VetEquip
INCORPORATED

Research Inhalation Anesthesia
Honest Answers from Knowledgeable People
Products and Information

Volume VI

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Technical Information

Any information given or written by VetEquip concerning any use or application of any product is intended to be informative in nature and is believed to be true and reliable. It is not meant as a substitute for due diligence on the part of the user. Please consult proper personnel, journals, or references to ensure current validity of the information and that all applicable protocols are being met in your facility.

Our goal is to design and build safe, efficient and user-friendly anesthesia systems for every research application.

Over the past 25 years, we have spent countless hours in literally hundreds of your facilities. We are confident that there is no other veterinary inhalation anesthesia equipment company with our knowledge and/or experience.

We ask the questions necessary to recommend the best possible anesthesia protocol for your specific needs.

What type of procedures are being done and how long are they?

What animal species are being used?

What physiologic effects of the anesthesia might interfere with the study?

How many procedures are usually done in one day? At one time?

How is the procedure area(s) set up?

Will there be MRI applications or level 3 or 4 containment studies?

Is it cost effective to have more than one person doing the procedures?

Is your facility or department under budgetary constraints?

We Believe in Our Anesthesia Systems!

SEVEN YEAR, 100%, Total Satisfaction Guarantee!

Try for ONE YEAR. Don't like it? Get a full refund!

Use it for SIX MORE YEARS. Problems? We'll repair or replace it.

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"VetEquip Gives Me Gas!" The Famous Tee Shirt Inside Back Cover

First Time Buyer's Guide

If this is the first inhalation anesthesia system you've purchased for your facility, we invite you to begin/enhance/complete your anesthesia equipment research with this "What you need and don't need" information.

1. If you are only working with rats, mice, cats, ferrets and other like sized creatures, you do NOT need a CO_2 Absorber (a.k.a. rebreathing head, SodaSorb container) on your anesthesia machine.
2. You need a "carrier gas" supply. This gas, usually oxygen or medical air, carries the anesthetic vapor into the patient's lungs as it breaths. Its pressure, as it is stored in a cylinder, powers the anesthesia machine.
3. You need a carrier gas flowmeter that will allow you to deliver the carrier gas as slowly as ½ liter per minute to a nosecone or as fast as 1 to 4 liters per minute to an induction chamber.
4. You need a good, reliable and valid vaporizer. A vaporizer is to an anesthesia machine as an engine is to a car. It needs to be "agent specific," originally manufactured for the agent you want to use. The only time that fact does not hold true is when a halothane vaporizer is dedicated to isoflurane or visa versa.
5. You need an oxygen flush assembly. If you are unable to "flush out" your induction chamber you will have no choice but to always work in a non-recirculating fume hood or a chemical fume hood with an activated carbon filter. If any vendor tells you otherwise, ask for independent test results showing their chamber can be precharged and opened *or* unflushed and opened without everyone in the procedure area being exposed above OSHA's Permissible Exposure Limits (PELs).
6. You need an induction chamber with a positive pressure seal. If you don't have one, see #5 above.
7. You need activated carbon filters that are reliable. The PEL for isoflurane is 2 parts per million (ppm), the human nose can't detect isoflurane until it reaches 50 ppm. It's important to be confident that your carbon filter is working even when you can't smell the agent.
8. You need a non-rebreathing circuit that delivers the agent saturated gas from the machine to the patient, and then collects and contains the waste gas from the patient to an adequate disposal system.
9. In the United States, isoflurane Permissible Exposure Limits are an OSHA compliance issue. You must take whatever measures are necessary to keep your procedure area below the PEL of 2 ppm. Neither your procedures, the species you use, the things you're studying, the facility you're working in, or the company, agency or educational institute you work for have any affect on this fact; you must comply with the 2 ppm PEL.

"I have 12 IMPAC's at our facility.

I have no reservation about training new users on VetEquip machines, even for those that have never used gas anesthesia before."

– Kathy

Associate Scientist

Animal Pharmacology

"I've been using VetEquip for 18 years - they have a top-notch maintenance program.

VetEquip sets the standard that others try to achieve and I want that level of quality."

– Suzette, RLATG, RVT

Senior Manager

Lab Animal Resources

Anesthesia System Components Glossary

Anesthesia Machine

This term includes the frame, yoke(s), flowmeter(s), vaporizer(s), oxygen flush assembly and all hoses and connections.

Regulator(s)

The regulator(s) are responsible for reducing the supply tank pressure to specified levels.

Oxygen Flush Assembly

The flush assembly is responsible for purging all waste gas from the induction chamber.

Vaporizer

The vaporizer is responsible for changing the liquid agent to a vapor which the patient can inhale. It then delivers the vapor into the moving steam of oxygen in controllable amounts.

Reconditioned Vaporizer

In human medicine, a vaporizer that has been properly cleaned and calibrated for its specific agent and is ready for clinical use. In veterinary use, it could refer to simply a "used" vaporizer or a vaporizer which has been re-labeled for an agent other than the agent for which it was designed. It is recommended that proper questions be asked to determine each sellers' definition of the term.

Remanufactured Vaporizer

May be used in lieu of "reconditioned", frequently means some internal parts are new and some used. Often the new and used parts are from different agent-specific vaporizers, e.g. enflurane rotor valve inside an isoflurane casing. May be used to describe a vaporizer whose *only* new part is an isoflurane dial while the rest of the vaporizer is entirely used enflurane. It is recommended proper questions be asked to determine each sellers' definition of this term.

Service Definitions

Service

A term reserved for any unscheduled work and any repairs directly related to a specific problem. "Service" and "Preventative Maintenance" are occasionally used interchangeably. "Service" is done on an "as needed" basis. "Preventative Maintenance" is regularly scheduled.

Preventative Maintenance Service (P/M)

Annual inspection including checks of all components for proper operation and potential problems. Identification and prevention of possible future breakdowns. Replacement of rubber or other disposable goods.

Calibration

Calibration indicates a vaporizer has been set to standard measuring graduations, under a variety of conditions. Internal components are cleaned of foreign matter and contaminents, new gaskets, seals and wicks are installed. The calibration process takes place while operating under different flowrates, temperatures and time frames.

Efficacy Test

A meter reading of vaporizer output, determining whether or not the output matches the dial reading at both high and low oxygen flows.

Certification

Documentation that all components of the machine have been inspected and perform to manufacturer's specifications. Guarantees that the components are working properly and should continue to perform as expected for another year.

VetEquip Anesthesia Book

The “Need To Know” book. Have you wondered what a “MAC” value is? How is it determined and what factors affect it? Is your anesthesia machine going through more isoflurane than you think it should? How much should it be using? What is the OSHA recommendation for anesthesia waste gas? Do you need an MSDS for isoflurane on file? How about one for the activated carbon in that disposable canister? Did you know you can keep that little nosecone in position with a piece of dental floss? Are you keeping track of how much waste gas you’re exposed to? How do you do that anyway? Need a sign out sheet for your departmental anesthesia machine? Wondering if you machine is due for service? When is a machine due; once a year? Every six months? All these answers and more can be found in the VetEquip Anesthesia Book.

The book is a 3 ring binder to which you can add any information you may need. The Book is included with every Lab Animal Anesthesia System or can be purchased separately. When The Book comes with your Lab Animal System, it will include manuals and protocols for that specific system.

999999 VetEquip Anesthesia Book

Inhalation Anesthesia 101 for the laboratory animal environment

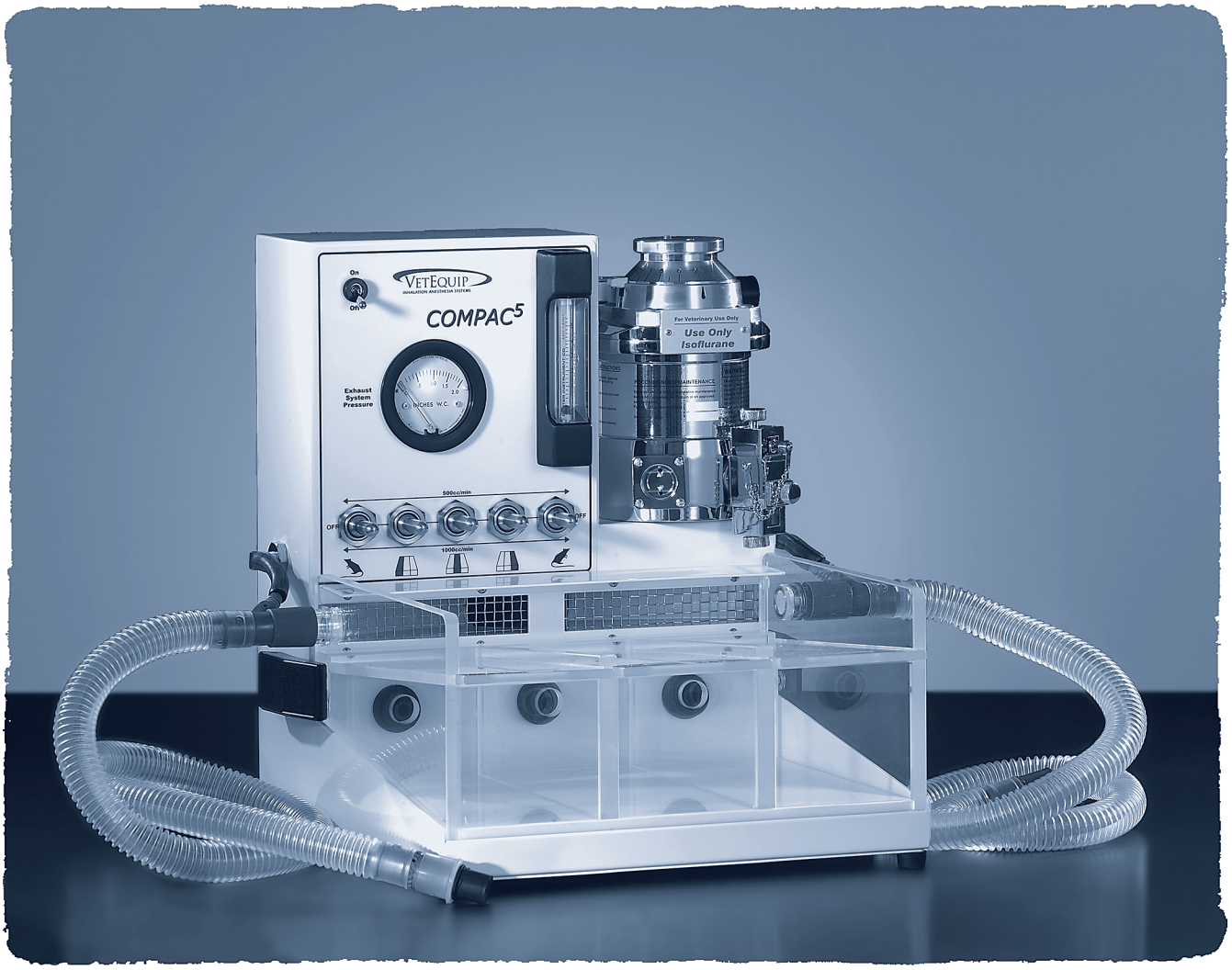
This 45 minute DVD is an excellent training film. Created by VetEquip in cooperation with Columbia University Center for Biomedical Communication with oversight by a representative of the AALAS On Line Learning Center. It qualifies the viewer for one unit of AALAS CE. Every component of a traditional anesthesia machine is described with clear instructions on how and why it is necessary. A basic rat anesthesia protocol is followed step by step. Special attention is given to waste gas control throughout. The DVD is included with every VetEquip Anesthesia Book, or can be purchased separately.

