

# Anaerobic Chambers

For Anoxic, Microaerophilic, and Hypoxic Applications



**Hypoxic Chamber**



**Vinyl Anaerobic Chambers**

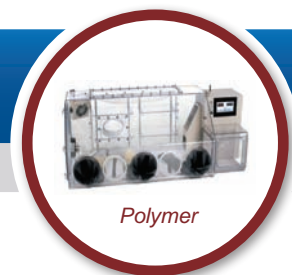
## Applications:

- ➔ Anaerobic microbiology research
- ➔ Biofuels and environmental microbiology
- ➔ Microbiome Studies
- ➔ Specialized cell culture incubation

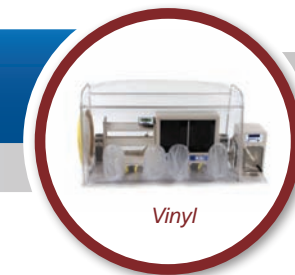
# Anaerobic Chambers



Aluminum



Polymer



Vinyl

The Coy vinyl chamber was the first developed especially for anaerobic microbiology, and it is now the anaerobic chamber of choice for the majority of users who employ an anaerobic process.

Coy also offers both economical polymer and sturdy aluminum chambers. Our modular construction and accessories allow us to tailor a chamber that meets your needs.

**At Coy Laboratory Products, we pride ourselves on asking you the right questions so that we can deliver you exactly the right product for your application.**

## Configurations and Types

- Vinyl, polymer or aluminum
- Heated or unheated, or unheated with incubator
- Gloved or gloveless

## Standard Features – All Coy Anaerobic Chambers

- Automatic or manual airlock with vacuum pump & tubing
- Gas regulator(s) with tubing and fittings
- Catalyst fan box(es) (heated or unheated)
- Stak-Pak with Catalyst (two per fan box)
- Six-receptacle plug strip
- Feed-thru adaptor(s)

## How Coy Anaerobic Chambers Work

All Coy Anaerobic Chambers operate with a hydrogen gas mix reacting with a palladium catalyst to remove excess oxygen. Key components of Coy Anaerobic Chambers are the gas (user supplied), the catalyst, the catalyst fan box, temperature control accessories (if needed) and the airlock. All chambers require the addition of two gas sources, a background gas (typically N<sub>2</sub>) and a gas mix containing 5% H<sub>2</sub> with the balance comprised of any inert gas such as N<sub>2</sub>, CO<sub>2</sub>, or Ar. A palladium catalyst in a stak-pak is placed over the circulation source called a catalyst box (sometimes referred to as a fan box). The gas mix with H<sub>2</sub> gas is circulated through the catalyst and removes O<sub>2</sub> by forming a water molecule. Generally, O<sub>2</sub> levels equilibrate to 0-5 parts per million (ppm). After initial establishment of the anaerobic atmosphere, the gas mix (H<sub>2</sub> 5%) should be refreshed every 5-10 days and the catalyst rejuvenated by heating it. The airlock is used to reduce O<sub>2</sub> levels prior to the transfer of samples in and out of the chamber to avoid large spikes of O<sub>2</sub> into the system.

## Anaerobic Chambers Interior Work Area L x D

Vinyl	inches	millimeters
Type A	59 x 32	1499 x 813
Type B	78 x 32	1981 x 813
Type C	42 x 32	1067 x 813

Aluminum – gloveless or with gloves		
1 Person	41 x 23	1041 x 584
2 Person	71 x 23	1803 x 584

Polymer – gloveless or with gloves		
3 foot	35 x 23	889 x 584
4 foot	47 x 23	1194 x 584
5 foot	59 x 23	1499 x 584

### Catalyst Fan Box

Made up of a fan to circulate the air and a tray to hold the stak-pak, the fan box may be heated, with digital display/controls (shown here) or unheated.

### Stak-Pak with Catalyst

The catalyst is contained within wire mesh called a stak pak. The catalyst is alumina pellets coated with palladium which provide a meeting ground for hydrogen and oxygen molecules. Additional wire mesh containers may be filled with other material and stacked in multiples of up to 2 in order to solve issues in the chamber such as moisture (desiccant) or chemical contamination (activated charcoal). The unique design of the Stak-Pak with Catalyst allows it to be stacked on a fan box and still maintain proper air flow.



## Incubation and Heaters

For applications that require incubation with temperature control, Coy has several solutions. The advantages and disadvantages of these options should be factored into your selection.

### Anaerobic chamber with heater option

The entire chamber becomes an incubator. Incubation capacity is limited only by the size of the chamber. Disadvantages include larger temperature variations and a less comfortable work area when compared to an unheated chamber with incubator option. It is a less expensive solution than purchasing an unheated chamber with an incubator.

