

## SECTION 117102

### LABORATORY WASHING AND STERILIZING EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. This section specifies Laboratory Washing and Sterilization Equipment including laboratory glassware and utensil washers/dryers, steam sterilizers, ice machines, animal cage and rack washers, tunnel washers, animal bedding dispensing unit, animal bedding disposal unit, bedding dump station, detergent dispensing units, animal water pouch fillers and modular wall units.

##### 1.2 DEFINITIONS

- A. Glassware and Utensil Washer/Dryers: An automated washing unit that uses high-temperature water and detergent to clean and disinfect instruments and lab glassware. The unit also includes capabilities for the post-wash drying of laboratory glassware and utensils.
1. Free standing Model - Multiple chamber washer/disinfector.
- B. Steam Sterilizer: A machine used to sterilize instruments and equipment by subjecting them to high-pressure steam up to 135°C (275°F). Sterilizers are available in both cart-loading and counter-top models. They can be either freestanding or recessed, with single or double doors (pass-thru). Steam sterilizers are also known as autoclaves. More efficient models employ a vacuum pump to remove air from the chamber prior to a sterilization cycle, thus providing more efficient steam sterilization. In animal facilities or other high throughput environments, autoclaves with very large floor-level chambers capable of accepting "roll-in" racks of cages or other items may be needed.
- C. Cage and Rack Washer: An automated washing unit that uses high-temperature water and detergent to clean and high-level disinfect cages, utensils and racks. Units are generally large enough to readily roll entire racks or carts directly into the washing chamber.
- D. Water Bottle Pouch Filler: An automated packing machine used for efficiently producing and filling animal water into film (plastic) pouches. The machine shall produce at least 10, 8 to 13 ounce water filled pouches per minute.
- E. Sterilizer and Rack Washer Enclosure Panels: Removable Stainless Steel metal panels used to fill the gaps between the tops and sides of freestanding sterilizers and cage and rack washers to the surrounding walls and ceilings while allowing service access.
- F. Ice Machine: Machine capable of making, holding, and dispensing ice. Volume production, total storage capacity and type of ice to be specified to meet the specific project demands.
- G. Detergent Dispensing System: A mechanical system that dispenses measured doses of detergent or other chemicals directly to washer disinfectors and cart washers.

- H. Tunnel Washer: A multiple chamber automated washing unit that uses high-temperature water and detergent to clean and disinfect cages, and utensils.
- I. Bedding Dump Station: Unit for the disposal and packing of bedding and animal waste from laboratory animal cages. These units typically incorporate both pre-filters and a HEPA filters to reduce aerosolized contaminants and minimize personnel exposure to air borne particulate.

### 1.3 RELATED WORK

- A. Sustainable design requirements and procedures including submittal requirements: Section 018111, SUSTAINABLE DESIGN REQUIREMENTS.
- B. Procedures and requirements for managing and disposing construction and demolition waste: Section 017419, CONSTRUCTION WASTE MANAGEMENT.
- C. Section 019100, General Commissioning Requirements
- D. Section 118119, Vacuum Bedding Handling System
- E. Seismic Bracing: Section 130514, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.
- F. Section 221100, FACILITY WATER DISTRIBUTION and Section 221300, FACILITY SANITARY SEWERAGE Section 226600, CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES: Plumbing Connections.
- G. Section 221500, GENERAL SERVICE COMPRESSED-AIR SYSTEMS: Connections to Compressed Air System.
- H. Section 224000, PLUMBING FIXTURES.
- I. Section 230511, COMMON WORK RESULTS FOR HVAC.
- J. Section 232213, STEAM AND CONDENSATE HEATING PIPING: Steam Connections.
- K. Section 230923, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Remote monitoring of the Steam Sterilizers.
- L. Section 260511, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Electrical Connections.
- M. Section 223100, WATER SOFTENERS
- N. Section 226719.16, DE-IONIZED WATER SYSTEM
- O. Section 230800, Commissioning of HVAC System

### 1.4 PERFORMANCE REQUIREMENTS

- A. Equipment shall have built-in monitoring for timed cycles, and control devices for temperature and pressure. Equipment shall have a printer, either integrated or remote, for recording cycle time, temperature, and pressure.
- B. Manufacturer safeguards must be provided with the equipment to protect the operator from harm during normal operation of the equipment.
- C. As needed in the application, provide a means of preventing accidental tampering with cycle times and parameters, via electric or physical safeguards.
- D. Provide water use reduction cycles and features where available. For instance, equipment utilizing steam should scavenge steam instead of wasting cold water to condition hot water/steam prior to entering drains.

E. Provide energy use reduction cycles and features where available.

### **1.5 QUALITY CONTROL**

- A. Refer to Section 230511, COMMON WORK RESULTS FOR HVAC: Quality Assurance 1.3.D - Products Criteria.
- B. Mechanical, electrical, and associated systems shall be safe, reliable, efficient, durable, easily and safely operable, maintainable, and accessible. Such equipment shall be appropriately protected from failures due to moist environments, as appropriate to use.
- C. Standard Products: Material and equipment shall be the standard products of the selected manufacturer, and they should be regularly engaged in the manufacture of such products for at least 3 years. The design, model and size of each item shall have been in satisfactory and efficient operation in a similar installation environment (eg laboratory setting, or an animal facility) on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work stations, shall be the current generation of technology and basic design at the time of purchase, which has a proven satisfactory service record of at least three years.
- D. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.
- E. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.
- F. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
- G. Installer Qualifications: For sterilizers, installer is authorized representative of sterilizer manufacturer and employs factory-trained personnel to install sterilizers. For other equipment, installer shall be licensed as may be necessary by regulatory organizations. For all equipment, installer shall meet the qualifications of ANSI/ASSE Standard 6010.
- H. Steam Sterilizers: Comply with the most current version of ANSI/AAMI ST8 or ST55.

### **1.6 SUBMITTALS**

- A. Submit in accordance with specification Section 013323, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data: Include the following:
  - 1. Illustrations and descriptions of laboratory washing/drying, cleaning, filling, sterilizing, and sanitizing equipment.
  - 2. Optional auxiliary equipment and controls.
  - 3. Catalog or model numbers for each component.
  - 4. Accessories and optional features which enhance equipment performance or operation.

5. Utility requirements.
6. Control wiring diagrams.
7. Installation Manuals
- C. Shop Drawings: Show details of fabrication, installation, adjoining construction, coordination with mechanical and electrical work, anchorage, and other work required for complete installation.
- D. Field Test Reports: Provide certification reports from accredited service technicians or installers.
- E. Structural calculations and details for support and seismic bracing and anchorage of equipment per Specification section 130541, stamped and signed by a professional engineer registered in the state of California.
- F. LEED Submittals: Submit in accordance with Section 018111.
  1. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.
  2. LEED Product Data Submittal Form: Submit completed product data form provided by the Contracting Officer's Representative; certified by vendor, installer, subcontractor, and/or manufacturer as appropriate.
- G. Operating Instructions: Comply with requirements in specification Section 010000, GENERAL REQUIREMENTS.
- H. As is appropriate (eg animal rack and cage washers), a statement regarding proper placement, configuration, and installation of exhaust ductwork to prevent condensation from cooling moist air from entering back into equipment.