999998 Anesthesia 101 DVD

The VetEquip COMPAC^5

A revolutionary anesthesia system that combines the best features of every VetEquip system! The COMPAC^5 has two independent breathing circuits and one to three independent vented induction chambers.

- All circuits, chamber or breathing, are independent of each other
- All circuits have a “flip-switch” choice of ½ LPM, 1 LPM or OFF
- Chambers are heated with standard warm water pump
- All chambers and circuits are vented; no pollution, no chamber flushing
- Set it on a counter top, carry it to the next room, tuck it in a cupboard, it’s 13” x 13” x 15”



901812 VetEquip COMPAC^5 Complete Anesthesia System
Includes Warm Water Pump (# 983105) and Extract All (# 933105)

Ask About Available Trade In Opportunities!

The VetEquip Mobile COMPAC^5

Combine the safety of the new COMPAC^5 with the convenience of complete portability. Exhaust cabinet and 4-wheeled, counter-balanced leg assembly, combined to create a mobile platform for your COMPAC^5. Smooth rolling double-wheeled castors allow you to move your unit to any procedure room in your facility. Available as a standard cabinet base or with fold-down shelf surfaces on each side of unit for the ultimate worstation. Add a single, dual, or triple O_2 yoke assembly (see pg. 14) to make full use of the mobile units' capabilities. Cabinet also doubles as storage unit for frequently needed items.

901814 Mobile COMPAC^5 Multi Paatient Anesthesia System
As Shown

901816 Mobile COMPAC^5 Multi Paatient Anesthesia System
With dual 12" X 12" fold down shelves

The VetEquip COMPAC^5 Accessories

The VetEquip COMPAC^5 is designed to be a complete system when used with your existing warm water pump and in-house or freestanding exhaust systems. If you do not currently have one or both, the following equipment is available to complete your COMPAC^5 System:

Extract-All Cabinet

933105 Extract-All Cabinet
Cabinet has double filters
18" x 42½" x 13 not incld. rear filter

or

Extract-All Bench Top

933101 Extract-All Bench Top
12" x 10½" x 7" not incld. filter

or

Filter Mate Portable Extractor

935101 Filter Mate Portable Extractor
14" x 23" x 223/4"
Up to 250 CFM
Houses a carbon based filter cell, surrounded by a negative pressure plenum to capture and re-filter any leaks

Warm Water Pump

T-Pump provides a large water reservoir and temperature settings from 85° to 107° F with a high flow rate to assure uniform temperature across the pad. Has two overheat safety devices as well as a "tip over" shut off. Illuminated on / off switch and folding handle.

983105 Gaymar Warm Water Pump

RC² - Rodent Circuit Controller

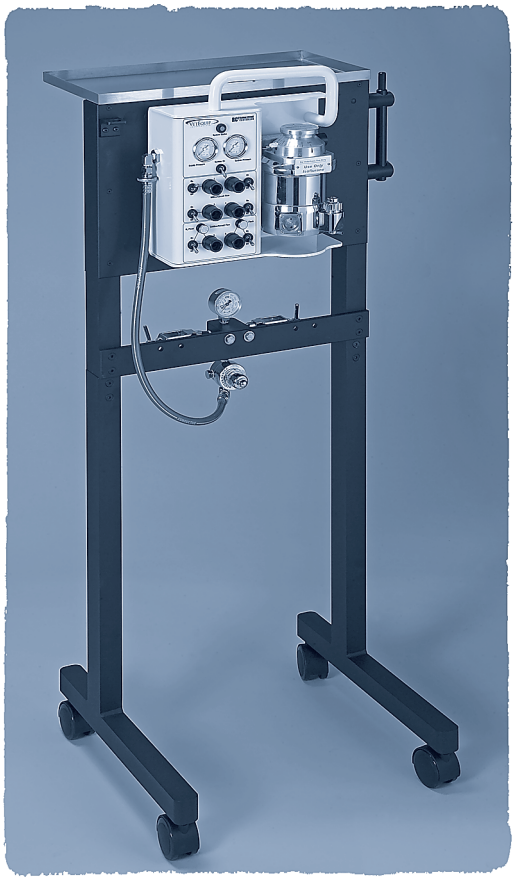
All oxygen flowrates are independently preset:

- Any combination of circuits can be used without readjusting oxygen flows
- All circuits are unaffected by the resistance occurring in split lines
- Any combination of non-rebreathing circuit styles can be used
- Any circuit length or combination of lengths can be used

922100 RC² - Rodent Circuit Controller System

12" wide, 6" deep, and 12" high

Includes: vaporizer; 2 induction chambers; 4 breathing circuits; 4 nose cones; 6' 22mm evacuation tubing; 10' O_2 hose and 6 VaporGuard filters

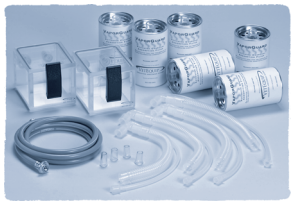


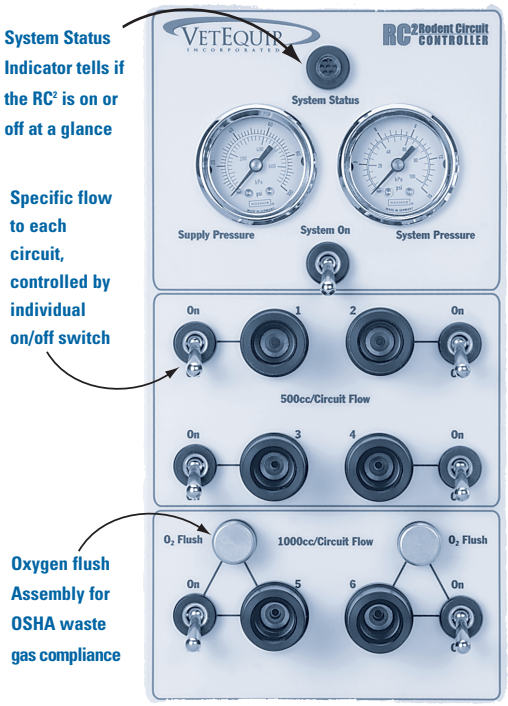
Circuits 1, 2, 3, and 4 preset to ½ lpm:

- Sufficient oxygen without excessive waste
- Oxygen flows cannot be set too high causing leaks around nosecones or facemasks

Circuits 5 and 6 preset to 1 lpm with Oxygen Flush Assemblies:

- Faster inductions, chamber saturation takes only 1 or 2 minutes
- Flushing saturated chambers complies with OSHA waste gas recommendations





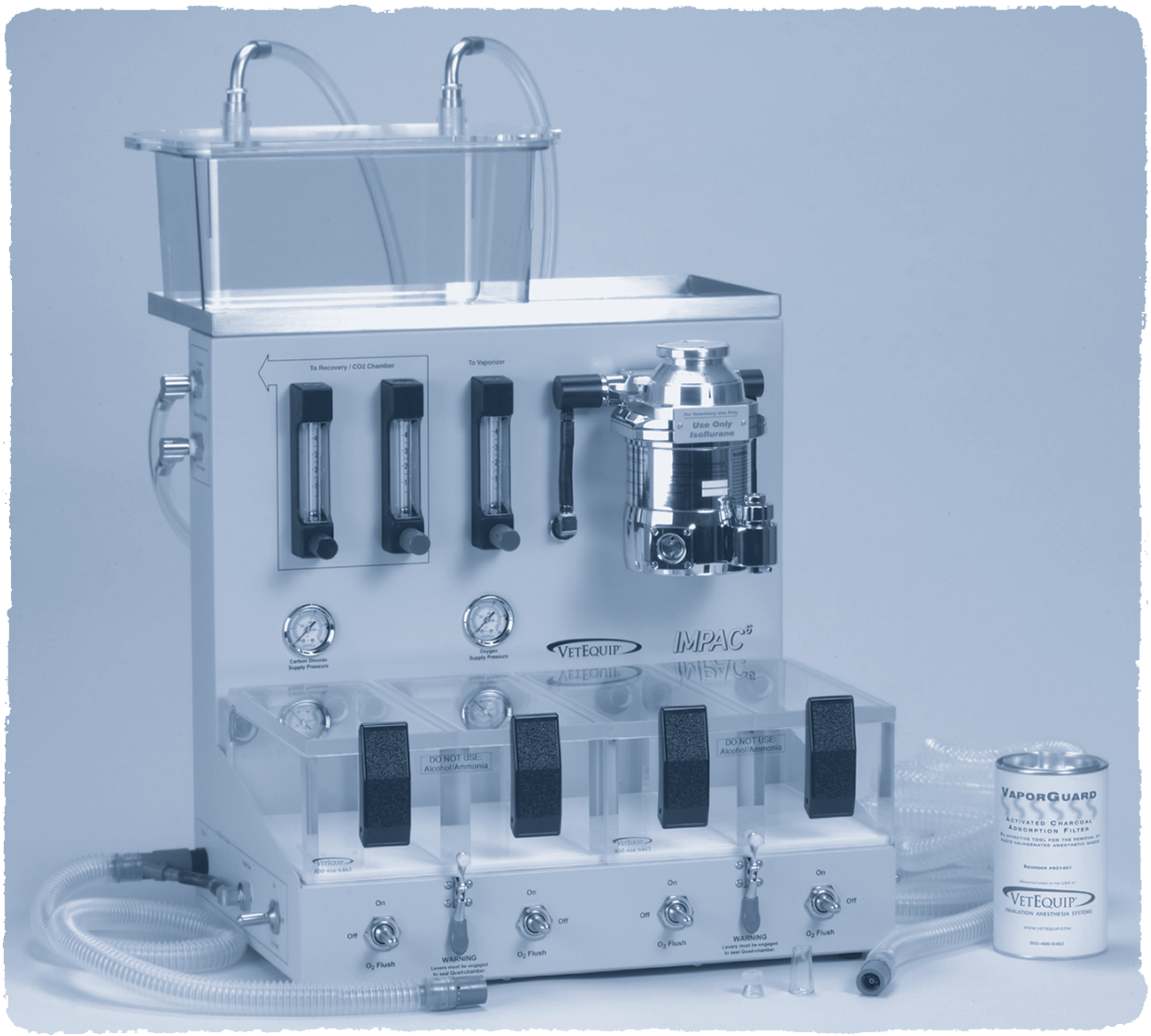
- **Perfect for teaching procedures, without teaching specifics of inhalation anesthesia**
- **Ideal for multiple, simultaneous procedures**
- **Perfect for multiple investigators doing complex procedures with no time for adjusting oxygen flows**
- **Customize this system by selecting your choice of chamber sizes and nosecone sizes**

922120 Mobile RC² - Rodent Circuit Controller System

Mobile RC² takes advantage of our time-tested anesthesia machine frame. Mount your RC² to the extruded aluminum, counter-balanced, body for the ultimate in portability. Allows the potential for having single, dual or triple O_2 tanks directly on the machine (see pg. 14)" RC² unit can be easily removed from frame for situations where space is limited.

