

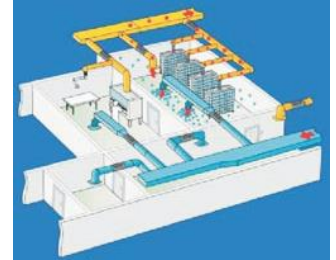
## Standard Operating Procedure – Optirat® Plus

### How Optirat Plus Works

Optirat Plus racks are connected to the facility's exhaust system with flexible air hoses. All ACS racks use the same type of hose, which connects using special thimble connectors.

Clean air is supplied by the building's HVAC (heating, ventilation and air conditioning) system to each animal room. Typically, the air enters through supply vents and exits through exhaust vents in each room.

This conditioned air is filtered again as it is drawn in through the front filters of each cage on the rack. Air is then drawn out through the rear exhaust filter of each cage and into the rack's central plenum where it exits through the exhaust hoses connected to the building exhaust system. This sequential layout facilitates low-velocity, single-pass airflow without re-entrainment or leakage.



Air is not re-circulated from the cages back into the room, which completely eliminates the introduction of odors, allergens, and contaminants. The Optirat Plus protects animals and personnel while providing flexibility, high-density, optimal conditions and a stable environment for the animals; all is accomplished without consumption of additional electricity, which further reduces the heat load in the room.



### Setup Procedures

Identify a location in the room with unobstructed access from the top of the rack to the room's HVAC exhaust. In most cases, there will be either ceiling drops or vents. There are several effective ways to make this connection. Please consult Animal Care Systems technical support if you are unsure how to do this. All Opti Carousel Racks **MUST BE CONNECTED TO NEGATIVE AIR PRESSURE**.



M79211 Anemometer

Move the rack into a position that has unobstructed access to the cages from one side, preferably the wide side (which has wider support pole spacing). Leave some clearance on all sides so the cage carousel can be rotated without interference.

Connect both hoses to the exhaust system, and using an M79211 Anemometer, verify that a minimum air velocity of 4.8 m/s is present in each hose. If the rack is going to be connected with only one hose, the extra exhaust port on the rack must be capped with an M21080 Ceiling Flange Cap, and the minimum allowable air velocity measurement in the single hose will be 10 m/s. Note: the above airflow requirements are the minimum allowable. **Recommended air velocity measurements are 7.2 m/s when using two hoses, and 14.4 m/s when using a single hose.** If actual airflow measurements exceed the recommended values by a

significant margin, M79190 Damper Assembly(s) should be fitted in line with the air hoses. When measuring air velocity for a rack with Dampers in place, measure the flow through both hoses, and average the two values.

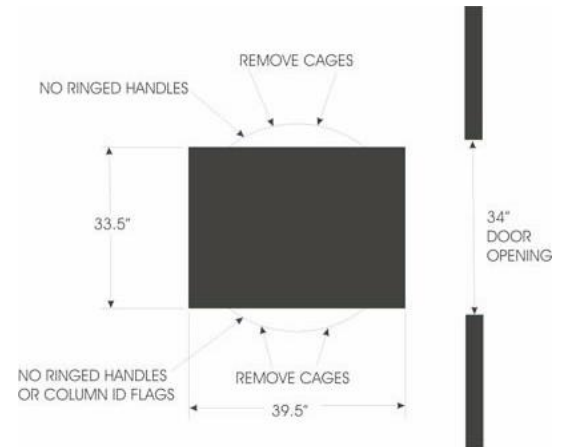


## Rack Handling Procedures

The Optirat *Plus* rack consists of six circular platters attached together to form a single carousel with a central exhaust air plenum; each platter accepts five cages. Each rack has two 3" thimble connections on the top center for vent hoses, four casters (two at the front are lockable), and four vertical posts, which double as transport handles.

The footprint of the rack measures 33 ½" x 39 ½" (the blue rubber bumpers representing the outer most features). The Optirat *Plus* rack can fit through doors as narrow as 34", with overhead clearance as low as 81". For doors narrower than 40", complete the following:

1. Rotate the rack so that the smaller dimension of the rack (33 ½") is aligned with the door.
2. Remove the interfering columns of cages on each side of the rack as shown in the diagram to the right. It may also be necessary to remove select column/row ID flags if they interfere with the doorframe.
3. Carefully move the rack through the door. Replace cages and any removed column/row ID flags.



**Rack WILL ventilate effectively with any number of cages installed.**

### Rack WILL NOT ventilate properly if:

- Multiple filters are missing from cages.
- Bottom drain valve is open.
- Exhaust hoses are not connected properly.
- Exhaust ports on rack are left open.