#### **1.7 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American National Standards Institute/Association for the Advancement of Medical Instrumentation (ANSI/AAMI):
  1. ST79-2006 Comprehensive guide to steam sterilization
  2. ST8-2008 Hospital Steam Sterilizer, 3<sup>rd</sup> edition
  3. ST55-2008 Table-top Sterilizers
- C. National Association of Architectural Metal Manufacturers (NAAMM):
  1. AMP 500-06 Metal Finishes Manual
- D. Underwriters Laboratories):
  1. UL Standard 61010-1

#### **1.8 WARRANTY**

- A. Comply with FAR clause 52.246-21 in all areas except for warranty period, which shall be no less than three years for all equipment.

## 1.9 GUARANTEE PERIOD SERVICES

- A. Engage factory-trained authorized manufacturers' representatives to perform maintenance service on equipment during guarantee period.
  - 1. Maintenance Service:
    - a. Inspection of equipment at regularly scheduled intervals as defined by the manufacturer.
    - b. Testing, cleaning, adjusting, repairing, and furnishing and installing replacement components as required to maintain equipment in reliable working condition.
  - 2. Maintenance service does not include cleaning, adjusting, repairing, furnishing and installing replacement components required because of improper use.

## PART 2 - PRODUCTS

### 2.1 LABORATORY GLASSWARE AND UTENSIL WASHER / DRYER

- A. Cabinet Model: Fully programmable high performance laboratory glassware washer/dryer. Capable of direct injection washing of narrow-necked glassware (with proper inserts) and providing a heated DI water final rinse cycle, detergent, neutralizer, rinse aid dosing systems, and accepts a wide variety of baskets and inserts for various laboratory glassware types. Approximately 1815 mm high by 866 mm wide by 882 mm deep (72 inches high by 34 inches wide by 34 inches deep).
  - 1. Exterior/Interior: Construction:
    - a. Interior: Chamber walls, ceiling, and floor ~~are~~ constructed of type 316 stainless steel for corrosion resistance. (ADD#02)
    - b. Exterior cabinet. Constructed of type 304 brushed stainless steel for corrosion-resistance
    - c. Doors:
    - d. Quantity: Single door
    - e. Operation: Automatic.
    - f. Counterbalanced
    - g. Lock: Prevents interference with wash cycle once it is in operation.
  - 2. Chamber size: Interior useable space approximately: 855 mm high by 655 mm wide by 660 mm deep (33 inches high by 25 inches wide by 25 inches deep).
  - 3. Loading: Manual.
  - 4. Controls: Non-proprietary digital control system. Includes standard and service-diagnostic programs. Space is available for custom programs. Multi-language display. RS-232, infrared serial ports or more modern technology such as USB ports are provided for connection to a PC.
  - 5. Heat Source: Steam. Steam Pressure: 29 to 87 PSI.
  - 6. Electrical Requirements: Electrical Connection: 3 Phase, 480V, 60Hz, 3P, 9A.

7. Standard Cycles: Pre-wash, Wash, Running Water Rinse 1, Acid Rinse, Running Water Rinse 2, Pure Water Rinse Cold, Pure Water Rinse Hot, Drying and Cooling.
8. Temperature:
  - a. Wash Cycle: 50 - 70°C (122 - 158°F).
  - b. Rinse Cycle: 50 - 70°C (122 - 158°F).
9. Stainless Steel Pump and Hydraulics: Constructed of AISI 304L stainless steel.
10. Plumbing Connections:
  - a. Hot Tap Water connection: One inlet valve 50 to 70 degree C (122 degree F to 158 degree F). Supply pressure: 207 kPa to 1014 kPa (30 psi to 147 psi), 15 l/minute (4 gal/minute). Provided inlet hose: Approx. 1524 mm (5 feet) long, 13 mm (1/2 inch) ID with 19 mm (3/4 inch) male hose thread ends.
  - b. Cold Tap Water connection: One inlet valve. Supply pressure: 207 kPa to 1014 kPa (30 psi to 147 psi), 15 l/min (4 gal/min). Provided inlet hose: Approx. 1524 mm (5 feet) long, 13 mm (1/2 inch) ID with 19 mm (3/4 inch) male hose thread ends.
  - c. DI Rinse Water Connection: One inlet valve. Supply pressure: 207 kPa to 1014 kPa (30 psi to 147 psi), 15 l/min (4 gal/min). Provided inlet hose: Approx. 1524 mm (5 feet) long, 13 mm (1/2 inch) ID with 19 mm (3/4 inch) male hose thread ends. Provide DI pump kit for input pressure below 690 kPa (10 psi).
  - d. Drain Connection: Two 25 mm (1 inch) O.D. flexible drain hoses for connection to 51 mm (2 inches) I.D. floor drain or standpipe.
  - e. Steam maximum consumption: 265 lbs/hr, 66lbs/cycle. Typically 1 cycle per hour used.
11. Construction:
  - a. Interior: Chamber walls, ceiling, and floor are constructed of type 316 stainless steel for corrosion resistance.
  - b. Exterior cabinet. Constructed of type 304 brushed stainless steel for corrosion-resistance
12. Design: Provide a system equal to or greater than the following:  
(ADD#02)
  - a. Pump system: Washer circulates water through the built-in upper and lower spray arms. Second pump is rated at 401 liters/minute (106 gallons per minute) and provides circulation through direct injection baskets or baskets with spray arms.
  - b. Dispensing Systems: Detergent dispensing container(s) of approximately 19 liters (5 gal) allow for dispensing of detergents at specified wash temperatures. Each dispensing unit includes a flow meter that precisely monitors detergent amount dispensed.
  - c. Drying System: Built-in, does not require additional floor space, features temperatures up to 115 degree C (239 degree F), HEPA-filtered forced hot air through injectors and wash chamber, allows for two time and temperature settings and a cool-down cycle, and shall perform at less than 70 dBA.

- d. Basket System: Modular stainless steel basket system allows for single or double level washing. Capable of injection washing and standard washing in a single load.
  - e. Pure Water Rinsing: Pure water is pre-heated in a tank built-in the washer, and re-circulated through spray arms and injectors at temperatures up to 95 degree C (203 degree F).
  - f. Spray arms: Include upper and lower spray arms.
  - g. Water fill: Adjustable from 11 to 30 liters (3 to 8 gallons). Fill level is monitored by flow meters and is accurate to 4 ml (0.15 oz). Standard fill level is 19 liters (5 gallons).
  - h. Pull Down Door: Features dual axis motion to minimize unnecessary wear on the gasket. Designed to support the weight of loaded baskets without additional supports.
  - i. Water temperature of any cycle is adjustable up to 95 degrees C (203 degrees F). Temperature is monitored by dual sensors with control accuracy of +/-0.5 degree.
  - j. Steam condenser: removes steam vapor when chamber temperature exceeds 50<sup>0</sup> and directs condensate to drain.
  - k. Drain Discharge Cool-down - Cold water added to effluent during drain phase to cool wastewater to < 60<sup>0</sup> C (< 140<sup>0</sup> F).
  - l. Water conservation system
  - m. RS 232 port - provides output for wash cycle process.
  - n. pH Special Programming: automatically adds base or acid solution to lower or raise pH level of effluent before discharge to building drain system.-
  - o. Seismic tie-down - Bracket allows for seismic anchoring
  - p. Emergency Shut-down Bottom - Shuts off all power to the unit.
13. Accessories:
- a. Additional chemical pump(s) to allow for injections of different chemicals during desired treatments.
  - b. Booster Heater for high temp rinse cycle.