IMPAC^6

- Designed specifically for high volumes of procedures
- 2 Breathing Circuits and 4 Induction Chambers allow investigator flexibility in designing custom “assembly line” protocols
- Each of the 6 circuits is equipped with a simple “ON-OFF-FLUSH” switch to reduce operator errors and speed procedures
- Separate O_2 and CO_2 flowmeters and chamber make euthanasia, O_2 assisted recovery and O_2 / CO_2 anesthesia accessible and precise
- Line pressure gauges create constant easy oversight of in-house gas supply
- Single waste gas port and tube for less counter top clutter



901808 IMPAC^6 - Integrated Multi Patient Anesthesia Center

22” wide, 18” deep, and 28” high
Weight 50 lbs.

Laboratory Animal Anesthesia Systems

Safety, Quality and Economy

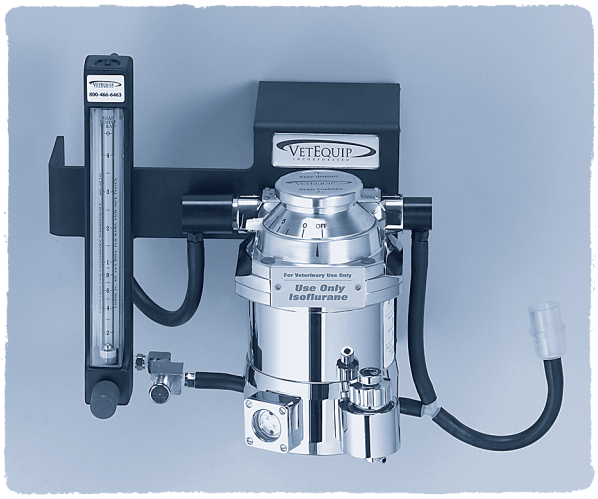
- Every component is chosen for durability, strength and safety
- All systems guaranteed for 7 years
- All vaporizers completely new and agent specific
- Aluminum frames with baked-on surface for scratch and stain resistance
- Clear acrylic induction chamber for clear views of the patient
- Positive pressure seals eliminate chamber leakage
- The Dual Procedure Circuit allows assembly line productivity
- Used with proper protocols, badge monitoring results in “no detectable amounts found”
- You add only: carrier gas, liquid agent, and animals

Every “Lab Animal System” comes complete with a ten foot high-pressure oxygen hose, frame, flowmeter, oxygen flush assembly, vaporizer, breathing circuit, chamber, nosecones, waste gas evacuation tubing and two VaporGuard filters.

Included with all
Laboratory Animal Anesthesia Systems

901807 V-10 Mobile Cart Lab Animal System
19” x 19” x 50.5” high, 60 lbs.
9” x 19”shelf with ¾” lip

901806 V-1 Table Top Lab Animal System
8” x 11” x 14” high, 15 lbs.

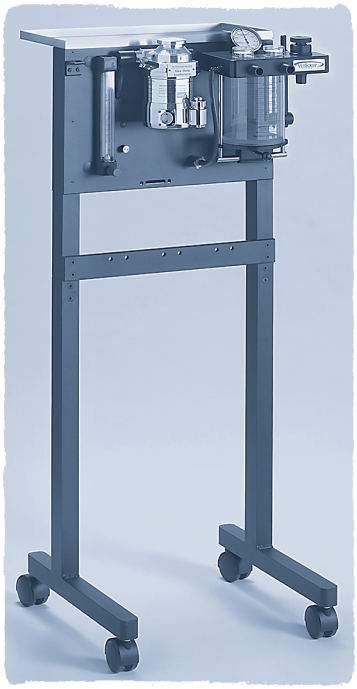


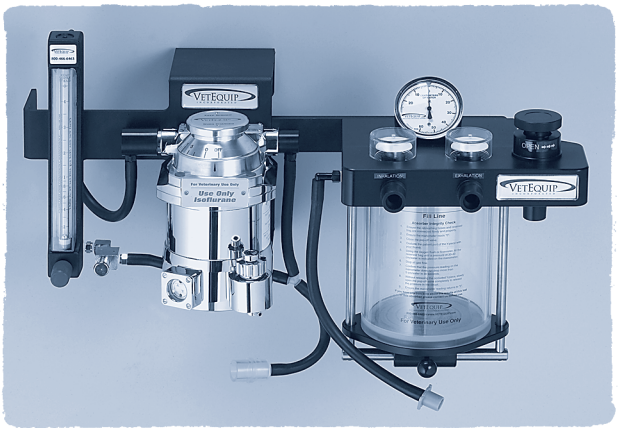
901810 V-9 Wall Mount Lab Animal System

Includes all accessories shown on page 10

901809 V-10/A Mobile Cart Lab Animal System With CO_2 Absorber

Includes all accessories shown on page 10





901811 V-9/A Wall Mount Lab Animal System With CO_2 Absorber

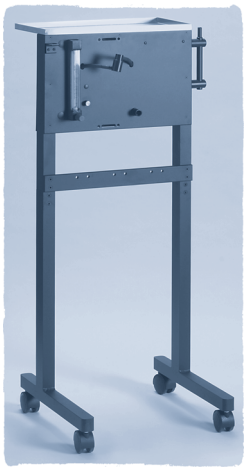
Includes all accessories shown on page 10

Portable and Mobile

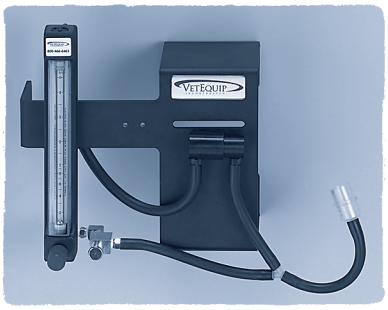
All Table Top, Mobile Cart, and Wall Mount Machines have an aluminum frame with a baked on finish that resists scratching and staining, a 0 to 4 lpm oxygen flowmeter, an oxygen flush assembly, vaporizer inlet and outlet, predrilled holes to fit most vaporizer models, a 10 foot, high pressure, oxygen hose with DISS (female) fittings, all necessary tubing for component connections and a standard common outlet.

These units do not include vaporizers, regulators, breathing circuits or chambers.

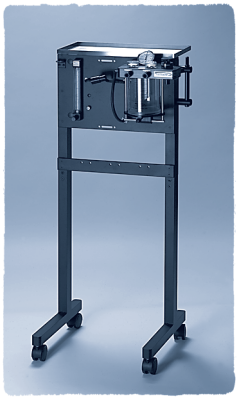
901801 Table Top (V-1)
One-handed carrying with weight-balanced handle
Wide, flat, rubber bottomed feet eliminate tipping
Use with "E" cylinder or "H" cylinder
Ideal for limited floor space
Easy storage in a locked cabinet



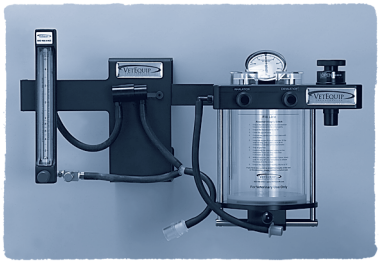
901804 Mobile Cart (V-10)
Shelf 19" by 9" with a ¾" lip
4 wheel, 2 leg design for more stability
Handle doubles as a hose and breathing circuit hanger
Cross bar holds E cylinder regulator assemblies



901802 Wall Mount (V-9)
Compact, saves floor and counter space
Easily bolts to most surfaces
Easy to reach and see, but out of the way

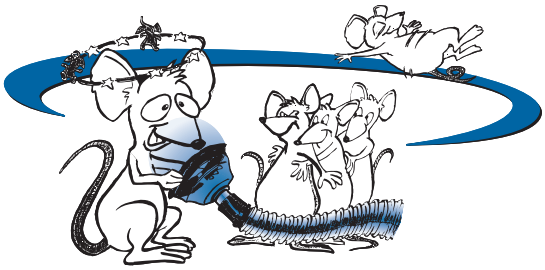


901805 Mobile Cart (V-10/A)
Same as V-10 with a 1500cc capacity CO_2 Absorber
Suitable for larger animals and rebreathing circuits
Easily adapted to ventilators



901803 Wall Mount (V-9/A)
Same as V-9 with a 1500cc CO_2 Absorber
Suitable for larger animals and rebreathing circuits
Easily adapted to ventilators

Vaporizers



We sell only completely new vaporizers, specifically manufactured for the agent for which they are labeled.

We do not sell vaporizers that have been "remanufactured", "converted", "rebuilt" or "re-serviced" from old enflurane vaporizers.

"Tec3" style vaporizers all look the same on the outside, different manufacturers have different quality standards for internal components. We use only the highest quality vaporizer manufacturer.

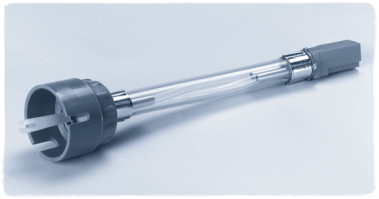
911103 Isoflurane - Funnel-fill
911106 Sevoflurane - Funnel-fill

911104 Isoflurane - Pin-indexed
911107 Sevoflurane - Pin-indexed
Requires pin index fill device

Vaporizers for other agents available – please contact us.

Anti-Spill Bottle Top

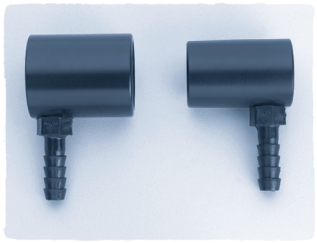
911111 Isoflurane
911112 Halothane
911113 Sevolflurane



Pin Index Bottle Fill Device

911117 Isoflurane
911118 Halothane
911121 Sevoflurane

Tec3 Style Vaporizer Inlet and Outlet



911124 Inlet

911125 Outlet

Carrier Gas Supplies

"Carrier gas," usually oxygen, is supplied from a cylinder, large or small, in the procedure room, on the anesthesia cart, or piped through the walls.

If your facility has "piped in" oxygen, you will see either wall plate outlets, gas faucets or drop lines in your procedure area. See page 15 for the appropriate hose fitting.

If you do not have piped in oxygen, you will need to have a cylinder in your procedure area. Standard sizes are "E" and "H." Most facilities do not own the cylinders, they rent them from a gas supplier. The supplier will rent the cylinders but not the regulators that are required to lower the cylinder pressures to 50 psi. Anesthesia machines need non-adjustable regulators that are preset to 50 psi.

The chart below compares E and H cylinders:

	E-Cylinder	H-Cylinder
Height	30"	54"
Diameter	3.5"	8.5"
Volume - Liters	651	7107
Initial Pressure	2200 PSI	2200 PSI
Approx. Hrs Use @ 1 LPM	11	118

Regulators

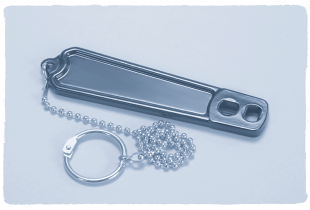
All regulators are gas specific, preset to 50 psi and have a DISS, male, gas specific, outlet.

