

**STANDARD OPERATING PROCEDURES**  
**DIVISION OF COMPARATIVE MEDICINE**  
**UNIVERSITY OF SOUTH FLORIDA**

SOP#: 1005.9

Date Issued: 10/98

Date Revised: 1/22 Page 1 of 7

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<b>TITLE:</b>	<b>Cage Wash Operation</b>
<b>SCOPE:</b>	Animal Care Personnel
<b>RESPONSIBILITY:</b>	Facility Manager, Maintenance Support and Cagewash Personnel
<b>PURPOSE:</b>	To Outline the Proper Procedures for Cagewash Operation

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**I. PURPOSE**

1. To outline the proper procedures for cage wash equipment operation to ensure animal caging, cage-racks, and all accessory equipment are properly washed and sanitized at their described intervals.

**II. RESPONSIBILITY**

1. It is the responsibility of the Maintenance Support and Cage Wash Personnel working in cagewash areas to make sure all cages, racks, feeders, watering devices, etc., are properly washed and sanitized and on the appropriate schedule.
2. It is the responsibility of each facility's Maintenance Support and Cage Wash Personnel to read and understand the Operator Manual for cagewash equipment located in their assigned facility.
3. It is the responsibility of each facility's Maintenance Support and Cage Wash Personnel to ensure each machine is properly maintained, monitored, and in good working order.
4. Facility Managers are responsible for all aspects of this SOP when Maintenance Support and Cage Wash Personnel are unavailable.
5. It is the responsibility of the Facility Manager to ensure efficacy of cage wash operations is conducted. (See **SOP # 1004** entitled, "**Monitoring Cage Wash Efficacy**", and **#1010** entitled, "**Microbiological Monitoring of Sanitation Procedures**").

**III. EQUIPMENT**

1. Three types of cage washers are used: (1) cabinet cage washers, (2) cage and rack cage washers, and (3) tunnel washers. Cabinet cage washers have relatively small chambers, into which a limited amount of equipment can be loaded and sanitized. Cage and rack washers have larger chambers into which large racks can be rolled. Tunnel washers carry individual pieces of equipment through the wash on a conveyor.

2. **Types of Cagewash Equipment in each Facility:**

<u>Facility</u>	<u>Type of Cage Washer</u>	<u>Co. Name</u>
ALZ	Tunnel	Basil 6000
ALZ	Cage/Rack	Basil 9500
CPH	Cage/Bottle	Basil 3700
COM	Tunnel	Basil 6000
COM	Cage/Rack	Basil 4600
IDRB	Cage/Bottle	Basil 3700
MDD	Tunnel	Arcadia
MDD	Cage/Rack	Atlantis Evo
PSY	Cage/Rack	Basil 9500
SRB	Cage/Rack	Basil 9500
SRB	Tunnel	Basil 6000 (2)

Cage and rack washers usually have specialized accessories to wash specific items (e.g., cage racks, bottle rack or pan racks).

3. Daily and weekly cleaning of cage washer screens, periodic removal and/or cleaning of water spray jet valves help ensure that the water spray jet valves will not become clogged with bedding or other debris. To help prevent breakdowns, motor gaskets and electrical components need to be examined and serviced regularly by an experienced specialist. Timers and other gauges should be checked daily to be sure that conditions are being met, which ensures the equipment is properly sanitizing. The Maintenance Support and Cage Wash Personnel perform most of the routine maintenance. Refer to the operation manual for your particular machine for recommended maintenance services and checks.
4. All cage washers are monitored for proper washing and rinsing temperatures to evaluate sanitation by the use of heat-sensitive indicator strips. (See **SOP# 1004** entitled **Monitoring Cage Wash Efficacy**).
5. All cage washers, including tunnel washers, cabinet washers and cage/rack washers have cycles. Most of the cage washers operate on pre-wash, wash, rinse and final rinse cycles. The pre-wash cycle is run to wet the cages or equipment down. Hot tap water is usually used with this cycle. Wash cycle uses phosphoric acid detergent, usually runs from one minute to four minutes (depending on cage washer). There may be one or two rinse cycles, a recirculated hot water rinse, and the final rinse, which is not recirculated. **Final rinse should reach a temperature of 180° F**, lasting (1) one-minute to (5) five minutes depending on cage washer and facility.
6. If the acid cycle is used, then the first rinse is canceled and the acid cycle comes on instead, runs for about (4) four minutes at 160°F, then goes to the final rinse.
7. **Tunnel Cage Washer Components**
  - a. ON - touch screen - to start conveyor.
  - b. OFF - red emergency-stop button - to stop conveyor.
  - c. All tunnel washers have an emergency red stop button at each end of washer (load end and retrieve end).
  - d. Some tunnel washers have a self cleaning debris screen with vertical plate. This is cleaned when performing daily preventative maintenance.
  - e. Detergent barrels - make sure barrels have detergent available and the level is marked daily.