## 2.2 LABORATORY STEAM STERILIZERS

### A. Chamber:

- 1. Interior: Type 316 Stainless steel.
- 2. Chamber Sizes:
  - a. Bulk Sterilizer (Cage wash): 1219 x 2184 x 2184 (48" x 86" x 86" - 213.6 cu. Ft).
  - b. Medium Sterilizer (BS1-2 Suite): 672 x 914 x 1549 (26.5" x 36" x 61" - 33.7 cu. Ft).
  - c. Medium Sterilizer (Lab Floors): 672 x 672 x 1000 (26.5" x 26.5" x 39" - 15.5 cu. Ft).
- 3. Chamber Pressure: up to 45 PSIG.
- 4. Chamber Temperature: 110 - 135 degrees C (230 - 275 degrees F).

B. Doors:

1. Quantity:

- a. Bulk Sterilizer (Cage wash): Double (Pass-through)
- b. Medium Sterilizer (BS1-2 Suite): Double (Pass-through)
- c. Medium Sterilizer (Lab Floors): Single

2. Configuration and Operation:

- a. Bulk Sterilizer (Cage wash): Horizontal Sliding (front and back openings), Power Doors
- b. Medium Sterilizer (BS1-2 Suite): Hinged Radial Arm (front and back) Doors
- c. Medium Sterilizer (Lab Floors): Hinged Radial Arm Door

C. Standard Cycles: Gravity.

D. Heat Source: Steam

E. Electrical Requirements:

- 1. Bulk Sterilizer (Cage wash): 480V, 60 HZ, 3P, 13.2 KW
- 2. Medium Sterilizer (BS1-2 Suite):
  - a. Vacuum Pump: 480V, 50/60 HZ, 3P, 4.4A
  - b. Electrical Supply: 120V, 50/60 HZ, 1P, 12A
- 3. Medium Sterilizer (Lab Floors): 208V 50/60 HZ, 1P, 5A

F. Loading: Manual.

G. Recorder: Integrated Printer with hardware ~~is~~ protected from moisture, and readily accessible for repairs and paper changes. (ADD#02)

H. Control Options: Integrated controls

- 1. Provide remote monitoring of the steam sterilizer via the DDC control system.
- 2. Coordinate interface with Section 230923, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.
- 3. Provide independent, third party manufacturer logix control system.
- 4. Network Communication: Port for network communications

I. Alarms: The following minimum cycle alarms shall be provided:

- 1. Vacuum system failure.
- 2. Steam table deviation.
- 3. Overextended sterilization time
- 4. Vessel flood.
- 5. Chamber drain probe failure.

J. Drain Discharge Cool Down System:

- 1. Cold water (Chilled water) shall be part of water conservation system to automatically cool the drain discharge temperature below 140°F before entering the building sanitary waste drain.
- 2. Construct drain of stainless steel.



K. Construction:

1. Chamber and door shall be constructed from solid, high quality type 316Ti stainless steel. Chamber and jacket shall be rated at 45 PSIG and full vacuum. Internal surfaces shall be highly polished to facilitate cleaning (better than 20 micro inches RA). The sterilizer chamber to be completely insulated with minimum 2" chloride free mineral wool, encased in a rigid removable sheet aluminum housing. Mount chamber on a stainless steel framework with adjustable feet. Stainless steel steam baffles shall direct steam from impinging the load, directing condensate to drain. Unit configured per Equipment Schedule with all exposed surfaces stainless steel. All serviceable components accessible from front and one side of unit.
2. Exterior Enclosure: Type 304 series stainless steel front, sides and top panel for free standing units and front panel for recessed units.
3. Sterilizer Jacket: Multiple U-channel jacket sections connected with a piping manifold that enhance the heat distribution of the chamber. The design of the jacket prevents erosion from inlet service conditions the jacket is constructed in accordance with section VIII Division 1 of the ASME Boiler and Pressure Vessel Code.
4. Safety Valve: The safety valve (ASME approved and so stamped) for pressure vessel is set at the approved maximum operating pressure of the vessel. Valve is sealed so that setting cannot be altered, and will blow down at least 2 psig before closing. Valve is sized so that pressure in vessel will not rise more than 10 percent over the set pressure.

L. Installation Options:

1. Bulk Sterilizer (Cage wash): Pit Mounted and recessed through the wall.
2. Medium Sterilizer Floor mounted and recessed through the wall.
3. Medium Sterilizer (Lab Floors): Floor mounted with Stainless Steel Cabinet.

M. Accessories:

1. Bulk Sterilizer (Cage wash):
  - a. Loading cars and transfer carriages (2)
  - b. Self-Cleaning drainline strainer consisting of appropriate piping to automatically flush the drainline strainer prior to completion of a sterilize cycle. Back-flushed debris should not reenter the chamber. A rough strainer can be provided within the chamber to prevent large objects from clogging the drain pipe prior to the fine strainer and/or allow casters to pass over drain.
2. Medium Sterilizer (BS1-2 Suite):
  - a. Loading cars and transfer carriages (2)
  - b. Vacuum pump
  - c. Control Panel at both ends
3. Medium Sterilizer (Lab Floors):
  - a. Two shelves and extra extended shelf

- b. Boiler control and safety device - to satisfy ASME requirements for secondary low water cut-off
- c. Water Saver package - for significant water usage reduction of 75% or greater.

## 2.3 ICE MACHINE

- A. Freestanding ice and water dispenser with removable water cooled flaked ice icemaker, approximately 533 mm (21 inches) wide x 609 mm (24 inches) deep x 1676 mm (66 inches) high for 23 kg (50 lbs) capacity.
- B. Exterior: Stainless steel frame with stainless steel panels.
- C. Storage Capacity: 23 kg (50 lbs).
- D. Production: Approximately 181 kg (400 lbs) of compressed nugget ice in a 24-hour period.
- E. Dispenser Controls: Push lever activated.
- F. Electrical Requirements: 115V, 60 Hz, 1 phase, 14 amp
- G. Coordinate with electrical to provide GFCI protection.
- H. Provide 2 m (7 foot) cord and NEMA 5-20 90-degree hospital-grade plug.
- I. Dispenser to have automatic storage bin level control to start and stop icemaker and to allow dispensing to continue with icemaker removed.
- J. Icemaker to use environmentally friendly R404A refrigerant, and be easily removed for service and maintenance.
- K. Controls: Microprocessor controls with diagnostics program for servicing.
- L. Storage bin:
  - 1. Insulated with high-density, foamed-in-place polyurethane.
  - 2. Easily accessed for manual loading of back-up ice.
  - 3. Bin Capacity: 80 lbs.
- M. Energy consumption: maximum of 5.7 KWH per 45 kg (100 lbs) ice produced.
- N. Water Consumption:
  - 1. 49 L (13 gal) of potable water usage per 45 kg (100 lbs) of ice produced.
  - 2. Condenser 90°/70°F - 131.0 gal per 45 kg (100 lbs) of ice produced.
- O. Installation:
  - 1. Coordinate with Mechanical for water supply and drains.
  - 2. Coordinate with electrical for GFCI protection and receptacle compatibility.