D & E Cylinder

901305 Oxygen
901302 Carbon Dioxide
901304 Nitrous Oxide
901309 Medical Air

H & M Cylinder

901306 Oxygen
901308 Carbon Dioxide
901304 Nitrous Oxide
901307 Medical Air

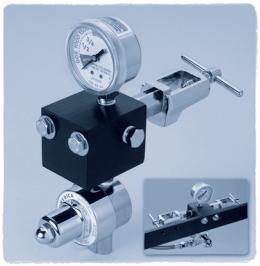


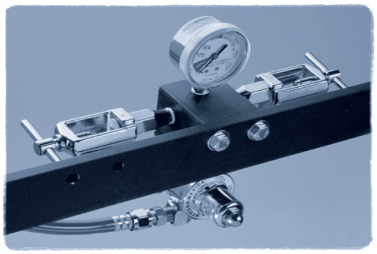
201744 "E" Cylinder Wrench with security Chain

901301 Gasket, "E" Cylinder
Sold individually

E Cylinder yoke/regulator assemblies for V-10 and V-10/A machines

932021 Oxygen, single
932081 CO_2, single





932022 Oxygen, double
932032 CO_2, double

Quick Disconnects

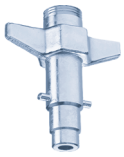
Quick disconnects provide a fast and easy method for moving an anesthetic machine without having to turn the gas supply on or off. They can be installed anywhere in the high pressure hose between the machine and the gas supply. The female (coupler) end is a check valve and is connected to the supply side of the hose. The male (adapter) end is connected to the machine side of the hose.

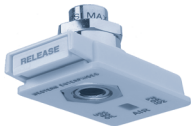
Find the connection type you need from the photos below and match that to the part number list.

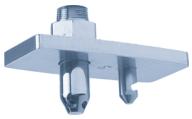

Ohmeda Coupler


Ohmeda Adapter


Oxyquip Coupler


Oxyquip Adapter


Chemtron Coupler


Chemtron Adapter


Puritan Coupler


Puritan Adapter

Ohmeda

931506 Oxygen Coupler x ⅛" FPT
931507 Oxygen Adapter x ⅛" MPT
931512 CO_2 Coupler x ¼" Hose Barb
931513 CO_2 Adapter x ⅛" MPT

Oxyquip

931511 Oxygen Coupler x DISS Male
931514 Oxygen Adapter x DISS Male

Chemtron

931517 Oxygen Coupler x ⅛" FPT
931509 Oxygen Adapter x ⅛" MPT

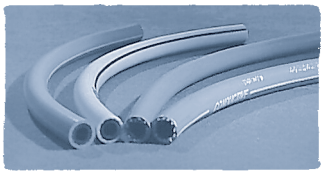
Puritan

931516 Oxygen Coupler x ⅛" FPT
931515 Oxygen Coupler x ¼" MPT
931510 Oxygen Adapter x ⅛" MPT

Hose

- Color coded, nylon reinforced, ¼" ID, conductive high pressure gas supply hose. Hose assemblies can be custom made to exact specifications.

931503 Oxygen, Green
931508 Carbon Dioxide, Grey
931504 Evacuation, Clear
931502 Nitrous Oxide, Blue
931501 Medical Air, Yellow



Outlet Stations

- Recess mounted or surface mounted
- Single or multiple gas configurations
- Gas Specific
- Connection type specific

931505 Outlet Station for Gas Supply
Specify gas type(s), connection type and mounting style

Breathing Circuits

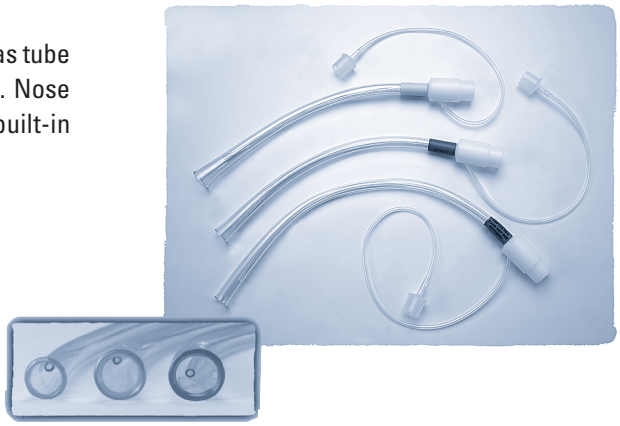
Breathing circuits carry the agent saturated gas from the anesthesia machine to the patient and from the patient to the waste gas evacuation system. They are divided into 2 categories, rebreathing and non-rebreathing.

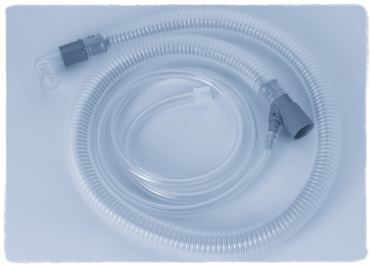
Non-rebreathing Circuits

Non-rebreathing circuits are not used with CO_2 absorbers or standard bellows ventilators. One tube carries the gas from the machine to the patient where a connection holds a facemask, nosecone or endotrachael tube. A second, larger diameter "exhaust down tube" also acts as a reservoir of breathable gas for the patient. Larger animals, 5 lbs and up, can be safely maintained on a non-rebreathing circuit by adding a "reservoir bag" between the down tube and the evacuation system.

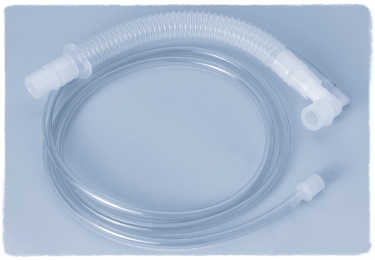
Modified Bain - 1/16" ID fresh gas tube inside the ¼" waste gas tube. Nose end flared to create a built-in nosecone.

921461 9mm flared end
921462 12.5mm flared end
921463 14mm flared end



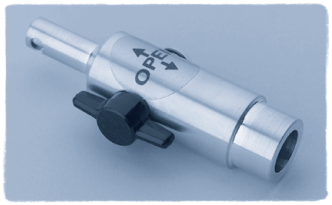


921411 Adult Bain, 60"
921410 Pedi Bain, 45"
¼" fresh gas tube within 22mm waste gas tube



921412 Mapelson E
¼" fresh gas tube outside the 22mm waste gas tube

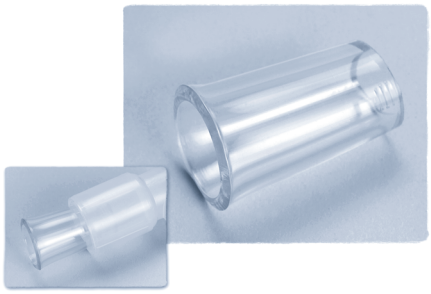
921425 Complete Non-Rebreathing Circuit
For use with animals up to 15 lbs.
With 1.0 liter reservoir bag and evacuation valve



921401 Bag Evacuation Valve

Bubble Tubing Nosecones

- Create a snug seal around the animal's nose
- Cut dead space to a minimum
- Allows access to eyes, ears and top of head
- All sizes can be stored in sterile instrument solution
- Fits all standard non-rebreathing circuits

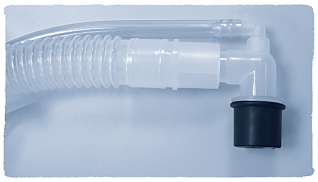


921609 Small to Medium Mouse, 9mm
921612 Large Mouse, Small to Medium Rat, 12mm
921614 Large Rat, 14mm

Finger Cots

921610 Finger Cot Nose Cone Kit
Includes 2 19x22mm adapters and 12 finger cots
190501 Finger Cot, Large, Black Latex

Finger Cot installation on Standard Bain Non-rebreathing Circut



Finger Cot installation on Standard Mapleson E Non-rebreathing Circut

Facemasks

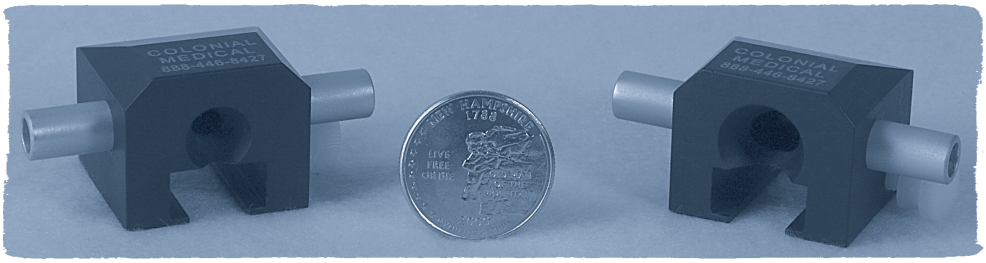
- Clear cone for full visualization of muzzle
- Flexible and replaceable rubber diaphragms
- Standard 15mm connector fits all breathing circuits

921431 Small Rodent Mask
921430 Medium Rodent Mask
921429 Large Rodent Mask
921428 Small Canine Mask
921427 Large Canine Mask

921415 Replacement Diaphragm
921416 Replacement Diaphragm
921417 Replacement Diaphragm
921418 Replacement Diaphragm
921419 Replacement Diaphragm

Stereotaxic Frame Nosecones

- Fits most stereotaxic frames
- Allows use of bite bar and ear bars
- Locks onto frame



921432 Mouse Size

921434 Rat Size

Anesthesia Induction Chambers

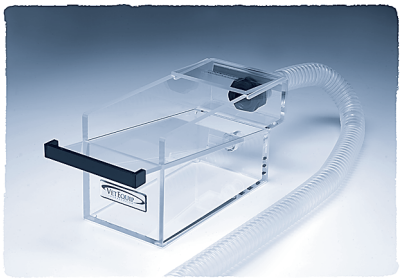
- Induction Chambers that don't pollute the procedure area
- Positive pressure gaskets at lids
- Clear, durable, acrylic construction
- Large, easy to use latches
- Non-skid feet
- Standard anesthesia size inlet and outlet ports
- Both ports on one side to reduce tubing in procedure area
- Ports positioned above level where sleeping animals could create occlusions

941443	1 Liter Chamber (ID 3.75"W x 4.50"D x 3.75"H)	705103	Replacement Gasket
941444	2 Liter Chamber (ID 3.75"W x 9.00"D x 3.75"H)	705104	Replacement Gasket
941448	7 Liter Chamber (ID 8.25"W x 8.75"D x 5.75"H)	705105	Replacement Gasket
941454	15 Liter Chamber (ID 15.00"W x 7.50"D x 7.7"H)	705106	Replacement Gasket

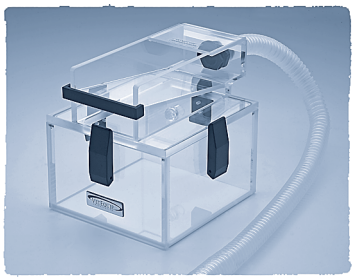
Vented Induction Chambers

Constant exhaust over the opening of these chambers assure investigator safety.* Excess anesthetic vapor is completely captured during all phases of the induction process, even while removing the animal. Connect to non-recirculating exhaust, or pair with one of our evacuation units on pg. 26 for the latest in anesthesia safety. Available in the standard 2-Liter size and introducing our new 7-Liter model for larger animals or groups of animals. Convenient slide top lid and standard inlet and outlet fittings. 6ft of 30mm evacuation tubing included.