### Anaerobic chamber with incubator option

An unheated chamber with an incubator has the advantage of incubation with more precise temperature control when compared to the same process with just a heater in the chamber. The chamber also is more comfortable to work in than a heated chamber. The disadvantage is the limited incubation capacity and odd-size containers may not fit in it.

### Anaerobic chamber with heater and incubator option

The advantage is that the heater can be kept turned off until the incubator reaches overflow capacity at which point it can be turned on. While this is a best of both worlds choice, it is more expensive. Only Coy Vinyl Anaerobic Chambers can be retrofitted in the field with an incubator. All three types of anaerobic chambers can have a heater specified at initial purchase or later.

## How Coy Vacuum Airlocks Work



Coy vacuum airlocks (manual or automatic) remove O<sub>2</sub> from ambient conditions to achieve acceptable levels of O<sub>2</sub> prior to transfer to/from the chamber. The airlock reaches the low O<sub>2</sub> level through a multiple vacuum/purge procedure. The standard factory procedure is to pull a vacuum to 20" of mercury, then purge back to 1" of Hg using an inert background

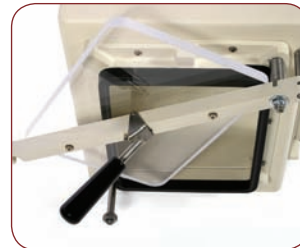
gas. Another cycle is repeated with the inert gas. A third cycle is performed with the H<sub>2</sub> gas mix used for anaerobic work. On the third and final purge, the vacuum level is brought back to ambient with just a slight vacuum left to hold the seal. The seal is easily broken by the user when opening the door. Automatic airlocks are equipped with an advanced electronic program that allows adjustments in vacuum levels, number of cycles, calibration of pressure sensors, and programmable profiles, depending on the type of work being done in the chamber. All vacuum pumps are equipped with moisture traps to prevent excess moisture from the chamber or gas tanks from entering the pump. This helps prevent pump vane rusting, which can significantly damage the pump. Manual airlocks operate with the user turning ball valves for the gas and pump while monitoring the vacuum levels. Automatic airlocks operate with the touch of a button.

## Airlock Specifications

		COY Type A, B or C Vinyl Anaerobic Chamber	COY 1 or 2 Person Aluminum Anaerobic Chamber (Gloved or Gloveless)	COY 3, 4 or 5 ft. Polymer* Anaerobic Chamber (Gloved)	COY 3, 4 or 5 ft. Polymer* Anaerobic Chamber (Gloveless)
<b>VACUUM AIRLOCK SPECIFICATIONS</b>					
Airlock Interior Dimensions/ Capacity	Inches (LxDxH)	13.6 x 13.6 x 13.4	13.6 x 13.6 x 13.4	NA	NA
	Millimeters (LxDxH)	345 x 345 x 340	345 x 345 x 340	NA	NA
	Capacity (100 MM petri dishes)	150	150	NA	NA
Door Opening	Inches (WxH)	8 x 11	8 x 11	NA	NA
	Millimeters (WxH)	203 x 279	203 x 279	NA	NA
Automatic or Manual Airlock Operation		Both	Both	NA	NA
Airlock Transfer Time		< 60 seconds	< 60 seconds	NA	NA
Adjustable Vacuum Levels		S	S	NA	NA
Adjustable # of Cycles		S	S	NA	NA
Self-Calibrating Pressure Sensor		S	S	NA	NA
9 Different Memory Profiles		S	S	NA	NA
Gas Low Alarms		S	S	NA	NA
<b>PURGE AIRLOCK SPECIFICATIONS</b>					
Airlock Interior Dimensions/ Capacity	Inches (LxDxH)	NA	NA	12 x 10 x 14	12 x 10 x 14
	Millimeters (LxDxH)	NA	NA	305 x 254 x 355	305 x 254 x 355
	Capacity (100 MM petri dishes)	NA	NA	50	50
Door Opening	Inches (WxH)	NA	NA	9 x 12	9 x 12
	Millimeters (WxH)	NA	NA	228 x 305	228 x 305
Automatic or Manual Airlock Operation		NA	NA	Both	Automatic
Airlock Transfer Time		NA	NA	60 - 190 seconds	60 - 190 seconds
Digital Time Display		NA	NA	A	S
Adjustable Purge Time		NA	NA	A	S
Sliding Airlock Shelf		NA	NA	A	A

\*Can be customized with vacuum airlock S = Standard equipment on this unit A = Accessory available for additional cost NA = Not available for this product

### Vacuum Airlock Door



This update to the airlock door has a spring-loaded corner pivot which allows the door to swing up while parallel to the airlock, saving valuable space. Older Coy airlocks may be retrofitted in the field with the new style door and updated digital electronics.

