspired oxygen on some models. The use of a Capnograph will greatly enhance patient safety and reduce unnecessary wastage of expensive volatile agent and gases which harm the environment.

FAQ's

Q How long will the sodalime last before I need to change it?

A The rate of exhaustion of the sodalime depends on the amount of carbon dioxide given off by the patient and will vary from case to case. Very quick exhaustion may be due to insufficient filling of the canister, or the sodalime may have been used before.

Q What makes the sodalime canister become hot?

A The absorption of carbon dioxide is an exothermic reaction i.e. heat is given off. The amount of heat is dependant on the respiration rate and the amount of sodalime within the canister. The heating may be beneficial against the cooling effect of cold anaesthetic gases.

Q Why is there water present in the canister and patient tubing?

A There are two reasons for this:

- 1) This is due to the moisture present in the patient's breath.
- 2) Sodlime contains a small amount of water necessary to create the reaction that absorbs the carbon dioxide, the heat produced from the reaction warms the water vapour and as it makes contact with the cooler parts of the system it condenses into droplets.

Q How do I clean the canister and patient tubing?

A Once emptied, wash out the remaining sodalime dust and moisture with a hard surface disinfectant / cleaning solution such as 'Safe Solution'. Always rinse the canister out thoroughly and dry it immediately. If you have the standard plastic tubing this is designed for single use. Many people reuse the tubes and flush them occasionally with a hard surface cleaner / disinfectant. If you do attempt to clean the tubes, they should be left hanging afterwards to dry. The best advice is to purchase the smooth bore circuit tubing- this is designed for reuse .

This information is provided for guidance only and is believed to be correct at the time of writing. Burtons Medical Equipment Ltd does not accept any responsibility for errors or omission. We are indebted to Gerard Brouwer BSc, BvetMed, DVA, MRCVS, for his assistance in completing these notes.

Spare parts & accessories

| Stock code | Description | Req'd Qty |
|--------------|---|-----------|
| 103-061 | 22mm disposable patient tubing set with wye 1.6mtr | 1 |
| 103-090-01 | 22mm fixed Y piece patient connector autoclaveable | 1 |
| 103-095-01 | 22mm swivel Y piece patient connector - disposable | 1 |
| 103-096 | 22mm a/claveable smooth bore Hytrel patient tubing 1.6mtr | 2 |
| 103-080-01 | Main body distribution block | 1 |
| 103-080-02 | Expiratory valve body | 1 |
| 103-080-04 | Inspiratory valve body | 1 |
| 103-080-05 | Replacement valve disc | 2 |
| 103-080-06 | Upper valve disc retaining clip | 2 |
| 103-080-07 | Lower valve disc retaining clip | 2 |
| 103-080-08 | Clear valve dome | 2 |
| 00-024-NBR70 | O'ring seal for valve dome | 2 |

| | | |
|---------------------|--|--------|
| 103-080-09 | Expiratory/inspiratory tapers | 2 |
| 0221-16-73 | O'ring seals for insp/exp tapers | 2 |
| 103-080-10 | Canister sealing gasket | 1 |
| 103-080-13 | Replacement catch for canister | 2 |
| 103-080-14 | Bag mount extension | 1 |
| 103-080-17 | Fresh gas inlet fitting | 1 |
| 103-080-24 | Bag mount elbow | 1 |
| 103-080-30 | Replacement sodalime canister with catches | 1 |
| M4X10C/SK | Securing screw for canister latch into main body | 4 |
| M4X12MMPAN | Securing screw for catch into canister | 4 |
| 103-103 | Replacement 30 mm gas scavenging valve | 1 |
| M6x20BUTHD | Mounting screws for Male V plate | 2 |
| 103-137 | Male "V " plate | 1 |
| 103-145 | "V " mounting bracket | 1 |
| 103-162 | Feed mount | 1 |
| 104-190 | Fresh gas feed tubing | 1.2mtr |
| 104-202 | 2 Litre rebreathing bag | 1 |
| 0040-177 | Gasket - bag mount extension to body | 1 |
| INS/CYCLOFLO-MANUAL | This operators manual | 1 |

If you have any further queries relating to the use of the Cyclo-Flo or any other Burtons product please feel free to contact our Sales Department who will be pleased to help.

Fault Finding

| Problem | Solution |
|---|---|
| Rebreathing bag does not inflate. | a) Check gas flow rate is sufficient patients tidal volume, increase if necessary. b) Check scavenge valve is not damaged;stuck open - replace if necessary. c) Check canister sealing gasket is not damaged /distorted and catches are secured correctly. Replace if necessary. d) Check patient tubing, feed tubing, rebreathing bag for leaks e) Check valve domes and canister for cracks - replace if necessary. Replace O'rings on domes if perished. |
| Rebreathing bag over inflates. | a) Check scavenge valve is damaged; stuck shut. Replace if necessary. b) Check gas flow rate is correct for patients tidal volume, reduce if necessary or use larger bag. |
| Excessive condensation in circuit | a) Dry out system more frequently b) Use an in-circuit water trap on expiratory limb of patient tubing. |
| Inspiratory and /or expiratory valves not functioning | a) Excessive moisture and /or sodalime dust on discs and wire cages. Remove discs, clean or replace. Clean or replace wire cages. |

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ANAESTHESIA SERVICES

Gerard Brouwer, with over 22 years experience in the field of veterinary anaesthesia and the UK's first freelance veterinary anaesthetist, offers the following unique and personal services on a national basis:

Anaesthesia for routine or higher risk cases

Enhanced patient safety
Increased reassurance for owners
Most effective use of surgeons' time
First opinion or referred patients
Individual cases, half day or full day sessions

Anaesthetic procedure reviews

Personalised visits to assess current practice protocols
Advice on improvements to increase patient safety
Advice on anaesthetic equipment purchases
On-site training and instruction in modern anaesthetic techniques

General consultancy

Lectures, seminars, workshops on all aspects of small animal anaesthesia
Independent advice and evaluation of anaesthetic agents and equipment
Commercial consultancy for the veterinary anaesthesia industry

For advice or to discuss your specific requirements, please contact:

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