*Independent test data available upon request @ **800-466-6463** or via email at **info@vetequip.com**



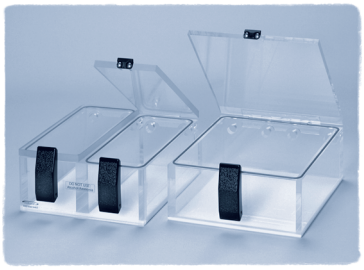
942102 2-Liter, OD 5.5"W x 13.0"D (slopes) 3.2" to 4.2" H
Fresh gas inlet–standard15mm x 22mm
Waste gas outlet–30mm OD



941447 7-Liter Vented Induction Chamber
Fresh gas inlet–standard15mm x 22mm
Waste gas outlet–30mm OD

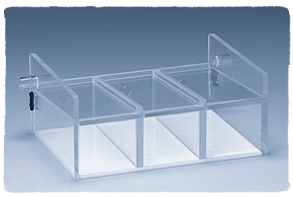
Replacement Chambers

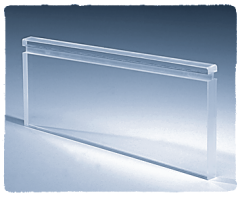
IMPAC[6]



941456 IMPAC[6], Divided
941455 IMPAC[6], Undivided

COMPAC[5]



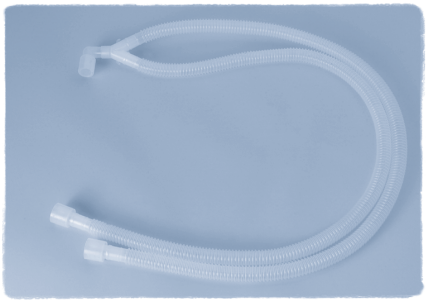


941446 COMPAC[5] Chamber Complete, 2 dividers, 5 lids
704306 COMPAC[5] Chamber Divider
704305 COMPAC[5] Chamber Lid, large
704304 COMPAC[5] Chamber Lid, medium
704303 COMPAC[5] Chamber Lid, small

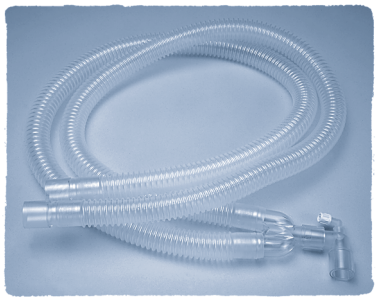
Rebreathing Circuits

Rebreathing circuits require a CO_2 Absorber and can be used with a ventilator. Two hoses or tubes are connected to the anesthesia machine. They meet in a "Y" at the patient's nosecone, endotracheal tube or face mask. The gas is delivered to the patient via one hose and returned to the machine via the other. The gas then passes through the CO_2 absorber where CO_2 is removed, fresh gas is then added to the flow, and the gas goes back to the patient again.

Open ends of hoses are standard 22mm, designed to push on to the inhalation and exhalation ports of any standard anesthesia machine. The "Y" piece at the patient end connects to any elbow, endotrachael tube, face mask or nosecone.



921413 Pediatric set, 36" hoses, ⅝" ID, 22mm fittings



921414 Adult set, 48" hoses, 1" ID, 22mm fittings

Reservoir Bags

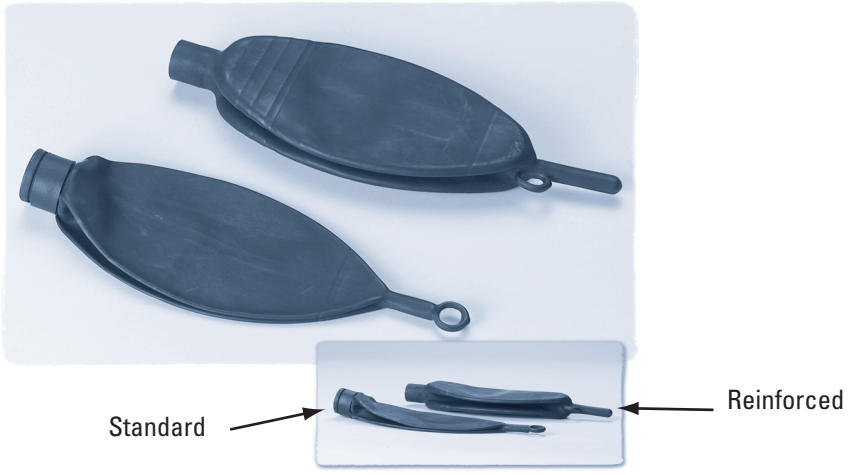
Reservoir bags are used on both rebreathing and non-rebreathing circuits. With rebreathing circuits, the bag hangs from the CO_2 Absorber, creating an extra reservoir of "breathable" air. With non-rebreathing circuits, the bag attaches to the end of the waste gas tube, again creating an extra reservoir of "breathable" air. Since the waste gas tube itself is a reservoir of breathable air, smaller animals, such as rodents, may not need the additional reservoir of a bag.

Standard Reservoir Bags
22mm neck with a flat oval shape

921402 ½ liter
921403 1 liter
921404 2 liter
921405 3 liter
921406 4 liter
921407 5 liter

Reinforced Reservoir Bags
22mm stretch neck and reinforced shoulder

921471 1 liter
921472 2 liter
921473 3 liter
921475 5 liter



Rebreathing Machine Components

A "rebreathing circuit" allows the oxygen (or medical air) and anesthetic vapor mixture from the anesthesia machine to be delivered to the patient, contained and collected as it passes (or is exhaled by) the patient, has the carbon dioxide removed from it, and then is re-delivered to the patient.

The reasons for using this anesthesia delivery and re-delivery method are: the total amount of anesthetic and oxygen (or medical air) used is reduced; some heat lost with exhaled air is re-introduced to the patient, reducing the overall heat loss; some moisture lost with the exhaled air is re-introduced to the patient, lessening dehydration.

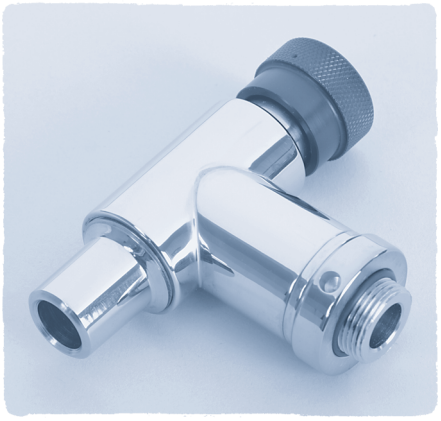
The "rebreathing" method is rarely used with small animals as total air volume passing through the patient's lungs must be significant for the physiologic advantages (heat and moisture retention) to be effective. For those animals in excess of 35lbs to 50lbs (or 13kg to 20kg,) the advantages can be effective.

CO_2 Absorber

For either the Mobile Cart or Wall Mount Machine. Holds the CO_2 absorbent, and with its uni-directional valves in the inhalation and exhalation ports, forces the moving gas to follow a circular pattern to and from the patient.

- Direct reading manometer displays pressure within the breathing circuit
- Anti-pollution (pop-off) valve allows breathing circuit pressure adjustments
- 1500cc absorbent container, easily removable, durable, clear

901751 CO_2 Absorber



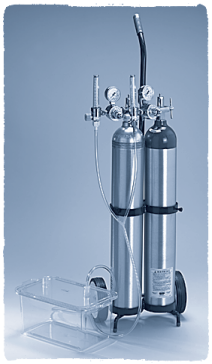
401733 Anti-Pollution (Pop Off) Valve

The Anti Pollution Valve (Pop-Off) interfaces between the anesthesia machine and the waste gas evacuation system. It collects the waste gas from the CO_2 absorber, allows in-circuit pressure adjustments and has a 19mm port for a waste gas tubing attachment.

3 Stage Solution System

As more facilities opt for beginning CO_2 euthanasia with measured percentages of O_2 and CO_2, economically priced systems become necessary. The Complete 3 Stage Solution System, with its individual O_2 and CO_2 flowmeter can be used for:

- Oxygen supported recovery
- Short term anesthesia
- Humane euthanasia

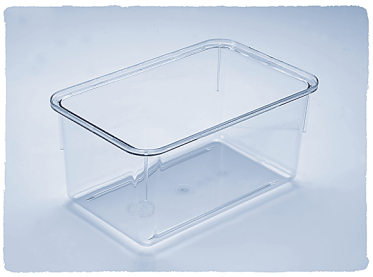


901703 3 Stage Solution System, E or D Cylinders
(cylinders not included)

901702 3 Stage Solution System, H or M Cylinders
(cylinders not included)

Both Setups Include

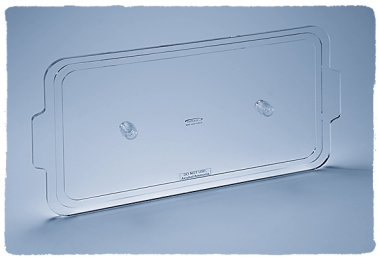
12lpm CO_2 Flowmeter/Regulator assembly, 15lpm O_2 Flowmeter/Regulator assembly, Recovery/CO_2 Mouse Housing Cage, Universal lids for rat and mouse cages, 8' tubing which connects to Flowmeter and universal lids. E or D Cylinder set up includes cylinder wrench (see pg. 14) and dual cart.



941441 Chamber, Recovery/CO_2 Mouse Housing Cage

211200 Dual "E" Cylinder Cart

941442 Universal Lid, Mouse Cage
11.5" x 7.25"



941445 Universal Lid, Rat Cage
18.75" x 9.75"

Universal lids fit on any standard mouse or rat housing cage. Excellent for either O_2 recovery or CO_2 euthanasia. No waste gas evacuation system is necessary for CO_2 and/or O_2. These chambers do not have positive pressure seals and consequently cannot be used for anesthesia induction.

401722 CO_2 flowmeter 0 to 12 lpm
(As Shown)

401745 12lpm CO_2 Flowmeter/Regulator assembly, E or D Cylinders

401740 12lpm CO_2 Flowmeter/Regulator assembly, H or M Cylinders

401720 O_2 flowmeter 0 to 15 lpm
(As Shown)

401746 15lpm O_2 Flowmeter/Regulator assembly, E or D Cylinders

401748 15lpm O_2 Flowmeter/Regulator assembly, H or M Cylinders

Anesthetic Waste Gas Overview

Anesthetic waste gases include any gas from the anesthesia machine that passes the patient without being inhaled, as well as any gases the patient exhales. Trace amounts can pollute the procedure area due to leaking equipment, spills while filling vaporizers, saturated charcoal canisters and inappropriate system use. It is assumed that prolonged and repetitive exposure to anesthetic gases can be toxic. Consequently, NIOSH has recommended Permissible Exposure Limits (PEL's) for anesthetic agents. The PEL established for halogenated anesthetics is 2 parts per million (PPM).