### Purge Airlock

The purge-only units operate by flushing background gas into the airlock to push out excess oxygen prior to opening the interior door. Ideal purge times are provided by Coy for various O<sub>2</sub> levels. Automatic units allow the user to preset a specific time to purge the airlock with a simple touch of a button. With manual units, the user operates ball valves and times the purge. Purge units, while initially less expensive to purchase than vacuum airlocks, generally have a higher operational cost and a longer transfer time.

## Coy Anaerobic Model 12 (CAM-12) for O<sub>2</sub>/H<sub>2</sub>

The CAM-12 monitors O<sub>2</sub> & H<sub>2</sub> levels in your anaerobic chamber. It is compact in size with an LCD Screen and requires no routine maintenance. Audible and visual alarms signal high and low gas concentrations. It allows for the use of less expensive gas mixes for chamber operation.

CAM-12 sensors can now be replaced in the field.

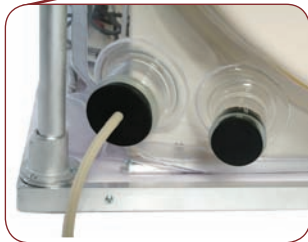


## Shelves

The sturdy metal shelving units are specifically designed with raised edges to help hold plastic ware and other items.

## Equipment Entry Port

Large equipment entry port is capped and secured in place after equipment is installed.



## Feed-Thru Adaptor

Electrical wiring, tubing or cords are input through two feed-thru adaptors.

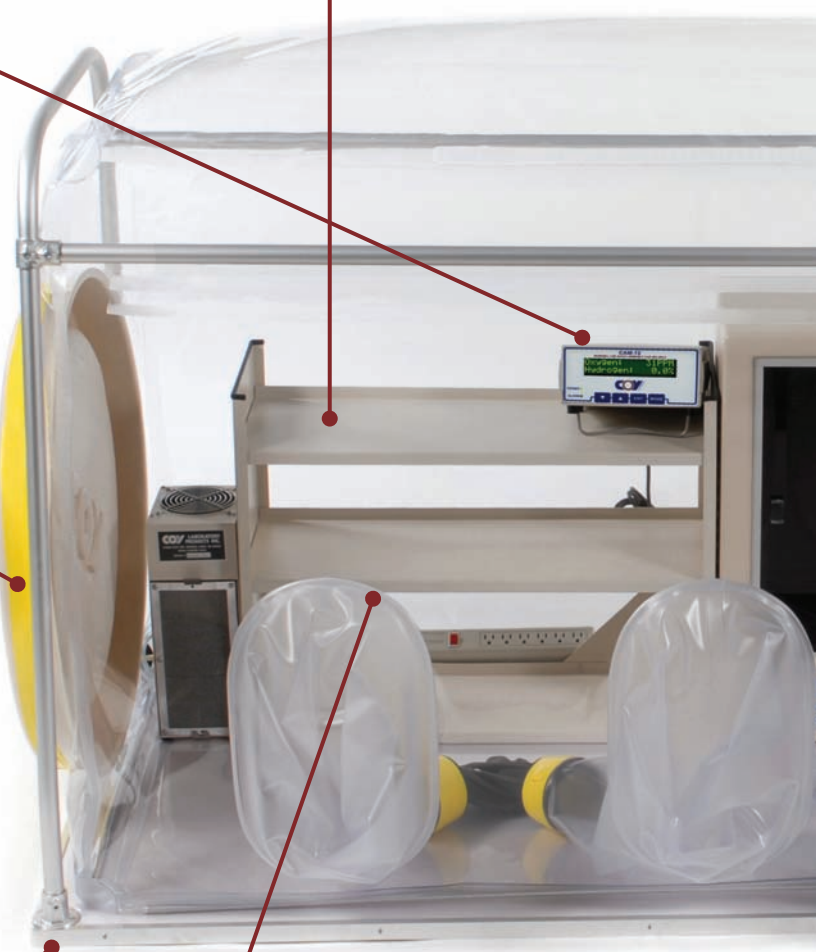
## Aluminum Frame Support

The tubular aluminum frame supports the vinyl chamber and is mounted on a padded plywood base that is covered with a foam pad and heavy vinyl. Hold-down rods secure vinyl to the base.



## Vinyl Glove Box Seams

Radio frequency welded seams; glove port has double-lapped seams for added strength.