## 2.4 CAGE AND RACK WASHERS

- A. Cage and Rack Washer: ~~is a~~ Heavy duty, large capacity hydrospray continuously operated cabinet washer designed for thorough, efficient washing, rinsing and drying of cages, racks, tops and lids used in care of laboratory animals. (ADD#02)

~~Sole Source Manufacturer:~~ (ADD#02)

~~TecniplastUSA/IWT, West Chester, PA. (484) 875-0500~~

~~www.tecniplastusa.com~~  
~~Model: IWT 9ATL001XXX~~ (ADD#02)

- B. Custom designed and fabricated to meet building restrictions including, but not limited to, room size and wall locations, coordination with other items in room, identified ceiling height with necessary clearances, column spacing, pit depth and location, mechanical load, electrical service and connections, plumbing service and connections. The cost of design and installation changes, changes to locations, changes to systems and/or products, different from indicated on the contract documents, to accommodate the proposed cage and rack washer system/manufacturer are at the sole expense and responsibility of the General Contractor. (ADD#02)

1. Quantity (2)

C. Rack Washer - General

1. Size and Configuration:

a. Approximate Exterior Dimensions: (ADD#02)

- 1) Width: 95 ' ø
- 2) Length: 100 "
- 3) Height: 106 1/3 " (pit included)
- 4) Pit depth: ~~Dimensions: 95.28 " (W) x 99.61 " (L) x 6 " (D)~~ maximum.  
(ADD#02)
- 5) Recommended Minimum Ceiling Height: 118"

b. Internal Chamber Dimensions: 48.8 " (W) x 90.5 " (L) x 87.9 " (H)

c. Loading Capacity: One of the following per load.

- 1) One standard presentation rack
- 2) Two compact presentation rack
- 3) One double-sided IVC rack / Rabbit Racks / Primate Racks.
- 4) One bottle washing presentation rack for #8 bottles crates of #18 bottles each.

d. Treatment Phases and Cycle Time:

- 1) Each wash cycle that includes detergent wash, drip, rinse, and vapor exhaust treatment shall not exceed:
  - a) Rodent cages- 6-10 minutes
  - b) Rabbit racks - 8-15 minutes
  - c) Primate rack - 20-30 minutes

e. Installation Configuration:

- 1) Pit-mounted
- 2) Door(s): Double door configuration.
- 3) Door Mounting and Operation: Hinged, manual operation. Doors swing adjustable per customer request.
- 4) Provide seismic anchors and calculations as required for project site.

- 5) Provide angle trim as necessary at clean and dirty barrier walls to match up with modular wall.

D. Operational Features

1. Heating System: Steam
2. Spray System:
  - a. Separate wash and rinse nozzles on oscillating manifolds
  - b. 100% separated wash and rinse circuits to prevent any risk of cross contamination
3. Machine Operation: Wash cycle shall be selectable and started from control system's operator interface panel. Equipped with the following features:
  - a. Recirculating water system equipped with in-line self-cleaning filter.
  - b. Water and energy saving features.
  - c. Vented vapor removal system.
4. Treatment Phases: Each wash cycle shall be able to be programmed for but not limited to the following: Detergent Wash, Drip, Rinse, and Vapor exhaust.
  - a. Detergent Wash:
    - 1) Wash with hot water and detergent.
    - 2) Water supply: Wash tank.
    - 3) Temperature: Not less than 130 degree F.
  - b. Dripping: Pauses before next phase to allow detergent water to drain back to wash tank; followed by back flushing the in-line self-cleaning filter.
  - c. Rinse: Rinse with non-recirculated clean, hot water.
    - 1) Water supply: Fresh hot water in dedicated rinse tank.
    - 2) Temperature: Not less than 180 degree F.
    - 3) Ability to turn temperature tape if required.
  - d. Exhaust: Remove vapor saturated air from chamber.
  - e. Exposure Time: Exposure time of each treatment phase shall be factory pre-programmed and unit shall be able to be re-programmed or adjusted during Commissioning.

E. Construction

1. Material:
  - a. Base and sump: Type 304 stainless steel, 12 gauge.
  - b. Door panels: Type 304 stainless steel, 16 gauge.
  - c. Exterior panels: Type 304 stainless steel, 14 gauge.
  - d. Spray header and jets: Type 304 Stainless Steel.
  - e. Pump housing and impeller: Type 316 stainless steel.
  - f. Process piping: Type 304 Stainless Steel.

- g. Process valves: Type 316 Stainless Steel.
  - h. Steam coils: Type 304 stainless steel.
  - i. Internal steam piping: Type 304 Stainless steel.
  - j. Drain piping: Type 304 stainless steel.
2. Cabinet Assembly:
- a. Chamber Wall: Stainless steel construction with reinforcement and insulation.
  - b. The wall assembly is fastened and sealed to the base to insure a watertight chamber.
  - c. Mechanical Area: Control system and mechanical system including tanks, pumps and service connection valves shall be confined to an enclosed area on the side of chamber.
  - d. Exterior Enclosure: Stainless steel panel.
  - e. Provide access panels for equipment servicing where required.
3. Base:
- a. Integral base frame and chamber sump construction.
  - b. Support Frame: Structural steel frame assembly capable of supporting integral sump.
  - c. Chamber Floor: Modular stainless steel removable grating panels.
4. Door(s):
- a. Door Frame Construction: Double-skinned sandwich construction with reinforcement and insulation.
  - b. Glass Panel: Full length tempered glass hinged door (mounted on a s/s reinforced frame featuring a consolidated inflatable gasket solution.
    - 1) Minimum Size: 77.5" Tall x 38.2" Wide
    - 2) The glass must consist of two 1/8" layers with Polyvinylbutyral film in between. (ADD#02)
    - 3) Doors (frames, glass and gaskets) to provide 100% air tight application, full vision inside the chamber, and reduced noise and heat transmission when the machine is running.
    - 4) During a standard cycle the maximum temperature measured on the external glass cannot exceed 107°F.
    - 5) The glass panel must be certified by an independent institute for compliance with UNI EN 81-1:2008, UNI EN 81-2:2008, UNI EN 12600:2004 in regards to crash resistance.
  - c. Door Gasket: Active inflating gasket, pneumatically operated. A truly active gasket is required, static gasket compression is unacceptable.
5. Chamber Lighting: Surface mounted LED fixture with vapor proof port.
6. Day Tank Storage Area: Storage area built into technical vane for storage and secondary containment of chemical day tank drums provided by others

7. Electrical Panel: Electrical panel to be a UL/CSA rated enclosure rated IP55/NEMA 4X

F. Control System

1. Hardware:

- a. Standard, commercially available PLC control with operator interface control panel.
- b. Standard USB Port at main control panel

2. System Features:

- a. Controls washer function, monitors washer operation and alerts operator of alarm conditions as it occurs or on demand.
- b. Indicate alarm conditions in visual and audio mode.
- c. Factory installed cycle phase time, temperature, alarms and other key operations settings.
- d. Allow operating personnel to select from menu of pre-programmed cycle parameters.
- e. Allow supervisor with pass code to modify pre-programmed cycle parameters.
- f. Stores record of each cycle's operating characteristics in the control system and available for download via USB communication port.
- g. Cycle Program Memory: Up to 99 factory installed programs and custom named programs.
- h. Lite View Interface: Allow access via Smartphone or Tablet app to mirror touchscreen functions, view data, pass messages, and allow Supervisor access to setting and adjustment of cycle settings.
- i. Self-start feature weekly programmable (day, time and cycle type)
- j. Programming:
  - 1) Military time expressed in minutes/seconds.
  - 2) Fahrenheit or Centigrade temperature expressed in tenths of a degree increments.