Containing Anesthetic Gas

With respect to specific methods or products, OSHA makes no recommendations as to how to comply with these limits. All anesthetic gases must be contained as they travel to and from the patient. Since gas is constantly being delivered to the patient, there is always an excess that needs to be either evacuated from the area or filtered such that all the anesthetic agent is removed.

Evacuating Gases

Evacuation of waste gas from the area without filtering means that the gas must continue to be contained until it can be released to the outside atmosphere. Channeling to the outside requires oversight to ensure that all connections are leak free. Testing must be done to assure that the number of bends in the evacuation line, as well as the overall length, does not cause resistance to the flow of gas from the anesthesia machine. Evacuation lines must be checked periodically to assure they are clear of obstructions.

Filtering Gases

Filtering means the gas is run through an adsorbent material such as activated charcoal, which collects and holds onto the anesthetic molecules. Once the charcoal is saturated, anesthetic gases which pass through will NOT be adsorbed. Protocols should included weighing small charcoal canisters before and after each use.

Passive vs. Active Evacuation

Passive evacuation occurs when the gas flow from the anesthesia machine pushes the waste gases to the outside atmosphere or a filtering canister. Active evacuation involves applying negative pressure (suction) to the evacuation circuit. In the passive system, a leak in the evacuation circuit could cause the waste gases to leak "outward" into the procedure area. In the active system, if negative pressure reaches the patient's nosecone, it may pull the anesthetic gases past the nosecone, depriving the patient of the delivered concentration of gas. If operating with a loose fitting mask, room air may be pulled into the nosecone area, diluting the set concentration of anesthetic.

In-facility Vacuum, Fume Hoods & Down Draft Tables

There are two common ways to use active evacuation. The first utilizes an in-facility exhaust system and a scavenging interface device. Tubing from the in-house exhaust system and exhaust tubing from the breathing circuit are connected directly to the interface. This device constantly attenuates pressure such that negative pressure is never applied directly to the anesthesia machine or patient. It should also have a provision to avoid accidental positive pressure build-up in the breathing circuit. This is the standard method in human hospital surgery suites. The second method is to apply the negative pressure to the procedure area (e.g. fume hoods and down draft tables) in a manner that allows any waste gas to be pulled into the stream of moving air, but does not apply negative pressure to the patient or anesthesia system. This method is very popular in rodent surgery as it lends itself to the use of less obtrusive breathing circuits.

Monitoring Anesthesia Exposure

Halogenated anesthetics, including desflurane, sevoflurane, isolfurane, halothane, and methoxyflurane are subject to NIOSH's Recommended Exposure Limits (REL)'s. The REL for these gases is 2 parts per million (PPM). This limit is based on a 1978 NIOSH study examining the effects of prolonged and repeated exposure to methoxyflurane and halothane. Although no similar study has been done with more current agents, we must still comply with the standard of 2 PPM.

Testing Methods

OSHA enforces the NIOSH recommendation without outlining any specific method for monitoring these levels. OSHA inspectors use canisters to collect an air sample and send the sample back to a laboratory for analysis. Safety assessment personnel at some larger facilities are using expensive real-time monitors. Analytical chemical laboratories, which issue and analyze badges, use a time-weighted average or other method of analysis to determine exposure. AAALAC's site inspection committee has requested proof of compliance. Without a specific guideline from OSHA, some type of monitoring is always better than none. It has been our experience that OSHA has been willing to accept all of these methods.

Real-time monitors

Real-time monitors show exactly how many PPM's are being detected as the test is being conducted. While precise, the spiked readings tend to be higher than the time-weighted average from the badge readings. The monitor sensors can be placed directly at nosecones or induction chamber lids where readings will be higher than the exposure at the investigator's breathing area, many inches away. The expense of real-time monitors may make them cost-prohibitive.

Badge Analysis

Badges are the monitoring method of choice for most facilities. The badge is clipped to the user's shirt collar where it adsorbs samples of the air near the breathing area. The badge is then sent to a laboratory for analysis and reporting.

Frequency

Monitoring via badges, air samples or real-time devices is not done daily or weekly. Most facilities opt to have one person in each procedure area wear a badge once every six months. You and your safety assessment committee may opt for more frequent monitoring if results exceed PEL's, procedure protocols change, if there is a change in personnel or equipment, or as needed.

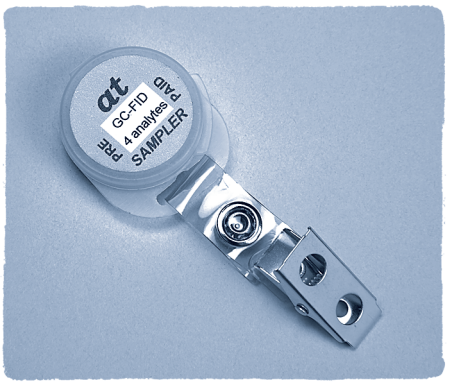
"I've worked with VetEquip for years."

I recommend VetEquip whenever anyone is setting up a lab because they know the anesthesia end.

I feel VetEquip partners with me and has an interest in what I'm doing, as opposed to wanting to just sell me something."

– Diane, RVT, LATG
Research Coordinator
Radiological Sciences
Laboratory

Monitoring Badge



931443 Waste Gas Monitoring Badge and Analysis Report

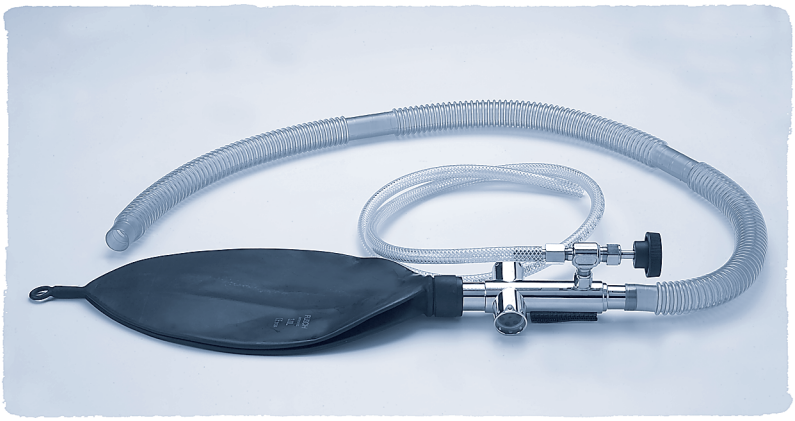
Waste Control Valves

The scavenging interface serves to prevent potentially dangerous increases or decreases of pressure in the anesthetic waste gas disposal system from reaching the patient's breathing circuit.

Positive pressure relief must be provided to protect the equipment and patient if occlusion of the scavenging system outlet occurs. If the scavenging system outlet becomes occluded, the positive-pressure relief vent opens to prevent transmission of high pressure to the breathing circuit.

Negative pressure relief is needed to prevent negative pressure (suction) generated by the disposal system from reaching the patient's breathing circuit.

A reservoir is necessary to allow the scavenging system to accommodate an increased volume of excess anesthetic gas, which may transiently exceed the per-minute removal capacity of the system. It may also serve as a monitor of the scavenging system if the reservoir is a distensible bag. Overdistension of the bag could indicate inadequate function of the system and the need to adjust the needle valve to allow more gas to flow through.

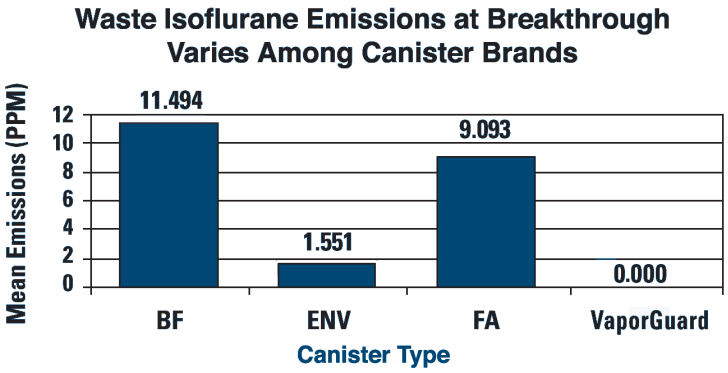


931440 Scavenging Interface Kit
Includes: 3L reservoir bag with 19mm neck, 6 each of 1/4" ID suction hose and 19mm evacuation tubing.

931439 Scavenging Interface Valve only

921405 3.0 Liter Scavenging Reservoir Bag

VaporGuard Filter

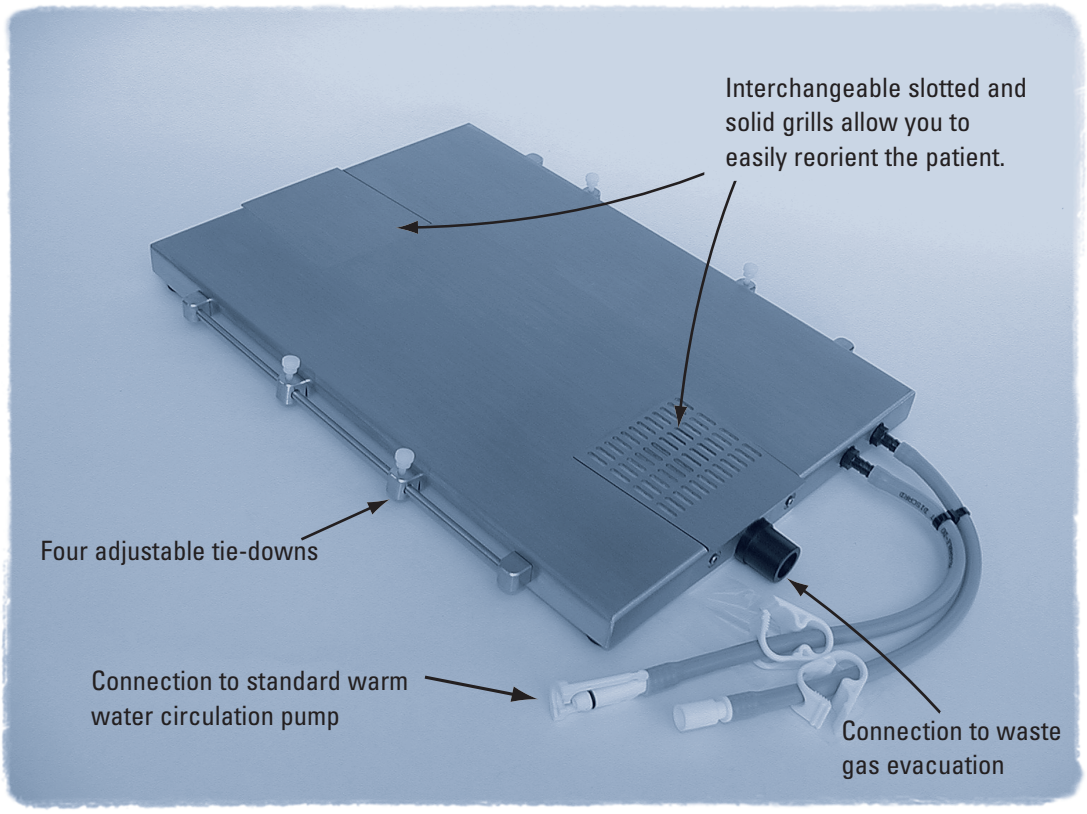


931401 VaporGuard Filters
Sold in cases of 8

*Independent test data available upon request @ **800-466-6463** or via email at **info@vetequip.com**

DSx Vented, Warmed Surgery Table

- Connects to any standard warm water pump for maintenance of body heat without danger of burns
- Connects to in-house or freestanding evacuation system for collection of any waste gas leaking around facemasks or nosecones
- Stainless steel surface is an excellent heat conductor ensuring immediate and adequate surface heat
- Stainless steel construction stands up to disinfectants, hand scrubbing and cage washer heat
- Replaceable filters and removable under-table channel cover guarantee easy and thorough cleaning
- 16"W x 11.5"D x 1.25" H; Weight - 9.5 lbs



965500 DSx Vented, Warmed Surgery Table

*Independent test data available upon request @ **800-466-6463** or via email at **info@vetequip.com**

DSx Accessories

983105 H_20 Pump

933101 Extract-All Bench Top

933105 Extract All-Cabinet

Self Contained Evacuation Systems

Self-contained recirculating air cleaning systems plug in to any 110 outlet to remove contaminated waste gas at its source.