### Model 2000 Forced Air Incubator for Vinyl Chamber

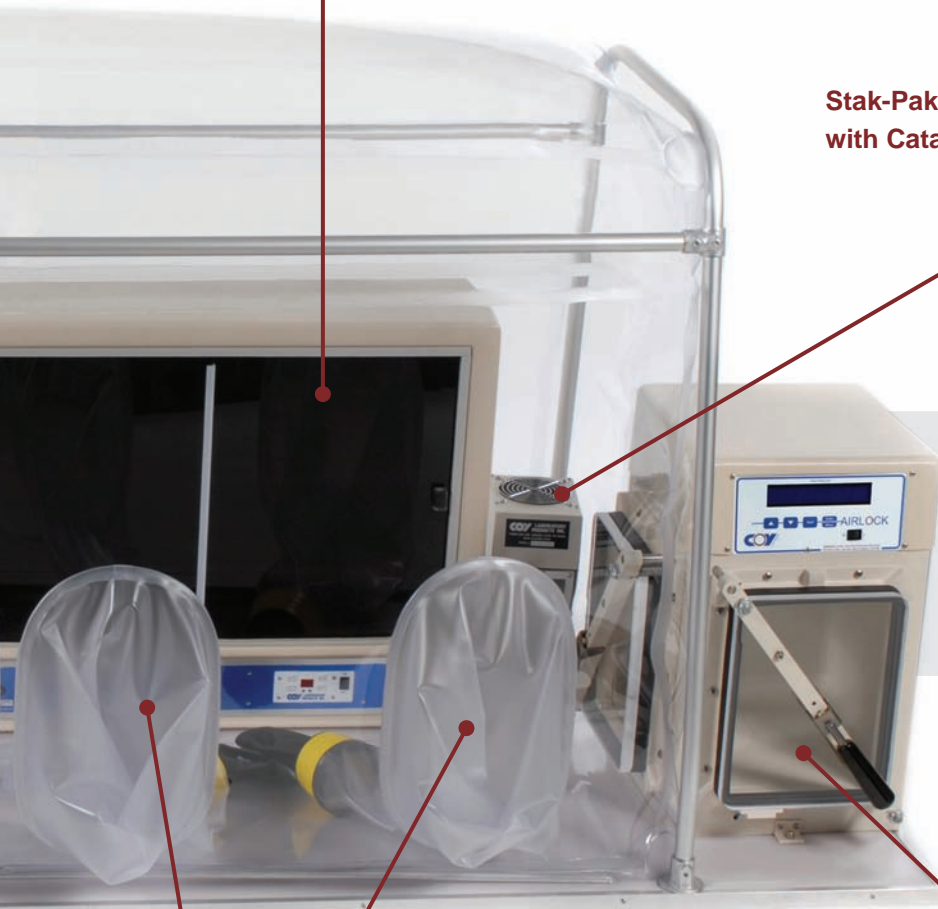
Custom engineered to create a constant-temperature environment without heating the entire chamber. Sliding doors save space.

### Catalyst Fan Box (HEATED OR UNHEATED)

Made up of a fan to circulate the air and a tray to hold the Stak-Pak with Catalyst, the fan box may be heated or unheated. The catalyst fan box circulates chamber air through the catalyst to remove O<sub>2</sub>.



### Stak-Pak with Catalyst

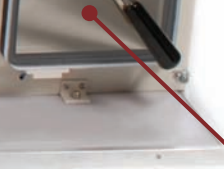


# Vinyl Anaerobic Chamber



### Glove Ports

Oval-shaped glove ports are constructed of a special highly flexible vinyl frosted to prevent cracking and gas leakage at bend points.



### Automatic Airlock

Automatic airlocks remove O<sub>2</sub> from ambient conditions to achieve acceptable levels of O<sub>2</sub> for anaerobic work. The O<sub>2</sub> is removed prior to opening the interior door and entry into the anaerobic chamber. The airlock reaches the low O<sub>2</sub> level through a multiple purge/vacuum procedure. Digital controls allow adjustments in vacuum levels, number of cycles, calibration of pressure sensors, and programmable profiles, depending on the type of work being done in the chamber. See page 3 for airlock details. Manual airlocks are also available.

### Airlock Door (Updated in 2006)

This update to the airlock door has a springloaded corner pivot which allows the door to swing up while parallel to the airlock, saving valuable space.