### Specific cages WILL NOT ventilate properly if:

- A filter is missing from that cage.
- Cage top is missing or not fully seated.
- A cage is not inserted fully into rack.

## Washing and Autoclaving Rack

1. Remove Cages. **DO NOT AUTOCLAVE WITH CAGES INSTALLED. SEVERE DAMAGE WILL RESULT.**
2. Disconnect both exhaust hoses from the top of the rack. If automatic watering is present, disconnect water lines, and open the water drain valve on the bottom left side of the rack. Leave this valve open during wash.
3. Be sure both exhaust openings on top of the rack are unobstructed.
4. Open the spring-loaded drain door by pulling out on the wire handle located on the underside of the bottom platter; it is visible from above. Lock the handle by rotating it 90-degrees upward until it drops into the detent on the platter.
5. Ensure the rubber gasket attached to the topmost platter is completely free from cleaning products, residue, or debris. Gently pull the gasket away from the stainless ceiling to inspect thoroughly.
6. Roll the rack into the wash or autoclave system, and begin the processing cycle.
7. Allow to dry for at least one hour with drain valve and door open. Using only pure water, wipe any detergent or foreign matter off the top rubber gasket. If a fabric wear cord is present, ensure it is properly located in its recessed track.



**KEEP DRAIN DOOR CLOSED** except when washing or autoclaving. To close drain door, pull wire handle out until it clears the detent in the platter. Then rotate it 90 degrees downward (clockwise) and release. Be certain that the wire handle has moved completely toward the center of the rack, and if it fails to do so, gently push it inward until resistance is felt.



## Cage Handling Procedures

Optirat *Plus* cages and water bottles are available in three materials, Makrolon® (clear polycarbonate) and two grades of Udel® (polysulfone), amber and smoke. Prior to autoclaving, cages must be washed with detergent and rinsed with water. Be sure any detergent residue is rinsed from the cage surface.



## Autoclaving and Washing Cages

**Note: ACS strongly recommends polysulfone for repeated autoclave use. Please refer to the following information for washing and autoclaving of cage parts.**

Autoclave temperatures may vary widely during autoclave cycles. ACS cannot be responsible for damage caused by improper settings or use of an autoclave system.

**When washing cage parts, set wash temperature to 180°F (82°C). Use only non-alkaline detergent and rinse thoroughly with de-ionized water.**

**Polycarbonate** cage parts are autoclavable up to **250°F (121°C) for a maximum of 20 minutes**. This temperature **IS** near the upper limit for polycarbonate, and should never be exceeded. **Do not stack polycarbonate parts in the autoclave or after autoclaving before they have cooled.**

**Polysulfone** cage parts are autoclavable to a temperature of **270°F (134°C)**. This is **NOT** near the upper limit for polysulfone, and autoclaving at high temperatures is not normally an issue.

## Cage Assembly Components

There are four parts to each cage assembly: Bottle assembly, feeder, cage base, and cage top. (The bottles are omitted on cages for auto-water racks.)

### Bottle assembly

Consists of a bottle, seal, and cap; these bottles do not use hangers. Bottle caps have an integrated stainless steel drinking tube. Before washing, place 15 bottles in a CP61A100 Optirat *Plus* Bottle Washing Basket without caps. Close the top, securely fasten the latch, and wash with the Bottle Basket inverted. Do not autoclave these bottles with caps on.



### Feeders

When washing or autoclaving, stack together in groups of 10 to 15, and place in a wire basket. Visually inspect for bent or broken wires; replace any damaged feeders. The Optirat *Plus* mezzanines should be washed and autoclaved arrayed vertically in an appropriate washing rack. Do not exceed **250°F (121°C)** autoclave temperature.

### Cage Bases

Each cage base consists of a cage bottom and its four inlet filter assemblies. Visually inspect each cage for cracks, damage or warping. If filters are clogged after washing, they should be replaced as per instructions in the Operation Manual. **Do not stack polycarbonate cages in the autoclave.** If polysulfone cages are being used, test a sample stack of cages at the maximum expected temperature prior to commencing normal operations. If the bottom cage in the stack is deformed after test autoclaving, the stack must be shortened. When storing at room temperature, stack as high as practical.

### Cage Tops

Optirat *Plus* cage tops are very deep, not flat like other models, and therefore should be treated as cage bases. The exhaust filter is located in the cage top and should be replaced if dirty. Tops made from polysulfone can be stacked up to 10 high when autoclaving, and as with all stackable components, a test stack should be autoclaved to ensure the bottom units do not warp or deform before processing large batches.