- f. Tunnel washers have temperature monitor/gauges and gauges for the water. Check these gauges regularly to ensure adequate water and steam pressure are available.

#### 8. Cage and Rack Washers Components

- a. Cage and rack washers have different racks for washing cages, wire bar lids and bottles.
- b. Some cage and rack washers have a self cleaning debris screen with vertical plate. This is cleaned when performing daily preventative maintenance.
- c. Some cage and rack washers have a sump pump suction strainer located on the floor inside the washer. After machine is drained, remove debris using temperature-resistant gloves.
- d. Check detergent barrels to make sure barrels have sufficient detergent available daily.
- e. Check temperature gauges and timers on control panels regularly.
- f. Some cage and rack washers, particularly the newer Basil units, have an acid cycle.
- g. All rack washers have door latches or quick release doors for escape from inside the chamber. The Basil washers also have a pull cable or stop bars inside the chamber to turn the cage washer OFF.
- h. Cage washers have controls that permit temperature control and emergency shut off. Some units have monitoring and/or recording equipment, automatic detergent solution dispensers, (See **SOP# 1003** entitled **Cage Wash Detergents**) and timers for various cleaning cycles. Various cleaning cycles are needed because of the different species. There is specific cleaning cycles for rabbits and guinea pigs, (See **SOP# 1001** entitled **Use of Acid Scale Remover**) and also some cage washing machines have cycles for bottle washing.

### IV. OPERATIONAL PROCEDURES

1. **Arcadia (MDD) Operational Procedures for the Tunnel Washer –**
  - a. Before Operating Unit:
    1. Check that all **machine filters** are correctly positioned in their housing.
    2. Check that all doors are **closed and locked**.
    3. Check that **emergency buttons are released**.
    4. **Open the cut-off valves** of all the utilities (water, compressed air, steam, and steam condensate).
  - b. Operation of Unit:
    1. Turn the power cabinet main switch to **ON**
    2. Tap the **center circle icon** on the main control board to enable commands.
    3. **Place items to be washed**, open side facing downwards to avoid water trapping, on load end of conveyor (dirty room side). Washer automatically conveys items.
    4. Tap the **open book icon** on the main control board to open the **recipe choice page** as necessary.
    5. Tap the **green circle icon** to **start the cycle**. Machine will immediately start cycle once operating conditions (detergent percentage, temperature set point, no active alarms) are reached.
    6. **Remove processed items** from unload end (clean room side).
    7. To **abort the wash cycle**, tap the **red icon** on the main page.
    8. To **stop operation of the entire cycle**, press an **emergency push button**. Alarm must then be acknowledged by tapping “ACK” on the main control board to resume operation.