Filter Mate Portable Extractor

935101 Filter Mate Portable Extractor
14" x 23" x 22¾" Up to 250 CFM
Houses a carbon based filter cell, surrounded by a negative pressure plenum to capture and re-filter any leaks

or

Extract-All Cabinet

933105 Extract-All Cabinet
Cabinet has double filters
18" x 42½" x 13 not incld. rear filter

or

Extract-All Bench Top

933101 Extract-All Bench Top
12" x 10½" x 7" not incld. filter

Accessories For Evacuation Systems

Filter Mate Portable Extractor (935101)
935105 FilterMate Replacement Filter
935106 FilterMate Thimble Connection
connects FilterMate to existing house exhaust

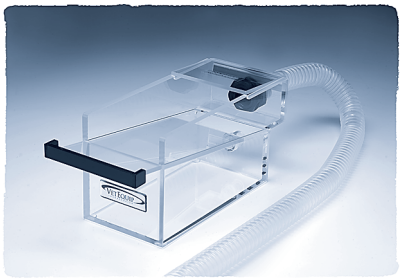
Extract-All Cabinet (935105)
933106 Primary Filter
933107 Secondary Filter
933108 Primary Filter refill
933109 Secondary Filter refill

Extract-All Bench Top (933101)
933106 Primary Filter

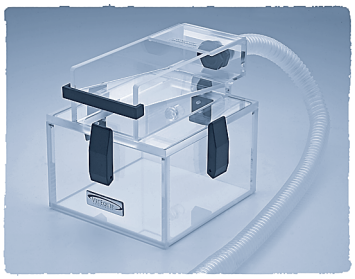
Vented Induction Chambers

Constant exhaust over the opening of these chambers assure investigator safety.* Excess anesthetic vapor is completely captured during all phases of the induction process, even while removing the animal. Connect to non-recirculating exhaust, or pair with one of our evacuation units on pg. 26 for the latest in anesthesia safety. Available in the standard 2-Liter size and introducing our new 7-Liter model for larger animals or groups of animals. Convenient slide top lid and standard inlet and outlet fittings. 6ft of 30mm evacuation tubing included.

*Independent test data available upon request @ **800-466-6463** or via email at **info@vetequip.com**



942102 2-Liter, OD 5.5"W x 13.0"D (slopes) 3.2" to 4.2" H
Fresh gas inlet–standard15mm x 22mm
Waste gas outlet–30mm OD



941447 7-Liter Vented Induction Chamber
Fresh gas inlet–standard15mm x 22mm
Waste gas outlet–30mm OD

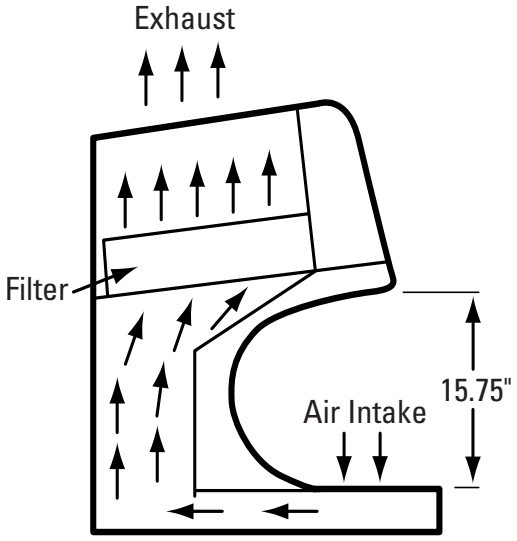
Downdraft Anesthesia Work Station

The Downdraft Anesthesia Work Station is specifically designed to provide a small bench-mounted unit with unrestricted access for those procedures that are difficult to perform in a fume cabinet. The downflow action takes the contaminated air away from the operator and an audible alarm will alert the operator when the airflow falls to an unacceptable level.

Features

- No ducting or installation costs
- Integral lighting illuminates the work surface
- All mechanisms in the head are on the clean side of the filter, with the switches and electrical components being isolated from any contamination
- The filter clamping mechanism enables the filter to be easily located and ensures an even seal at the filter face
- The main filter block can be chosen from fourteen different types which include speciality filters for vapors of acids, mercury and formaldehyde
- Total airflow = 145 CFM
- Work surface face velocity = 80 FPM
- Charcoal filter is easily removed for regular weight/saturation checks

966001 Downdraft Anesthesia Work Station, 24"
966002 Replacement carbon filter for 24" DWS
966003 Downdraft Anesthesia Work Station, 36"
966004 Replacement carbon filter for 36" DWS
Other filters available upon request.



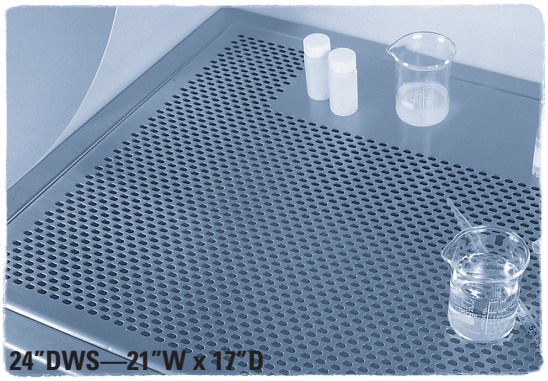
24" DWS—24"W x 24"D x 32"H

Clean air recirculates into the laboratory, so there's no heat loss or costly ducting.

Easy to use Control Panel

- Includes visual alarm for low airflow to indicate pre-filter blockage
- Automatic "Time-in-Use" counter
- Optional electronic monitoring of both airflow and filter saturation

Cut away sides give extra access to the work surface.



Stainless steel tray is removable for easy cleaning and access to the pre-filter.

Anesthesia Work Station

- Basic Respiration or Volume Ventilator during anesthesia
- Animals from 150gm to 7kg
- Adjustable high pressure limit
- Airway pressure monitor
- Oxygen flush locked with expiratory phase
- Heated rebreathing chamber
- 0 to 100 ml tidal volume displacement tube
- 300 ml CO_2 absorber
- Control rate and volume

921255 Anesthesia Work Station

HEMC 2000 Small Animal Ventilator

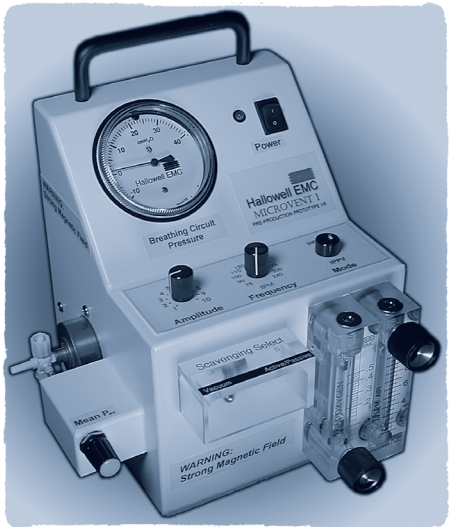
- Animals 1-200kg
- Tidal volume range from 20-3000cc
- Time Cycled Respiratory Rates 6-40 bpm
- Maximum working pressure adjustable from 10-60cm/H_2O
- Volume constant to compensate for lung compliance changes
- Dual airway pressure alarms monitor peak inspiratory pressure

921761 HEMC 2000 with 300-1600ml bellows
921762 Bellows & Housing 0-300ml
921764 Bellows 1600-3000ml
921765 Housing 1600-3000ml
921766 Bellows 300-1600ml
921767 Housing 300-1600ml

MicroVent 1

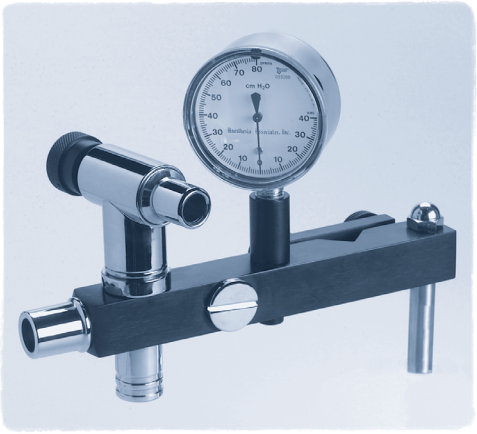
- Animals with tidal volumes 0-10ml
- IPPV and High Frequency Oscillatory Ventilation
- IPPV mode allows control of:
  - Oxygen flow 50-100mls per minute
  - Breaths per minute 75-2400
  - Breath volume 0-10ml
  - Mean Airway Pressure
- Oscillatory Mode:
  - Lungs are expanded and held inflated as high frequency vibrations (750-2400 per minute) cause osmotic O_2 - CO_2 exchange without lung movements

921760 MicroVent 1 Ventilator



Interfacing Ventilators with Anesthesia Machines

Interface devices have air reservoirs allowing changes in piston intake volumes to occur unaffected by constant output volumes. There is no lack of air to be pulled into the ventilator and there is no back pressure within the anesthesia system.