## Removing Cages

1. When removing cages from the rack, grip each cage firmly with both hands positioned near the bottom at either side. Lift slightly, and pull outward. Always use both hands when removing Optirat *Plus* cages, as they're heavy and too large to hold safely with one hand.
2. Place the cage on a clean, flat surface such as an animal transfer station or changing station.
3. To remove the top from the cage, grasp it on either side with both hands, and gently pry the clips out using as little force as necessary to release them from the cage base; be sure to use proper precautions for bio-safety.

## Cage Changing

1. Clean the work surface with approved sanitizer, and be sure to keep the sanitizer at the changing station.
2. Place a clean cage base assembly with bedding, fresh feed and water on the changing station.
3. Remove the top for direct access to the animals.
4. Lift each rat by the base of the tail, and transfer it from the soiled cage to the clean one.
5. Replace top, and reinstall cage in rack.

## Bottle Changing

1. Lift the empty bottle out of its recess in the cage top.
2. To remove the cap, grasp it firmly and pull with a twisting motion (the cap is not threaded; twisting will help the cap separate from the seal).
3. Locate a clean, filled Optirat *Plus* bottle, and insert its drinking tube into the port on the cage top. Lower it into its cavity.

## Feeder Changing

1. Remove cage from rack, place in on a clean work surface, and remove the cage top.
2. Lift the feeder off the hanging feature on the cage base. If a mezzanine is in place, remove it first.
3. Place the new feeder, and close the feeder door; typically, the feeder hangs from the left wall, but it can also be hung from the features on the front or right walls. Replace the mezzanine if present. Refit the cage top.

## Cage Bedding

It is very important to measure the correct amount of bedding; this amount is around 4-5 cups for Optirat *Plus* cages. The bedding should be spread evenly across the floor of the cage and between 3/8" and 1/2" deep. Too much, too little, or too absorbent bedding keeps moisture inside the cage. Animals can also pile up large amounts of bedding in front of the filters, which then hinders airflow through the cage. We recommend aspen shavings, corncob or similar type of cage bedding.



**Correct amount of bedding**



**Too much bedding**

## Feed

Fill the feeder with an appropriate volume of dry feed. Do not fill past the upper rim of the feeder, as this will prevent the feeder door from fully closing and cage top from properly seating.

## Replacing Cages on the Rack

When replacing a cage on the rack, ensure the cage is firmly seated on the platter and fully inserted into the rack. Inspect each row horizontally and each column vertically to identify any cage misalignment.

**Note: Place only complete cage assemblies on rack** with animals, feed, bedding, and water bottle or water valve.

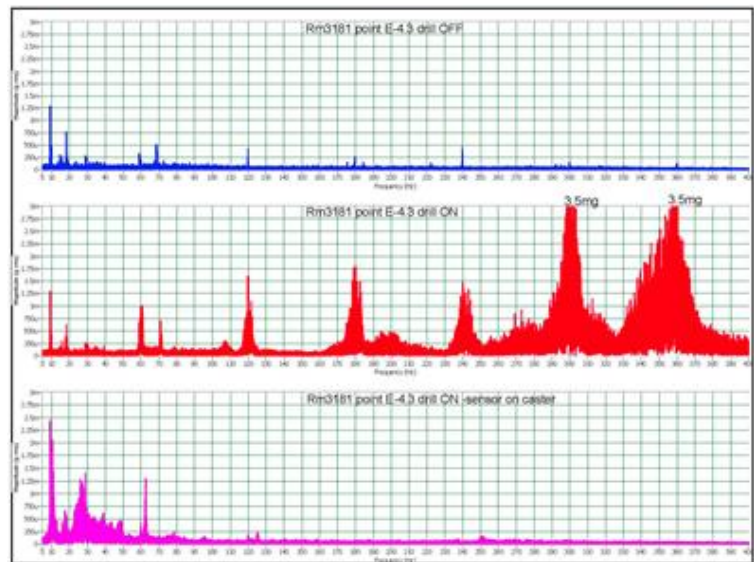
**DO NOT place cage on rack without filters and a properly fitted cage top.** Cages may be installed in any order.

**DO NOT USE RACK TO STORE EMPTY CAGES.**



## Disruptive Conditions

Not even ACS' vibration-free racks can prevent disruption to the animals in a construction zone. If there is any construction/renovation work being done in or near your facility, we strongly recommend placing vibration isolator pads under all of the rack's casters. This practically eliminates the vibration from power tools and other noise. These pads are available from Grainger or other industrial supply houses or can be purchased from ACS. Contact your sales rep for details.



Top graph: Vibration levels with no construction noise.

Middle graph: Vibration levels with construction noise, no pads.

Bottom graph: Vibration levels with construction noise and vibration isolator pads.