3. Control Panel Features:

- a. Microprocessor, PLC controller and electronic components shall be housed in insulated control box
- b. Control box is UL and CE compliant.
- c. Main control panel at load end of washer.
- d. Secondary control panels at load and un-load end of washer. Allows start cycle, open door, and shows general alarm status only.

4. Operator interface:

- a. Backlit color touch screen LCD digital display.
- b. Language: English, and Spanish required.

5. Information display on control panel includes but is not limited to:

- a. Stored Cycle name for operator selection.

- b. Pre-programmed cycle parameter data.
- c. Real time in-process cycle performance data.

G. Mechanical Features

1. Spray System:

- a. Jet-spray Manifolds, horizontally mounted oscillating arms in 120 degree sweeping pattern.
- b. Self-draining spray nozzles.
- c. Separate wash and rinse jet-spray nozzles.
- d. Spray nozzles shall be positioned to reach all cages and cart surfaces, including underside of shelves and base.
- e. Wash nozzles: Not less than 48 and no more than 84
- f. Rinse nozzles: Not less than 48

2. Water Tanks:

- a. Separate wash and rinse tank.
- b. Include top inspection latch.
- c. Equipped with level control, automatic fill, overflow safety and temperature control.
- d. Wash water tanks with radius corners and bottom slope to outlet.
- e. All tanks to be insulated and sealed.

3. Water Pumps:

- a. Wash pump:
  - 1) Deliver water from wash tank to washing circuit of jet-spray manifold.
- b. Rinse pump:
  - 1) Deliver fresh clean and pressurized water to rinse circuit of jet-spray manifold.
  - 2) Used rinse water to be returned to wash tank for re-use and conservation of heat load
- c. Detergent Pump:
  - 1) Pneumatic diaphragm pump type.
  - 2) Equipped with sensor to detect level of chemical in the drums, and send an alarm signal to the PLC display when the drum is empty.
- d. Steam Heating Coil:
  - 1) In water tanks as required.
  - 2) Equipped with condensate return and steam trap.
- e. Self-Cleaning Filter:
  - 1) In-line installation type.
  - 2) Removable without tools

- 3) Must include sensor to prevent operation unless filter is re-installed correctly.
- 4) Filter: Stainless mesh with perforation smaller than jet-spray orifice.
- 5) Automatically flush every single washing cycle.
- f. Valves: Pneumatically operated.
- 4. Exhaust Fan:
  - a. Extract vapor and condense from chamber during and at the end of cycle.
  - b. Variable Speed depending on cycle stage
- H. Other System Features
  - 1. Additional Feature Options:
    - a. Second wash tank: Provide additional wash tank allowing for sequential wash phasing using two different detergents.
    - b. Colored LED Light: Provide LED light capable of changing color to reflect the status of the machine and the type of cycles being run.
  - 2. Drain Monitoring Options:
    - a. Drain Discharge Cool-Down System: Reduce effluent discharge to less than 140 degrees F by supplying cold water to drain release point.
    - b. Drain Discharge pH Balancing System: Balance effluent discharge to a programmable pH range (Default 6-9) by supplying balancing agent at discharge point.
  - 3. Data Collection Options:
    - a. Printer: Provide Integral Thermal Printer at Main Electrical Panel
  - 4. Special Cycle Options: (Provide these options on Rack Washer #1 Only)
    - a. Auto-watering Flush: Provide feature to flush auto-watering manifolds during an IVC rack cycle
    - b. Bottle Washing Kit: Provide integrated docking feature inside chamber that allows for connection of specialized bottle washing presentation kit that can wash quantity (8) bottle crates holding quantity (18) bottle per crate.
    - c. Aquatics Cycle: Provide integrated dosing pumps and controls for a dedicated aquatics cycle guaranteed to clean off algae and bio-film.
  - 5. Decontamination Options: (Provide options on Rack Washer #2 Only)



Designation	Utility/ Service Required	Steam Heated Model	Notes:
E1	Main Power	480V/ 60Hz / 3-phase FLA: 27.2 A Fusible Disconnect Req'd: 45 A	
E2	Secondary Power*	115V / 60Hz / Single Phase 30A	*Only required on Cage and Rack Washer #2 with VHP decontami nation options
CW	Softened Water (Main Supply)	29-44 PSI 59-140 F 1"NPT 50ppm < CaCO3 <120ppm	
TW	Cold Water*	29-44 PSI 59-68 F ½ "NPT	*Required for drain cooling option
S	Steam	44-72 PSI Min Flow Rate: 330 lbs/hr 1 ¼" NPT Filtered, and Dry	
CR	Condensate	Pressure/Flow: Same as incoming steam ¾" NPT	
A	Compressed Air	87 PSI 1.25 CFM 1/2" NPT	
SE	Exhaust	590 CFM 7 3/32" Flange	Exhaust to balanced at 590 CFM with exhaust fan at 100%
DA	Data	Ethernet RJ45 Connector Static IP Address Req'd	

a. On-board VHP Generator with Fast Aeration Kit and Catalyst Unit (VHP Only):

- 1) Provide on-board VHP generators eliminating need for separate remote unit.
- 2) Integral control system and software to interface between generator and system PLC
- 3) Provides 1 hour decontamination cycle time.

- 4) Reduces and breaks down VHP in use prior to opening chamber
- 5) Eliminates the need for a dedicated ductwork attachment to the rack washer.
- 6) Internal power socket

#### I. Safety Features

##### 1. Safety Door Switch:

- a. Requires doors to be completely closed to start or continue operation.
- b. Stops operation if door is opened during operation.
- c. Electro-mechanic pumps shut off when door open

##### 2. Emergency Stop:

- a. External emergency push buttons near each door to stop operation.
- b. Interior emergency push bar on side of interior wash chamber.
- c. Emergency Signage Provide per AALAC Requirements
- d. When internal e-stop is pushed, system must allow free and easy egress with no additional steps required to release a door.

##### 3. Door Interlocks:

- a. Safety mechanism to prevent doors on both ends from being opened simultaneously during normal operations.

##### 4. Chamber Overpressure Device: Chamber must be outfitted with pressure release device preventing overpressure situation inside the chamber.