# Vinyl Anaerobic Chambers



## THREE MODELS AVAILABLE:

### TYPE A

- ➔ Includes one pair of gloves, one ABS plastic work pad, two fan boxes, four Stak-Paks with Catalyst

### TYPE B

- ➔ Includes two pairs of gloves, two ABS plastic work pads, two fan boxes, four Stak-Paks with Catalyst

### TYPE C

- ➔ Includes one pair of gloves, one ABS plastic work pad, one fan box, two Stak-Paks with Catalyst

### Standard Equipment and Features

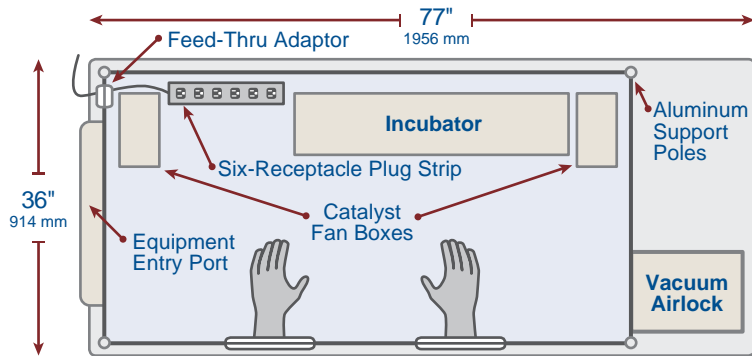
- ➔ Vacuum pump
- ➔ Vacuum airlock with moisture trap that prevents moisture from being drawn into pump
- ➔ Setup and care kit
- ➔ Chamber front made of optically clear, pressed, polished 30 mil vinyl with 40 mil vinyl bottom extending 2"/51 mm up on all sides

- ➔ Mounted on a 3/4"/19 mm padded plywood base with heavy vinyl cover which prevents cuts and punctures to the bottom of the chamber
- ➔ Tubular aluminum frame
- ➔ Gas mix regulator and nitrogen background gas regulator plus tubing and fittings
- ➔ Large equipment entry port (27"/686 mm diameter) opposite the airlock is capped and secured in place with supplied vinyl adhesive after equipment is installed
- ➔ Electrical wiring, tubing or cords are input through two feed-thru adaptors, 2"/51 mm and 1 1/2"/38 mm
- ➔ Latex gloves (size large) are placed over a special cuff and then situated on the permanently attached vinyl sleeves and secured with the supplied vinyl adhesive, allowing replacement of damaged gloves without affecting the chamber's atmosphere. The sleeves are made of 15 mil flexible vinyl that allows maximum mobility and dexterity. Optional neoprene gloves available.

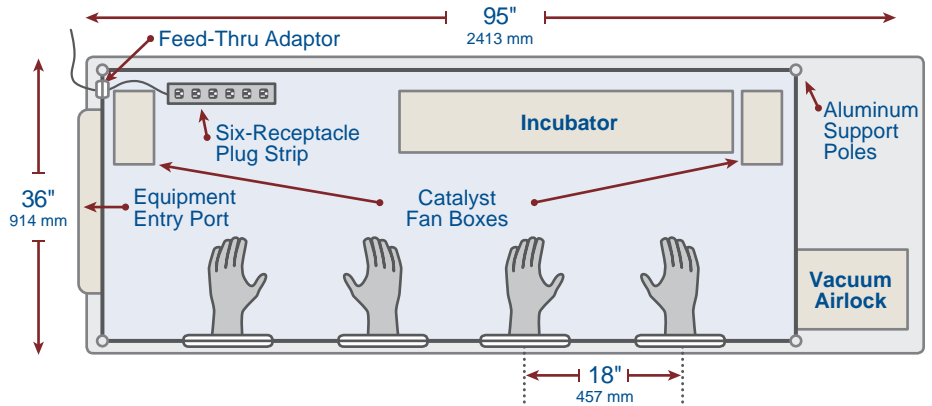
## Why Choose Coy Vinyl?

- Large, useable workspace and interior space because of the pliability of the vinyl and large glove ports that allow the user to reach higher and deeper into the chamber
- Easier to maintain more stringent anaerobic conditions
- Vinyl chambers use less gas because they expand and contract, compensating for volume changes associated with short gas injections or hands entering and exiting the chamber
- More economical to operate than rigid chambers that expel gas to the lab, wasting expensive anaerobic gas mix
- Flexibility of chamber lets user rest elbows on padded base rather than on a narrow rigid entry port, reducing fatigue
- At the end of the chamber's life, a new chamber can be attached to the existing airlock at a fraction of the cost of a completely new chamber set-up with airlock
- Operator productivity is improved because of the ease of entering the flexible chamber with attached latex gloves
- Reliable to operate; it is easy to solve issues before the anaerobic environment is compromised
- Life-cycle costs are lowest of the three types of chambers we offer
- Easy to custom size to fit your applications and space without large increases in cost or delivery time