9. Refer to operator manual for additional operating instructions beginning on page 29.
- c. Tunnel Washer Maintenance:
  1. **Weekly:**
    - a. Clean external surfaces.
    - b. Inspect and clean filter(s).
    - c. Inspect the rinse nozzle for any obstruction.
    - d. Drain and clean the tank.
    - e. Inspect the refilling nozzle for any obstruction.
    - f. Remove washing arms and check nozzles for any obstruction.
    - g. Check in line filter for cleaning conditions.
    - h. Remove the pre-rinse / rinse arms and check nozzles for any obstruction.
    - i. Inspect and clean unloading bay.
  2. **Quarterly:**
    - a. Check the cage sensor/reflector conditions on the unloading bay.
    - b. Check the emergency buttons and bumper.
    - c. Check the curtain conditions.
  3. **Semi-Annual:**
    - a. Servicing procedures as recommended and performed by a trained service technician.
  4. For detailed maintenance instructions see page **119 of operator manual**
2. Atlantis Evo (MDD) Operational Procedures for the Cage and Rack Washer –
  - a. **Before operating unit verify:**
    - a. Building electrical supply disconnect **switch (circuit breaker) is ON.**
    2. **Steam and water supply valves are open.**
    3. **EMERGENCY STOP** pushbuttons are pulled.
    4. **Sump filters are clean** and properly installed.
    5. **Detergent supply is available.**
    6. **Printer paper is available.**
  - b. **Operation of Unit:**
    - a. Turn on the main **POWER** switch.
    - b. **Acknowledge any alarm(s)** if present and correct. Note, machine status is indicated by control panel and internal LED lamp.
    - c. Press **DOOR** pushbutton on Side A control panel to **open door.**
    - d. **Load items to be washed**, ensuring that all items are properly loaded.
    - e. Close door and keep **DOOR** pushbutton pressed for a few seconds to automatically **lock it.**
    - f. Press the **center circle** on the control panel display to access the cycle page and select recipe choice.
    - g. Tap **center circle** on control panel to return to pain page
    - h. Tap **green start icon** on control panel to start the cycle.
    - i. Following cycle completion, the control panel will display **“ACCOMPLISHED”**
    - j. Tap the **DOOR** pushbutton or door icon on control panel to **open door and unload items** wearing proper PPE.
  - c. Cage and Rack Washer Maintenance:
    1. **Weekly:**
      - a. Clean external surface.
      - b. Inspect and clean filters.
      - c. Clean nozzles.

- d. Replace printer paper roll (as needed).
  - 2. **Monthly:**
    - a. Inspect and clean tank.
    - b. Clean gaskets (as needed).
    - c. Conduct Emergency Pushbutton check
    - d. Partial internal emergency bar check
  - 3. **Semi-Annual (Performed by trained service technician):**
    - a. Check temperature controllers.
    - b. Rinse efficiency check.
    - c. Compressed air filter.
    - d. Washing chamber and tank descaling.
  - 4. **Annual (Performed by service technician or service engineer):**
    - a. Complete internal emergency bar check.
    - b. Air vent check.
    - c. Replace door gasket.
  - 5. For detailed maintenance instructions see page 256 of operator manual.
3. **Basil 4600 (COM) Operational Procedures for the Cage and Rack Washer -**
- a. **Before Operating Unit:**
    - a. Flip building electrical supply disconnect **switch (circuit breaker) to the ON position.**
    - b. **Ensure steam and water supply valves are open.**
    - c. **Open chamber door** and move loaded wash cart(s) into wash chamber.
      - a. Make sure all cages, racks are positioned correctly.
      - b. Position cart(s) in center of wash chamber.
    - d. **Close and latch door(s)** securely. Note: Cycle will not start if doors are not closed securely.
    - e. **Check manual drain valves** on bottom of detergent tank. Make sure they are in the closed position.
    - f. **Check detergent supply**, making sure supply hoses are correctly positioned in detergent container and that the detergent pump(s) is turned on.
  - b. **Operation of Unit:**
    - a. **Set Power Switch to Power** (Power Switch located behind printer door).
    - b. **Press Cycle Menu** until desired cycle menu appears on the screen.
    - c. **Press Select Cycle** until desired cycle name flashes.
    - d. When the desired cycle name is flashing, **press Cycle/Start twice.** Types of cycles differ slightly by buildings (e.g., cycles for rabbit cages with an acid phase, and cycles to wash water bottles).
  - e. When the button is pushed twice on cycle/start, the **washer will automatically progress through the following cycles:**
    - a. Pre-wash                    1 minute                    140° F
    - b. Wash                            4 minutes                    140° F
    - c. First rinse                    1-2 minutes                    140° F
    - d. Acid rinse                    4 minutes                    140° F
    - e. Final rinse                    2 minutes                    **180° F (minimum)**
    - f. Exhaust phase                2-5 minutes                    N/A
    - g. Cycle complete --