#### J. Utilities

1. Provide unit with the utilities listed below.

### 2.5 TUNNEL WASHER

- A. Tunnel Washer: ~~is a~~ Heavy duty, large capacity hydrospray continuously operated belt washer designed for thorough, efficient washing, rinsing and drying of cages, tops and lids used in care of laboratory animals.  
(ADD#02)

- B. Tunnel Washer ~~is~~ equipped with a Bedding Dispensing Station integrated into the discharge end of the washer (after the dryer), and equipped with an integral HEPA filtered dust collector, material receiver (hopper), and Bedding Dispenser storage bin. The conveyor systems automatically flips the dry cages and automatically fills them with bedding. (ADD#02)

~~Sole Source Manufacturer:~~ (ADD#02)

~~TecniplastUSA/IWT, Exton, PA. (484) 875-0500 [www.tecniplastusa.com](http://www.tecniplastusa.com)~~

~~Model: IWT 9LATUN725~~ (ADD#02)

C. Custom designed and fabricated to meet building restrictions including, but not limited to, room size and wall locations, coordination with other items in room, identified ceiling height with necessary clearances, column spacing, pit depth and location, mechanical load, electrical service and connections, plumbing service and connections. The cost of design and installation changes, changes to locations, changes to systems and/or products, different from indicated on the contract documents, to accommodate the proposed cage and rack washer system/manufacturer are at the sole expense and responsibility of the General Contractor. (ADD#02)

D. Tunnel Washer - General

1. Size and Configuration:

- a. Minimum TW opening: STANDARD BELT: 720W x 340H mm (28.25"W x 13.38"H)
- b. Maximum external size: 1465W x 9750L x 2650H mm (57.75"W x 383.88"L x 104.25"H) above the floor
- c. Minimum conveyor width: 720 mm (28")
- d. Conveyor speed: adjustable between 0.5 and 1.9m/min (adjustable between 19.6 and 74.8 inch/min)
- e. The TW shall come out from the factory with four (4) pre-set conveyor speeds
- f. Standard sections: load, wash, rinse, dry, unload

2. Loading Capacity:

- a. Mouse Cages: Three Across Per Row
- b. Rat Cages: Two Across Per Row

3. Installation Configuration:

- a. Maintenance Area on Right when Viewing from Dirty Side
- b. Unit must be capable of being installed up against a wall
- c. Provide seismic anchors and calculations as required for project site.
- d. Provide angle trim as necessary at clean and dirty barrier walls to match up with modular wall.

4. Operational Features:

- a. Heating System: Steam
  - 1) Spray System: Separate wash and rinse modules to prevent any cross contamination.
  - 2) The operator manually loads the items to be washed on the conveyor belt at the load end of the tunnel washer. The items are conveyed automatically through the different phases, as far as the unloading area where they are unloaded by the operator.
  - 3) Treatment Schedule: A treatment schedule shall be automatically programmed as follows:
    - a) Load: Items should be maintained in their loading position without any mechanical devices.

- b) Recirculated detergent wash: Hot detergent solution is recirculated through the jet system under pump pressure. Temperature adjustable (standard working temperature 55°C (131°F)).
  - c) Water recovered from the rinse tank under pump pressure re-freshes and keeps warm the water in the wash module.
  - d) Rinse: Hot water from house supply is heated through a steam heat exchanger and sprayed through the jet system. Then, the used water is pumped to recirculated wash tank. Temperature adjustable (standard working temperature 82°C (180°F))
  - e) Dry with blowing: water drops are mechanically removed using two dedicated air blades. More than 80% of the water lying on the cage after the rinse phase shall be removed in this module.
  - f) Dry with hot air: Up to 99% of remaining small water drops are removed by the evaporation process via hot air. Temperature adjustable (standard working temperature 110°C (230°F)). Air shall be recirculated for energy saving.
- 4) Self-Starting: Self-Starting feature shall allow water to warm up in the tanks early in the morning prior to the staff arrival. It shall decrease the start-up time of daily operations.
  - 5) Self-Cleaning: Self-Cleaning feature shall allow the automatic cleaning of the washing chamber and the wash tank. It shall decrease the daily maintenance operations.
  - 6) Main parameters to be set under password:
    - Wash temperature;
    - Rinse temperature;
    - Dry temperature;
    - Conveyor speed;
    - Detergent concentration;
    - Waste water control parameters (optional)

#### E. Construction

##### 1. Material

- a. Frame: AISI304L stainless steel
- b. Wash Solution Reservoir: AISI304L stainless steel
- c. Rinse Water Reservoir: AISI304L stainless steel
- d. Cabinets Sides & Top Panels: AISI304L stainless steel
- e. Recirculating Valve Components: AISI304L stainless steel
- f. Internal Water and Steam Piping: AISI304L stainless steel
- g. Drain Piping: AISI304L stainless steel
- h. Drain Valve & Components: AISI304L stainless steel
- i. Steam Piping: AISI304L stainless steel
- j. Water Piping: AISI304L stainless steel
- k. Spray Jets AISI304L stainless steel
- l. Steam Coils AISI304L stainless steel

- m. Insulation jackets        AISI304L stainless steel
- n. Wash Pump        AISI316L stainless steel
- o. Transfer Pump        AISI316L stainless steel
- 2. Assembly:
  - a. All serviceable components located on one side of washer inter-piped and inter-wired so that only one connection is required for each service and utility. It shall be possible to install the machine against a wall.
  - b. Stainless steel tubular frame with welded studs to facilitate barrier wall separation construction at clean and dirty barrier walls.
  - c. The washer shall be shipped in sections for entry into building. Sections and sump joints shall be then assembled on site to eliminate any possibility of leakage.
- 3. Door:
  - a. Splash proof doors provided for access to jet systems and interior.
  - b. Tempered glass, water tight windows provided in each door for observation of treatment process.
  - c. Doors insulated with 1" non-flammable polystyrene insulation and equipped with silicone bulb sealing gaskets, latches and heavy-duty self-losing hinges.
  - d. Doors shall open 180° for cleaning and maintenance.
- 4. Electrical Panel
  - a. Electrical control panel is to be bolted to the side of the machine.
  - b. Within control box are transformer for 24V control circuit, magnetic starters with overload protection for all motors and all other electrical components required for operation.
  - c. Minimum IP55 protection rate is required
- 5. Control System
- 6. Microprocessor, PLC controller and electronic components shall be housed in insulated control box
- 7. Control box is UL and CE compliant.
- 8. Main control panel at load end of washer.
- 9. Operator interface:
  - 10. Backlit color touch screen LCD digital display.
  - 11. Language: English, and Spanish required.
  - 12. Programmable for conveyor speed, temperatures, and key process parameters.
  - 13. Security settings available for operator, supervisor, and maintenance levels.
  - 14. Information display on control panel includes but is not limited to:
  - 15. Stored Cycle name for operator selection.