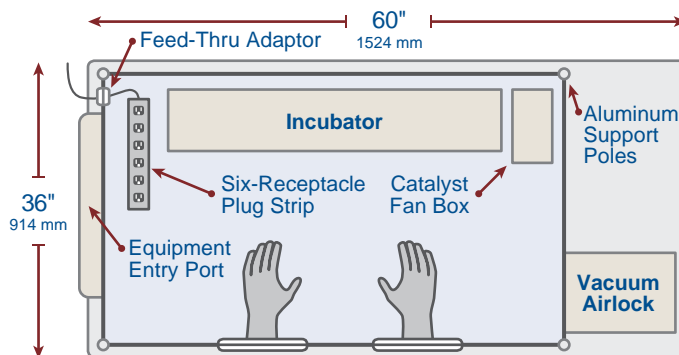
### Type A



### Type B



### Type C



Please note that the dimensions given represent the overall size of the base. Typical placement of fan boxes and airlocks is shown. Some optional equipment is shown as well.

# NEW! Hydrogen Sulfide Removal Column (HSRC)

Accumulation of hydrogen sulfide (H<sub>2</sub>S) in Anaerobic Microbiology Chambers can result in damage to electronics and decreased catalyst lifetime. The COY Hydrogen Sulfide Removal Column (HSRC) provides maintenance-free, high capacity removal of undesirable hydrogen sulfide (H<sub>2</sub>S) by recirculating the Chamber atmosphere through the Column.



The HSRC's **unique layering of H<sub>2</sub>S removal media** acts via a combination of absorption and chemisorption. Having two media maintains performance under a broad range of operating conditions since the mechanism-of-action/performance of individual media depends on a complex set of variables. An integral airflow system, combined with the column design, ensures required contact time and flow rate to take advantage of the high H<sub>2</sub>S removal capacity with single-pass H<sub>2</sub>S clearance.

- ⇒ Operates Horizontally or Vertically
- ⇒ Two replacement filter cartridge types: **user refillable** or **pre-filled disposable**

**NOTE: All new units are equipped with the refillable cartridge as standard**

## Indicator Strips Eliminate guess work of when to change the media



**Indicator strip that has not been exposed to H<sub>2</sub>S - white.**

Strip placed under the column using the holder included with the HSRC.



**Strip exposed to H<sub>2</sub>S – brown.**

The indicator, specific for H<sub>2</sub>S, detects cumulative levels and is specifically designed to work without wetting. Above is typical cumulative color change seen during average chamber usage in Figure 1 with *Clostridium difficile*.



**Strip under column used to signal need for media replacement**

The above strip was under the column run in the chamber used as shown in Figure 1. As no H<sub>2</sub>S is indicated to be passing through the column, the column still has H<sub>2</sub>S removal capacity even after 8 months.





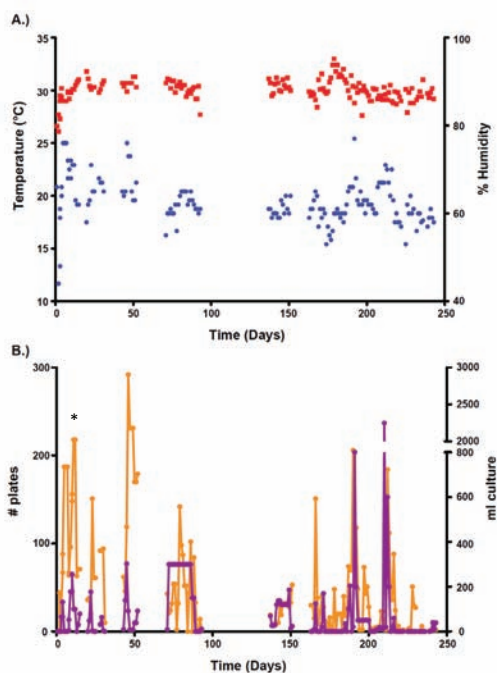
# Hydrogen Sulfide Removal Column (HSRC)

## Unlike other removal systems or methods, the HSRC:

- Provides a high H<sub>2</sub>S removal capacity
- Removes other volatile byproducts of microbial metabolism
- Functions over a wide range of environmental conditions
- Requires no maintenance for months
- Includes indicator to signal when media change is needed
- Two refill choices: user refillable (media only) & disposable pre-filled cartridge
- Can be recharged without disturbing the anaerobic atmosphere
- Two media formats; Tri-layer (standard) and Bi-layer



## Maintenance Free for 8 months & still going



**Figure 1: Chamber conditions & usage during prototype column testing.**

*Clostridium difficile* grown with cysteine-containing media. (A) Chamber conditions. Temperature (red symbols) remained relatively constant throughout the test period while humidity (blue symbols) varied somewhat. Peaks in humidity correlate to peaks in chamber usage as high numbers of plates can lead to a significant increase in humidity. A dehumidifier was run constantly throughout this testing to keep humidity levels from reaching the condensation point.

(B) Chamber usage. As a measure of usage, and therefore potential H<sub>2</sub>S production, the total number of 100mm plates (orange symbols) and ml of culture (purple symbols) was recorded daily. While usage varied significantly, levels of H<sub>2</sub>S produced throughout the testing period were relatively high.

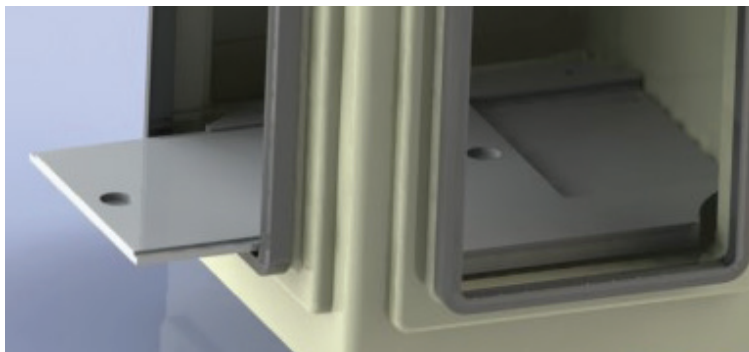
**Capacity remained after ~8 months of use** (see previous page)

\* HSRC activated on day 11

Results from initial prototype presented at Anaerobe 2012 on July 1st in San Francisco CA, USA. Poster: Device for Hydrogen Sulfide Removal in Anaerobic Chambers. P.E. Carlson (Univ. Michigan) and K.E. Studer-Rabeler (Coy)

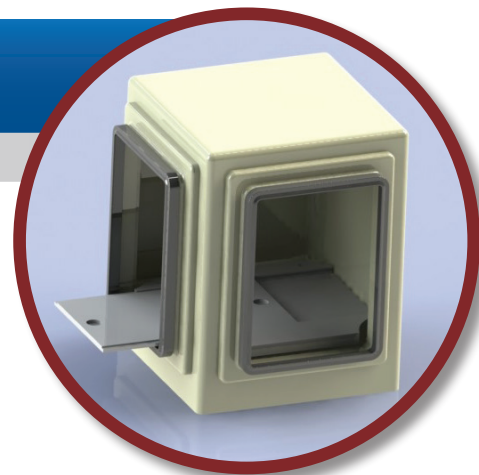
## NEW! Sliding Shelf for Vacuum Airlocks

The world's most ergonomic chamber just got a bit more comfortable.



The **sliding airlock shelf** option makes sample transfer easier and faster. Shelf is easily removed for cleaning.

Factory installed option (part #6360000).



## NEW! Coy Anaerobic Monitor - Model 12

The **CAM-12** monitors O<sub>2</sub> & H<sub>2</sub> levels in your anaerobic chamber. It's compact size with an LCD Screen and requires no routine maintenance. Audible and visual alarms signal high and low gas concentrations. The CAM-12 also allows for the use of less expensive gas mixes for chamber operation reducing your operating cost.



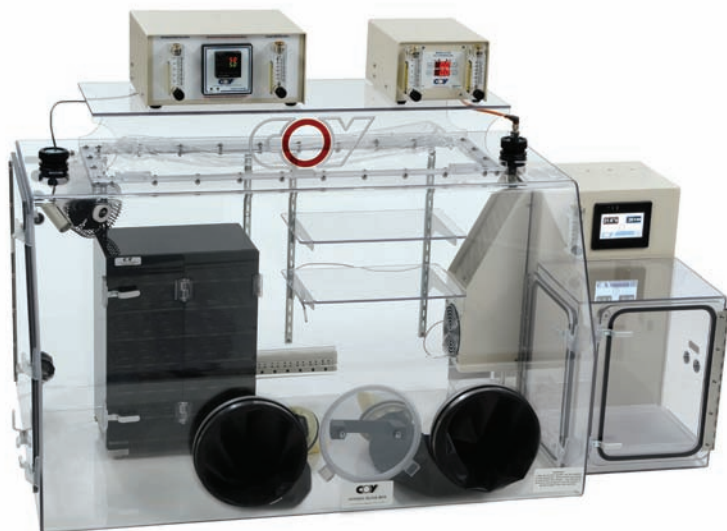
### Key New Features

- Operator selectable compensation from 0-20% CO<sub>2</sub>
- Operator can easily exchange sensors for recalibration or replacement (**reducing down time to 24 hours or less**)
- Calibration accuracy is factory preset, not dependent upon user calibration



## Microbiome Studies

Oxygen Control Glove Boxes allow you to create microaerophilic atmospheres in 0.1% oxygen increments.