- f. **Retrieve items on clean side. Cautiously open chamber door** to vent out remaining steam vapors. **Allow chamber to cool** a few minutes before removing load. **The load and water are very hot** when door is first opened.
4. **Basil 6000 Tunnel Washer (COM, SRB)**
- a. Front panel of the Basil 6000 Tunnel Cage Washer has a graphic performance data display screen and a set of pushbuttons. The pushbuttons are used to make temperature set point adjustments (SP). See Basil 6000 Series Tunnel Cage Washer Manual.
  - b. **Before Operating Unit:**
    1. **Open chamber access doors** and check, making sure chambers are empty.
    2. **Ensure screens are clean** and in place and that screen access panels are secure.
    3. **Ensure chamber access doors are closed securely.**
    4. **Close wash and rinse manual drain valves.** These valves remain open at SRB unless unit is out of service.
    5. **Check detergent supply** daily and make sure supply hose is correctly placed in detergent barrel.
  - c. **Operation of Unit:**
    1. **Turn Circuit Breaker ON** -- turn power switch(es) ON, allowing cage wash and rinse chamber recirculating tanks to fill to capacity. **Steam supply valve should be open** at all times.
    2. **Allow water/solution in recirculating tanks to reach set temperature of 160 degrees F.**
    3. Press **Start Button to ON.**
    4. **Place items to be washed**, openings down on load end of conveyor (dirty room side). Washer automatically conveys items.
    5. **Remove processed items** from unload end (clean room side).
    6. To stop conveyor: **Press stop to stop operation of cycle** (dirty side) or Press Drive System Stop (clean or dirty side) -- conveyor will stop, other wash system will remain active. Pull button out to start conveyor.
5. **Basil 9500 (ALZ, PSY, SRB, VA) Cage and Rack Washer** operation instructions:
- a. **Before operating unit verify:**
    - a. Building electrical supply disconnect **switch (circuit breaker) is ON.**
    2. **Steam and water supply valves are open.**
    3. **EMERGENCY STOP** pushbuttons are pulled.
    4. **Wash chamber is empty** and all material has been removed.
    5. **Sump filters are clean** and properly installed.
    6. **Detergent supply is available.**
    7. **Printer paper is available.**
  - b. **Operation of Unit:**
    - a. Place **POWER-OFF/STANDBY** switch to **POWER.**
    - b. Open chamber door and load wash chamber. Ensure all cages, bottles, etc. are correctly positioned on load grating or in an accessory rack.
  - c. **Verify clearance space of loaded items** permits unobstructed movement of moving parts. Load must not touch doors or damage may occur.
  - d. Once washer is properly loaded press **DOOR CLOSE** touch pad to close doors. First factory set cycle menu appears on screen.
  - e. Press **SELECT CYCLE** touch pad to select a cycle from displayed menu

- f. When desired cycle is selected (cycle name is blinking on display screen), press **CYCLE/START** touch pad. Name of selected cycle appears on screen and remains displayed during safety delay.
- g. After safety delay has elapsed, washer automatically progresses through programmed cycles.
- h. **Open chamber door** by pressing **DOOR OPEN** touch pad. Leave doors open and allow load to cool before removing.

**WARNING: hot steam may escape if door is fully opened. Wear appropriate PPE when chamber contents are hot.**

- i. Refer to Operator Manual for additional information.

6. **Basil 3700 Cage and Bottle Washer** (CPH, and IDR) operational instructions:

- a. **Before operating unit verify:**
  1. Building electrical supply disconnect **switch (circuit breaker) is ON.**
  2. **Water supply valves are open.**
  3. **Chamber is empty.**
  4. **Vortex plate located under load grating is free of debris.**
  5. **Detergent supply is available.**
  6. **Printer paper is available.**
- b. **Operation of Unit:**
  - a. **Open chamber door and load wash chamber.** Ensure all cages, bottles, etc. are correctly positioned on load grating or in an accessory rack.
  - b. **Verify clearance space of loaded items** permits unobstructed movement of oscillating jet system.
  - c. **Close chamber door securely.**
  - d. Select **AUTOMATIC** in mode selection screen. Press appropriate cycle on Cycle Select screen.
  - e. Press **START** to initiate cycle.
  - f. Cycle operation may be halted at any time by pressing **STOP** touch pad. To resume cycle operation press **RESUME**. To abort cycle operation, press **ABORT**.
- c. After wash cycle is completed **open door slowly to allow chamber and load to cool.**

**WARNING: hot steam may escape if door is fully opened. Wear appropriate PPE when chamber contents are hot.**

- d. Refer to Operator Manual for additional information.