16. Pre-programmed cycle parameter data.
17. Real time in-process performance data
18. An internal battery shall back up all cycle memory for up to one (1) year and permit restart of a cycle upon restoration of power after a power disruption except for emergency stop.
19. Alarms are indicated visually, audibly, and recorded.
20. Provide machine with volt free contact to communicate with building system to send a signal when the unit is running or in alarm.
21. Lite View Interface: Allow access via Smartphone or Tablet app to mirror touchscreen functions, view data, pass messages, and allow Supervisor access to setting and adjustment of cycle settings.
22. Mechanical Features:
  - a. Frame & Tanks:
    - 1) Frame, tanks, and cabinet of one piece welded stainless steel AISI304 construction. Frame equipped with adjustable legs and supports for pumps, steam heat exchanger and drive mechanism. Wash and rinse tanks to feature round corners.
    - 2) Each tank equipped with two (2) automatic water level control (high/low level), safety overflow piping, automatic drain valve and stainless steel steam coil heating for recirculating treatment solutions.
    - 3) Automatic PLC temperature controller mounted on the operator's panel will display and monitor recirculating solution temperatures.
    - 4) Temperature guarantee for both wash and rinse tanks
    - 5) Top and sides insulated with 20mm (1") non-flammable polystyrene insulation covered by a protective stainless steel jacket.
    - 6) Exhaust duct is to be provided over the tunnel for evacuating all moisture to a single building exhaust connection point
  - b. Steam Coil
    - 1) Stainless steel steam coil heating for recirculating wash and rinse tanks complete with condensate return, steam traps and strainers.
    - 2) Steam coils shall be removable for cleaning and maintenance. Coils shall not be welded in place.
    - 3) Steam exchanger to be sized so that the water in the rinse boiler reaches the temperature of 55°C (131°F) in 20min when the machine is fed with cold water (15°C (60°F)) (start-up)
  - c. Spray System:
    - 1) Wash solutions under pressure to guarantee proper dynamic pressure at each nozzle.
    - 2) Wash treatment pump is to be centrifugal type with 316L stainless steel, laser-welded impeller and pump body, minimum IP55 protection

- 3) Jet System for wash and rinse sections composed of machined jets fitted into spraying arms. Each arm equipped with a quick disconnect fitting (push and pull) for easy removal without use of tools and one-position slot index plate for proper placement. Jet properly sized and feed lines contain ball valves to hydraulically hold down light plastic cages and steel pans to conveyor belt.

d. Drive System:

- 1) Drive system shall consist of motor, gear reducer, automatic safety overload clutch and variable speed drive.
- 2) Unload end is equipped with a drive system emergency stop button and warning lights.
- 3) Both loading and unloading sections shall be equipped with photoelectric cells which stop the conveyor (and consequently the water circulation) if the items that have been washed are not removed and taken away by an operator OR if the tunnel-washer is not processing anything for an adjustable period of time.

e. Detergent Pumps:

- 1) Provide one on-board detergent pump for dispensing on chemical into wash module.
- 2) Provide separate dosing pump for use in pH balancing of effluent prior to drain.

- f. Water discharge control system with cold water and chemical injection: the washer shall be provided with a cold-water inlet valve and a chemical injection point, integral with the drain line, to add cold water and chemicals during draining for assistance in reducing the effluent temperature and pH. A temperature gauge and a pH probe shall be included on the cold-water inlet piping.

- g. Bedding Management Feature: Wash section equipped with easily accessible stainless steel calibrated mesh filter and auger to separate water from bedding and prevent jets from clogging. Resulting separate bedding to be sent through a dedicated piping connection to the dirty vacuum bedding system.

- h. Integration with In-line Bedding Dispenser/Cage Inverter provided with Bedding Dispensing System

F. Safety Features:

1. Emergency push/pull stop buttons at both load and unload sections and on the electrical panel.
2. A safety bar is to be mounted at the end of the unloading section.
3. Each chamber door with a proximity sensor to terminate all process and conveyance functions upon opening any door.
4. A torque limiter (clutch) is to be installed to prevent the belt from being damaged if some items crash into the tunnel.
5. The unloading module is to feature an in-line emergency stop which is activated in case of something wedges-in during the conveyor chain turning.
6. Additional emergency stops located at bedding dispenser panel.

7. Safety enclosure at cage inverter with access doors protected by proximity sensors to terminate all process and conveyance functions upon opening any door.
8. Solenoid valves for fluids are normally closed.
9. Protection panels to cover all the electromechanical equipment and pipework at high temperature.
10. General security switch (IG) installed on the door of the electric power cabinet.
11. Manual operations and modifications are only allowed via password.

G. Utilities

	SERVICE	CONNECTION	SERVICE REQUIREMENTS
E	Electrical supply	Tunnel Washer Electrical Box	480V 60Hz three-phases + n + earth Max installed power 31.5 HP FLA: 48.79 A Fusible Disconnect Req'd: 80 A
CW	Softened Water	1" NPT	Dynamic pressure: 29-44 psi Supply temperature: 59-140°F Max hardness: 15°F Consumption: 148 gallons/h (33 gallons initial fill) Supply flow rate min 951 gallons/h
TW	Cold Domestic Water	¾" NPT	Dynamic pressure: 29-44 psi Supply temperature: 59°F Consumption: 42 gallons/h Supply flow rate min 634 gallons/h
D	Drain	4" Dia. Floor Sink	Max flow rate 0.5 l/s
SE	Exhaust	Round bolted flange Di 7"	1176 CFM min exhaust flow request at the customer side. 1350 Pa max tunnel internal resistance
A1	Compressed air - Tunnel Washer	½" NPT	Dynamic pressure: 87 psi Quality: filtered, dry and oil free Max flow: 0.53 CFM at 87psi Consumption flow: 0.35 CFM at 87psi
S	Steam	1 ½" NPT	Dynamic pressure: 87psi Quality: filtered and dry Max flow: 506 lbs/h Consumption flow: 330 lbs/h
CR	Condense Return	1" NPT	Max flow: 506 lbs/h
DA1	Data - Tunnel Washer	Ethernet Jack	Static IP Address Required. For Teleservice and LiteView Interface



## **2.6 BEDDING DUMP STATION**

- A. Freestanding unit for dumping and packing of bedding from laboratory animal cages, approximately 1336 mm wide x 899 mm deep x 1790.7 mm high (52.6 inches wide x 36 inches deep x 70.5 inches high). It shall be capable of packing used bedding and other matter normally found in used animal caging, into container bags or plastic lined waste boxes to be sealed and removed for disposal. Unit shall utilize HEPA filtered air to reduce aerosolized contaminants and minimize personnel exposure to particulate. The unit shall be based upon a commercially available waste management unit manufactured by a United States manufacturer with a wide distribution and service network, such as the Lab Products Inc. Company.
- B. Construction: Exterior painted steel finish with stainless steel waste chutes.
- C. Filtration: Three stage air filtration; Polyester Pre-filter, Pleated Pre-Filter, and HEPA final filter.
- D. Work area opening 1143 mm wide x 584.2 mm high (45" wide x 23" high) accessing Dual Stainless Steel funnel disposal ports channel waste to containers
- E. Controls: Pre-filter and HEPA filter warning lights indicating the need to change filters when static pressure increases above .90 inches of water.
- F. Blower Motor: 1/3 hp direct drive motor
- G. Electrical Requirements: 120V, 60 Hz, 10 Amp.
- H. Maintenance: Access and change filters without tools.
- I. Options: Waste port cover plates

## **2.7 DETERGENT DISPENSING SYSTEM:**

- A. Configuration: Floor Mounted in room V-300B.
- B. Controls: Integrated, Programmable, Microprocessor controls with remote PC interface control capability.
- C. Dispensing Options: Detergent Solutions
- D. Solution Tank Options: Detergent 95 (25) and 189 (50) liters (gallons) capacity.
- E. Electrical Requirements: 120V.
- F. Pumps and all tubing and connections required for connection to adjacent cage and rack washer and tunnel washer equipment.