- ➔ Convert your existing Coy Anaerobic unit to microaerophilic atmosphere or purchase a unit dedicated to higher O<sub>2</sub> levels (%)
- ➔ Combine anaerobic and microaerophilic operations in one chamber unit or a dual chamber unit with a shared airlock
- ➔ Add CO<sub>2</sub> control options to reduce operation cost and improved flexibility
- ➔ **High accuracy calibration makes Coy microaerophilic workstations the most accurate on the market**

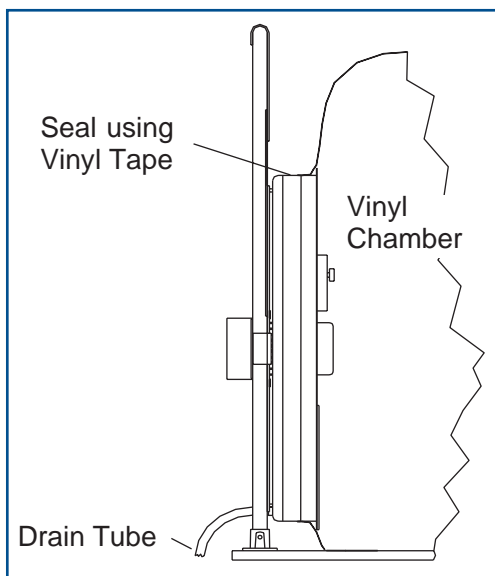
Ask about co-culturing mammalian cells and bacteria in low oxygen using Coy Gas Permeable Plates



## High Capacity Dehumidifier

### Control Excess Moisture Automatically

The easy-to-maintain Large Capacity Dehumidifier controls moisture levels inside the Coy Vinyl Anaerobic Chamber automatically without the use of desiccant.

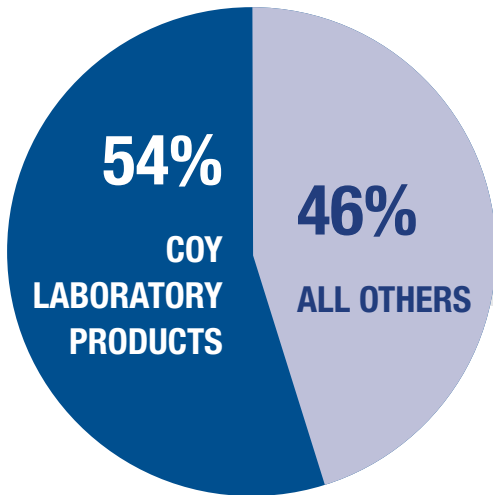


- ➔ Control range: ambient to 30% RH
- ➔ Fits on existing vinyl chambers

The Dehumidifier's Peltier Cells create a cold plate inside the glove box on which water collects and is directed into a small reservoir inside the glove box that is drained through tubing to a larger reservoir outside the glove box.

The unique mounting system allows it to fit into the same space as the standard equipment entry port of the Coy Vinyl Glove Boxes. Support from the Glove Boxes Aluminum Frame, adjustable clamps, and taped seal make the Coy Large Capacity Dehumidifier easy to add on to any existing system or install on a new system while still allowing equipment installation into the glove box.

# The #1 Choice in Microbiology\*



After over four decades of global success, at Coy Laboratory Products, we still focus on personal service. Our relationships with customers and attention to their individual needs have put Coy anaerobic chambers in laboratories and research facilities throughout the world. Our emphasis on service and our ability to fulfill specific customer requirements are made possible by the flexibility and versatility of our products.

\* Coy Anaerobic chamber citations (%) in all American Society of Microbiology journals

- 54% Coy Laboratory Products
- 46% All Other Anaerobic Chambers Combined  
(January 1998-January 2013)

## Coy O<sub>2</sub> Control Glove Boxes and Cabinets for InVitro Studies.

Coy manufactures a line of O<sub>2</sub>-controlled glove boxes using a sensor and controller on a feedback loop system to control O<sub>2</sub> levels in 0.1% increments from 0 to ambient. Designed originally for cell biology studies, many traditional anaerobic microbiology researchers now use these units for microaerophilic studies. As an additional option the O<sub>2</sub> control system that powers these glove boxes can be added to any existing anaerobic chamber—contact Coy for further information.



**Our experts can help you configure a solution that meets your needs. Call (734) 475-2200 or visit [www.coylab.com](http://www.coylab.com) for more information.**