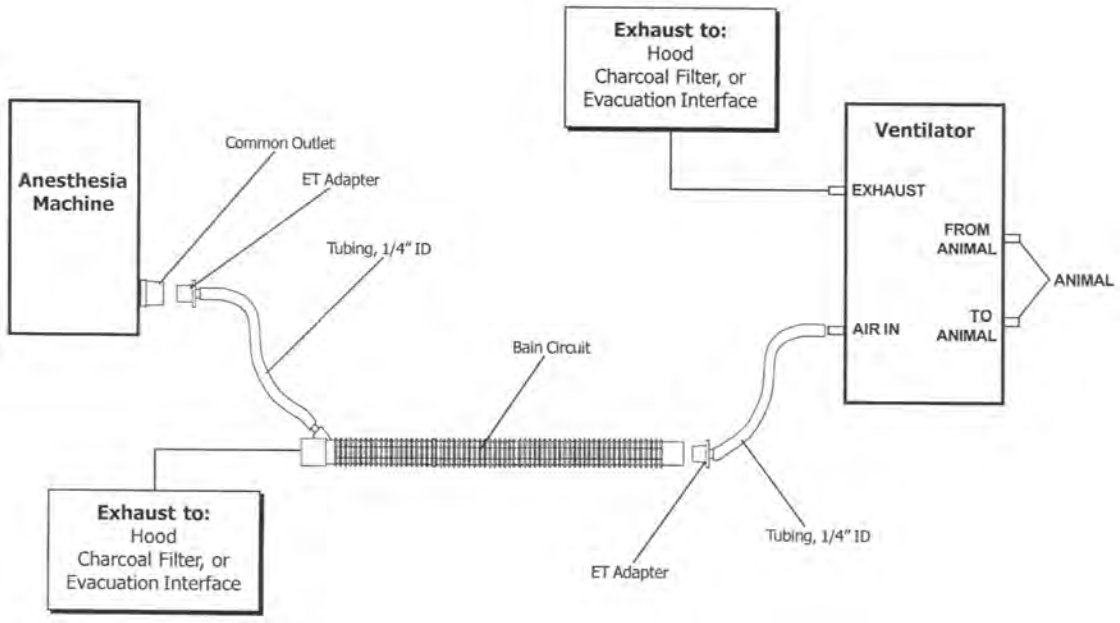


The Universal Control Arm acts as a pressure stabilizing interface, provides an enclosed, adjustable pop off for excess volumes (easily connected to your in-house evacuation) and a manometer for constant viewing of the pressure within the interface circuit.

The Arm can also be used with any non-rebreathing circuit for the added advantages of the enclosed pop off valve and the manometer.

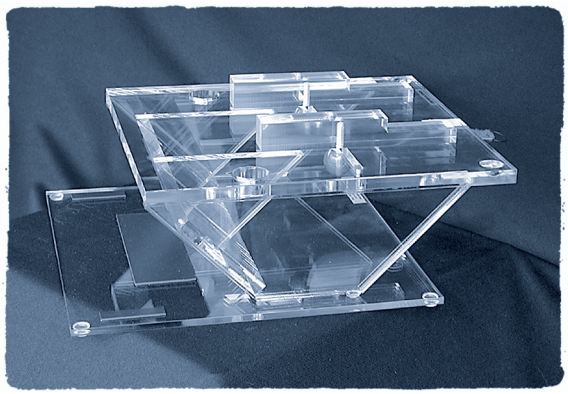
921451 Universal Control Arm

As diagramed below, a Bain non-rebreathing circuit combined with tubing, filters and ET adapters can be used to create an interface. This system can be constructed from components found in most labs or purchased as a Complete Interface System.

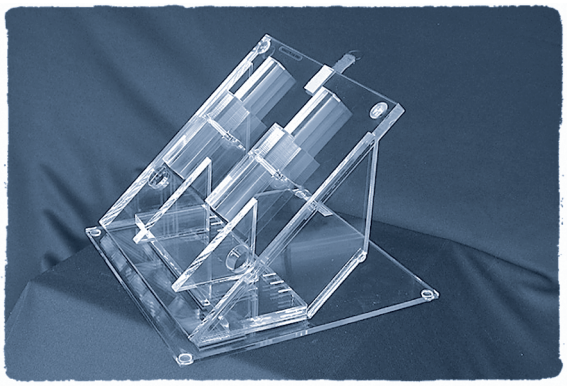


921452 Complete Interface System
For piston-style ventilator

Rodent Intubation Aids



984102 Rodent WorkStand



984102 Rodent WorkStand, tilted view

The HEMC Rodent WorkStand was developed in collaboration with George A. Vogler, D.V.M., DACLAM of Saint Louis University Medical School Comparative Medicine Department to facilitate endotracheal intubation and intratracheal dose instillation and other similar procedures. The WorkStand will support rats, mice and similar small rodents in a stable and comfortable position.

984104 Mouse Intubation Pack

984106 Rat Intubation Pack

Used with the Rodent WorkStand, each pack is designed to neatly hold all the tools and supplies needed to perform quick, efficient and minimally traumatic orotracheal intubation of small rodents. Each compartment is labeled for contents, reordering information and component instructions.

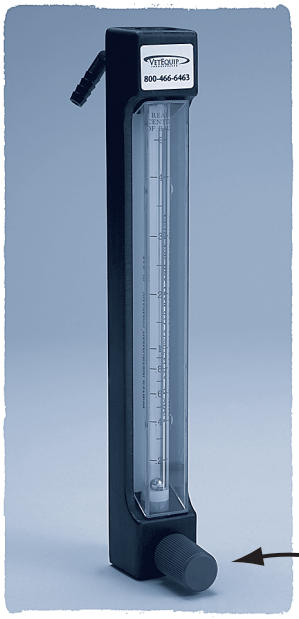
Both Packs include; a specially designed and molded autoclavable intubation speculum, a lidocaine applicator, and endotracheal tube guide wire, an incisor loop and a brief tutorial video. In addition, the Rat Pack contains scissors, umbilical tape, and a mirror for the verification of tracheal intubation. The Mouse Pack includes HEMC's NEW mouse endotracheal tubes in two sizes.

Otoscopes in 3 quality ranges are available by special order:

MDS, non-rechargeable NICAD batteries. Special Order #000A3748
Welch Allyn, rechargeable NICAD batteries. Special Order #000A3749
Light and easy to handle Welch Allyn, rechargeable LI Ion batteries Special Order #000A3754

Modification and Replacement Components

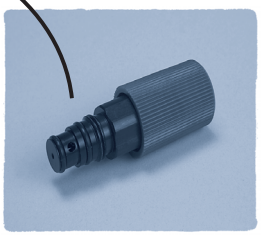
Table Top, Mobile Cart and Wall Mount anesthesia machines can be modified with additional carrier gas flowmeters and/or with a "low flow" fine calibrated oxygen flowmeter. Other flowmeters are available via special order.



411723 Oxygen, 0 to 1 lpm
411722 Oxygen, 0 to 4 lpm
401726 Oxygen, 0 to 12 lpm
401735 Carbon Dioxide, 0 to 10 lpm
401730 Carbon Dioxide, 0 to 2 lpm
401728 Medical Air, 0 to 5 lpm
401721 Nitrous Oxide, 0 to 4 lpm

901751 CO_2 Absorber

Removable components for easy cleaning. Enclosed anti-pollution valve to capture and vent waste anesthetic gases. Direct-reading manometer to monitor pressure in the breathing circuit.

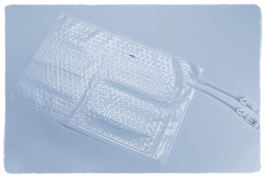


401719 Flow Control

211200 Dual "E" Cylinder Cart

983701 Click-Tite Adapters

Short pieces of water hose with a threaded (male) connection on one end and click-tite adapters on the other.



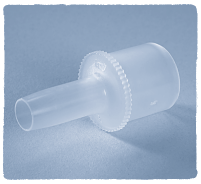
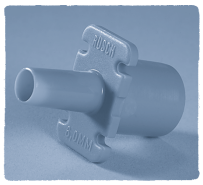
983701 Warm Water Pad, 15" X 22"

Translucent; flexible; with leak proof, click-tite water hose connections.

941441 Chamber, Recovery/CO_2 Mouse Housing Cage

211100 Single "E" Cylinder Cart

Modification and Replacement Components

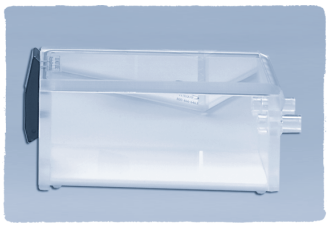



314525 Adapters ET, 6mm Clear
304519 Adapters ET, 6mm, Blue

304789 Y Piece, ¼" tube adapter

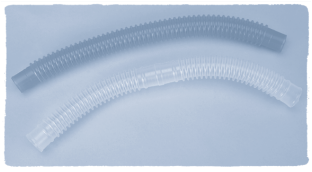
304502 Adapter, Elbow only, Mapleson E Breathing circut

921412 Mapleson Non Rebreathing E Circuit



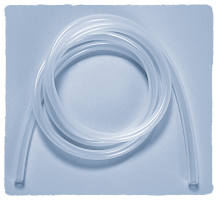
941444 2 liter Induction Chamber

921433 Stopcocks



931435 19mm Evacuation Tubing, Blue
931436 22mm Evacuation Tubing, Clear

901301 Gasket, "E" Cylinder
Sold individually



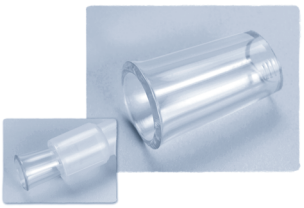
172104 Silicon Tubing, ¼" ID

171434 Latex Conductive Tubing, ¼" ID

931530 O_2 Hose, 10', DISS X DISS
Included with every LAAS

931401 VaporGuard Filters

921400 Dual Procedure Circuit, Complete

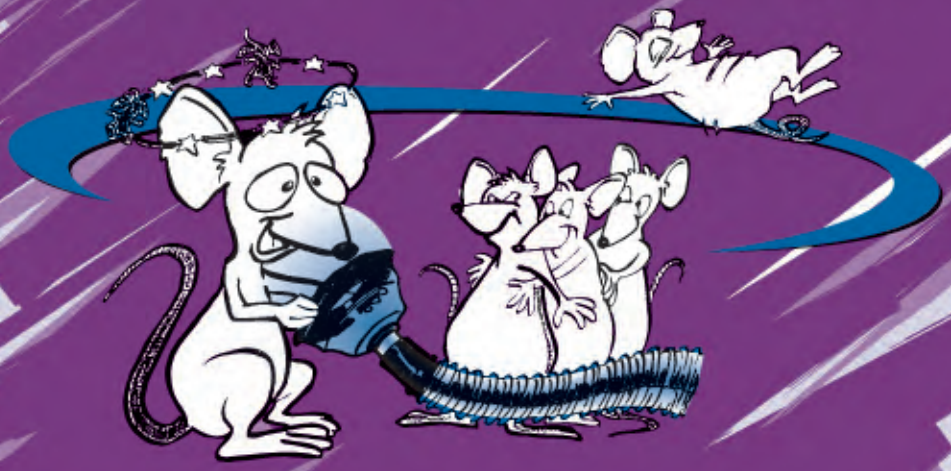


921609 9mm Nosecone
921612 12mm Nosecone
921614 14mm Nosecone

304507 Adapter, 22mm Female X 19mm Male

304501 Adapter, 15mm ID X 22mm OD

VETEQUIP gives me gas...



"I'm not as high as some thinkle peep"

Every complete Lab Animal System comes with a VetEquip Tee Shirt. Tee shirts are also available for sale!

999997 VetEquip Tee Shirt
Hanes® Heavyweight 100% cotton, preshrunk, coverseamed, double needle sleeve and bottom hem. Specify size– L or XL

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