## **2.8 ANIMAL WATER POUCH FILLER**

- A. An automated packing machine used for efficiently producing and filling animal water into film (plastic) pouches. The machine shall produce at least 10, 8 to 13 ounce water filled pouches per minute. Unit consist of Pouch machine and a Manifold Unit with water treatment proportioner.
- B. Pouch Machine Unit:
  - 1. Mobile, automatic packaging unit designed to produce and fill pouches with facility provided animal drinking water.

2. Control functions are regulated through a user friendly touch screen operator interface featuring digital selections.
  3. A specially formulated plastic film is fed through the machine by servomotors that allow for two pouches water volume capacity from 8 to 13 ounces. The final product is a water filled pouch containing animal drinking water.
  4. Size: 28" wide x 32" deep x 73" high (73 x 82 x 193 cm)
  5. Power requirements: 120V, 50/60 HZ, 1 P, 20A
  6. Treated (Animal) Water supply requirements:
    - a. Connection:  $\frac{3}{4}$ " (20mm) diameter inlet IPS, 3 gallons minimum, 11 gallons maximum of water per minute at 40 PSI - lbs per square inch (2.81 kg/cm<sup>2</sup>).
  7. Accessories:
    - a. Tote Container
    - b. Master Carton sterile valves
    - c. Nine rolls of pouch film
    - d. Silicone patch for pouches
- C. Manifold Unit with Reservoir, Proportioner and Filtration System:
1. Filters and treats water with chemical additives, Ultra filtering the water with a 10 micron pre-filter, followed by a 1.2 micron filter, then a 0.2 micron filter and finally a 0.1 sub-micron filter, virtually removing all microbes from the water. Unit also provides equalized consistent water pressure to the Pouch Unit.
  2. Used for the injection of diluted chlorine or other chemical additives into the water system.
  3. Size: 31" wide x 31" deep x 79" high (80 x 80 x 200 cm)
  4. Rack frame construction: 1.250 (3.17 cm) stainless steel square tubing 1/16" (0.16 cm) thick wall all welded construction, beadblast finish.
  5. Power requirements: none (non-electric inline device operates with the water flowing through the unit).
  6. Treated (Animal) Water supply requirements:
    - a. Connection:  $\frac{3}{4}$ " (20mm) diameter inlet IPS, 3 gallons minimum, 11 gallons maximum of water per minute at 40 PSI - lbs per square inch (2.81 kg/cm<sup>2</sup>).
  7. Accessories:
    - a. Water storage: non-corrosive / rubber diaphragm bladder tank
    - b. Drainage tank: polyethylene water capture located at bottom of rack structure
    - c. Pre-dilution tank: non-corrosive

## **2.9 STERILIZER-AND CAGE / RACK WASHER ENCLOSURE PANELS (MODULAR WALLS)**

- A. Design and custom fabricate to conceal from view body, wiring, piping, and other appurtenances, and to confine water vapor, gases, and heat in the enclosed area:

- B. Size panels and support members to extend from floor to finished ceiling.
- C. Panels: Fabricate panels of not less than 1.27 mm (0.050-inch) thick type 304 stainless steel, with corners welded. Insulate with 13 mm (1/2-inch) moisture-resistant, sound-deadening, material bonded to surface of back side.
- D. Support Columns: Fabricate of not less than 1.52 mm (0.060 inch) thick, stainless-steel tubing, not less than 38 mm (1-1/2 inches) square, with mounting plates welded to top and bottom.
- E. Location: At each side of doors and at each vertical panel extending from floor to finished ceiling.
- F. Louvers: Stainless steel, located in soil side panels above sterilizer doors, and with minimum clear opening area equal to 76 sq. mm/mm (3 sq. in./in.) of sterilizer width.
- G. Louvered Doors: Fabricated from not less than 13 mm (0.5 inch) thick stainless steel; double pan construction; with internal stiffeners and sound-deadening insulation.
  - 1. Equip door with heavy-duty hinges and locks.
  - 2. Center louvers and locate them within 152 mm (6 inches) of bottom of doors.
  - 3. Size louvers to produce clear opening of not less than 25 sq. mm/mm (1 sq. inch/inch) of sterilizer or aerator width.
  - 4. Equip with spring-hinged, non-louvered, access doors at wall openings above rack return conveyor.
- H. Scribe Strips: Stainless-steel closures to fit assembly to wall or ceiling.
  - 1. Maximum Width: 102 mm (4 inches). Use panels to close spaces greater than 102 mm (4 inches).
- I. Finish: No. 4 finish (bright, directional polish) complying with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" Finish after welding.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install units in accordance with manufacturer's documented instructions.
- B. Coordinate installation with related mechanical, plumbing and electrical work. Provide cutouts and openings for mechanical, plumbing and electrical work as indicated or as required by trades involved.

### **3.2 TESTING AND CERTIFICATIONS**

- A. Field test installed equipment after water and steam systems are pressurized for proper operation.
  - 1. Operate each unit for six hours through repeated full cycles. During and after testing, there shall be no evidence of leaks, overheating, electrical failure, or other symptoms of failure.

2. For units that fail testing, make adjustments and corrections to installation, or replace equipment, and repeat tests until equipment complies with requirements.
3. Where applicable, installer shall provide certificate of compliance and/or documented cycle records validating the activation and ready-for-use status of the equipment.

### **3.3 PROTECTING AND CLEANING**

- A. Protect equipment from dirt, water, and chemical or mechanical injury during storage, installation, and throughout the duration of the construction period.
- B. At the completion of work, clean equipment as required to produce ready-for-use condition.

### **3.4 SEISMIC PROVISIONS**

- A. Where required by Seismic Zone Classification and/or local regulations, provide seismically approved anchors, mountings and tie-downs per Manufacturer and/or Certified Structural Engineer

### **3.5 DEMONSTRATION AND TRAINING:**

- A. Instruct personnel and transmit operating instructions in accordance with requirements in specification Section 010000, GENERAL REQUIREMENTS.
- B. Training must be provided by the manufacturer, or manufacturer certified instructors.
- C. Orientation and Training on all equipment to be provided to a minimum of two owner designated personnel per equipment item/system and shall certify their operational competency.

### **3.6 COMMISSIONING**

- A. Provide commissioning documentation in accordance with the requirements of Section 230800 - COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.
- B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 230800 - COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

### **3.7 CONSTRUCTION WASTE MANAGEMENT**

- A. General: Comply with Contractor's Waste Management Plan and Section 017419, CONSTRUCTION WASTE MANAGEMENT.
- B. To the greatest extent possible, separate reusable and recyclable products from contaminated waste and debris in accordance with the Contractor's Waste Management Plan. Place recyclable and reusable products in designated containers and protect from moisture and contamination.

- - - E N D -