## V. SAFETY CONSIDERATIONS

1. All personnel that work in cage & equipment sanitation areas are provided formal operational and safety training regarding use of major fixed equipment, including rack washers, bulk sterilizers, tunnel washers, autoclaves, and cabinet washers and regarding safe practices in wet areas around major fixed equipment supplied with electricity, steam, hot water, and chemicals, including the use of PPE (e.g., gloves, boots, eye, hearing and respiratory protection), the importance of keeping wash areas free of slip hazards such as

accumulated water using squeegees and/or mops, and appropriate lifting techniques. All personnel should use caution when working around electrical components in a wet environment.

2. All personnel that work in cage & equipment sanitation areas will participate in the program's occupational health & safety program to include annual medical evaluation and respirator fit testing as part of the Respiratory Protection Program and annual hearing evaluations as part of the Hearing Conservation Program.
3. Walk-in type cage/rack washers pose the possibility of entrapment which is eliminated by formal safety training and appropriate signage regarding methods of egress and machine de-energizing mechanisms.
  - a. Atlantis Evo (MDD) – **Emergency stop bars, identified as being red in color with placard above that reads “Emergency Bar Push to Exit” and located on each side of washer, instantly stop washer when pushed.** Push either bar to stop the washer, which will automatically release both washer doors. To exit, firmly press either stop bar and safely exit using either chamber door.
  - b. **BASIL 4600 (COM) - Emergency stop red cables, located on each side of washer, instantly stop washer when pulled.** Pull either cable to stop washer. Windows in doors have a sign that can be read from the interior, “Pull red cables to stop”, with arrows pointing in direction of cables. Each door has a 4”X4” white pad located on the interior of the door in the region opposite the exterior handle that says “Push Here”. Pushing in that location allows door to be opened from the interior.
  - c. **Basil 9500 (SRB, PSY) - Emergency stop bars, identified with red/yellow stripes and located on each side of washer, instantly stop washer when pushed down.** Push either bar to stop washer. To exit, push firmly between door panels using shoulder and upper arm, exerting force with upper body (i.e., “body check”). Push between door panels where indicated by arrows. Exit chamber doors. To close emergency exit safety doors, fold two panels to engage middle gasket, then push firmly until straight.
  - d. **Basil 9500 (ALZ) - Emergency stop red cables, located on each side of washer, instantly stop washer when pulled.** Pull either cable to stop washer. Interior signs “Pull red cables to stop”, with arrows pointing in direction of cables. To exit, push firmly between door panels using shoulder and upper arm, exerting force with upper body (i.e., “body check”). Push between door panels where indicated by arrows. Exit chamber doors. To close emergency exit safety doors, fold two panels to engage middle gasket, then push firmly until straight.
4. **All cage washers use exceedingly hot water. Be careful -- allow steam to escape before retrieving any items and use heat resistant gloves when removing hot items.**
5. Gloves must be worn and a NIOSH approved disposable particulate N-95 respirator is recommended and available for use when working in the dirty- side of cage wash area.
6. Bedding disposal stations should be used to reduce exposure to airborne allergens and contaminants to cage wash personnel and in the environment.
7. Hearing protection must be worn when cage wash equipment is running.
8. Gloves and eye protection are required when connecting detergent or chemical barrels, or filling spray bottles with undiluted detergent and/or disinfectant, or when working with undiluted chemicals (e.g., acid scale remover).

9. When lifting items, use proper lifting techniques.
10. Be careful of the conveyor belt on tunnel washers - watch fingers and hands.

## VI. DOCUMENTATION

1. Adhesive Temperature Stickers / Cage Wash Temperature Sheets. See **SOP# 1004**, entitled "**Monitoring Cagewash Efficacy**".
2. Manufacturer's Operating Manuals for specific cagewash equipment-- located in each facility.

## VII. REFERENCES

1. Guide for the Care and Use of Laboratory Animals
2. AALAS training manuals
3. Equipment Operator Manuals

Approved:

Date: