

## SECTION 118119

### VACUUM BEDDING HANDLING SYSTEMS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. This section specifies Laboratory Washing and Sterilization Equipment including animal bedding dispensing unit, animal bedding disposal unit, clean bedding handling system, waste bedding disposal system, and vacuum rated waste container..

##### 1.2 DEFINITIONS

- A. The Bedding Dispensing System: ~~is a~~ Designed and dimensioned for continuous handling, transportation, storage and dispensing of clean bedding materials used in laboratory animal facilities. Clean animal bedding material is transported pneumatically from the customer storage area to the washing area chosen point of dispensing. It is used in research animal care laboratories and facilities to move clean bedding materials via pneumatic conveyor from a bulk bedding storage area to bedding dispenser in clean side wash room.  
(ADD#02)
- B. Bedding Disposal Unit: The Vacuum Bedding Disposal System is a vacuum cleaning system designed for continuous removal of soiled bedding waste material and disposable enrichments (such as sizzle nest, enviro dri, nesting, small chew blocks for mice, etc. It is used in research animal care laboratories and facilities to remove soiled bedding materials via pneumatic conveyor to a remote negative pressure container for disposal.
- C. Reinforced Negative Container: A roll-on / roll-off vacuum rated waste container, such that as material is transported through the conveyance pipe network, it is deposited directly in the waste container.
- D. Conveyance Piping Network System: Stainless Steel multi-phase negative pressure piping tube system to carry either clean or waste bedding. The system shall include all components necessary for the operation such as the vacuum power unit, filters and materials receivers and microprocessor control systems.
- E. Bulk Bag Discharge Station and Hoist: The system consists of a motorized electric hoist and trolley system to transport 50 lbs. bedding bags to a bulk bag discharge station, before the material proceeds to the filtered material receiver.

##### 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 117102, LABORATORY WASHING AND STERILIZING EQUIPMENT
- E. Seismic Bracing: Section 130514, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS. Section 221100: PLUMBING CONNECTIONS.

- F. Section 221500, GENERAL SERVICE COMPRESSED-AIR SYSTEMS: Connections to Compressed Air System.
- G. Section 224000, PLUMBING FIXTURES.
- H. Section 230511, COMMON WORK RESULTS FOR HVAC.
- I. Section 230923, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Remote monitoring of the Steam Sterilizers.//
- J. Section 260511, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Electrical Connections.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Equipment shall have built-in monitoring for control devices for vacuum 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 equipment set points.
- D. Provide energy use reduction cycles and features where available.

#### **1.5 QUALITY CONTROL**

- A. 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.
- B. 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.
- C. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.
- D. 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.
- E. 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.
- F. Manufacturer Qualifications: Modern plant with proper tools and skilled workers to produce high quality equipment and meeting the following minimum requirements:
  - 1. Five years or more experience in manufacturing the type of equipment specified.

G. Installer Qualifications: Installer shall be licensed as may be necessary by regulatory organizations. For all equipment, installer shall meet the qualifications of ANSI/ASSE Standard 6010.

1. Twenty installations of equal or larger size.

#### **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 bedding dispensing and disposal system.
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. Conveying Piping and Vacuum Source Piping showing intended pathway, attachments to building walls, and penetration through building walls

E. Field Test Reports: Provide certification reports from accredited service technicians or installers. Provide a Commissioning Protocol that must be approved by the Owner prior to execution of the testing.

F. 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.

G. 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.

H. Operating Instructions: Comply with requirements in specification Section 010000, GENERAL REQUIREMENTS.

#### **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. National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 500-06 Metal Finishes Manual

C. Underwriters Laboratories:

1. UL Standard 61010-1

### 1.8 STANDARDS

A. The Bedding and disposal dispensing system ~~are designed and built in Europe and should shall~~ adhere to ~~at least~~ the following directives and standards: <sup>(ADD#02)</sup>

1. 98/37 EEC Machinery directive.
2. 73/23 EEC Low voltage directive.
3. 89/336 EEC Electromagnetic compatibility directive.
4. ATEX 94/9/CE Atmospheres Explosive directive.
5. EN 292/1 Standard: Safety of machinery. Basic concepts, general principles for design. Part 1: basic terminology, methodology.
6. EN 292/2 Standard: Safety of machinery. Basic concepts, general principles for design. Part 2: technical principles and specifications.
7. EN 563 Standard: Safety of machinery. Temperatures of touchable surfaces. Ergonomics data to establish temperature limit values for hot surfaces.
8. EN 60204-1 Standard: Safety of machinery - Electrical equipment for machines - Part 1: General requirements.
9. ISO 11201 Standard: Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions.

B. The technical documentation of the machine is to include a declaration of conformity according to the EEC directives.

### 1.9 WARRANTY

A. Comply with FAR clause 52.246-21 in all areas except for warranty period, which shall be no less than ~~two~~ three years for all equipment. <sup>(ADD#02)</sup>

### 1.10 GUARANTEE PERIOD SERVICES

A. Engage factory-trained authorized manufacturers' representatives to perform maintenance service on equipment during guarantee period.

B. Maintenance Service:

1. Inspection of equipment at regularly scheduled intervals as defined by the manufacturer.
2. Testing, cleaning, adjusting, repairing, and furnishing and installing replacement components as required to maintain equipment in reliable working condition.
3. Maintenance service does not include cleaning, adjusting, repairing, furnishing and installing replacement components required because of improper use.

## PART 2 - PRODUCTS

### 2.1 VACUUM BEDDING DISPOSAL SYSTEM - NEGATIVE REINFORCED CONTAINER.

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

~~TecniplastUSA/IWT; West Chester, PA. (484) 875-0500  
www.tecniplastusa.com~~

- A. 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)
- B. Operation
1. Soiled animal bedding material and disposable enrichments ~~are~~ emptied into the waste disposal station located in the cage-wash room. The main vacuum pump pneumatically draws the soiled bedding materials from the disposal station into the reinforced negative container. (ADD#02)
- C. The system shall ~~consist~~ of the following main components: (ADD#02)
1. Disposal Station (to be located in the dirty side of the cage-wash area):
    - a. Material: type AISI 304L Stainless Steel.
    - b. Provide a variable speed upper belt to meter material delivery into the funnel and prevent excessive dumping and clogging.
    - c. Provide multi-blade mechanical shredder integrated into the waste funnel to automatically process all types of bedding waste materials and disposable enrichments.
    - d. Provide laminar flow hood cabinet integrated with the waste funnel to provide allergen and dust protection to the operator.
    - e. Unit to be mounted on a chassis and enclosed with insulated panels all around in order to minimize noise emission (to be lower or equal to 75 dBA, recorded at 1mt distance from the source and 1mt above the floor).
    - f. Provide push-button controls for start/stop of system and also relay run and alarm status to operator in wash room.
    - g. Provide status light allowing operator to know when container is not connected or full.
  2. Material transport pipe-work is to maintain airflow speed of 25 m/s (82 ft/s). Large radius bends 600mm (24 inch). Large radius bends are required to prevent air speed drop and material clogging.
    - a. Material: type AISI 304L Stainless Steel.
    - b. Minimum thickness of pipe-work is to be 1.5mm (0.06in) and minimum diameter is to be 89mm (3.5in).
    - c. To be blasted clean by compressed air and degreased prior to installation.

- d. Joints are to be made of antistatic rubber lined mechanical clamps and individually grounded.
- e. Installation specifications to be submitted as part of the bid documentation.
3. Reinforced negative container is to be located in the loading dock area:
  - a. Material: painted steel.
  - b. Container of 15m<sup>3</sup> (approx. 20 yards )
  - c. Equipped with two level vibration sensors. First sensor detects intermediate amount of bedding (2/3 capacity of the container). The second sensor detects full container and stops the system.
  - d. Reinforced Negative Container is designed to work under 30 KPa (negative pressure).
  - e. Provide wall mounted control panel to allow waste company to stop system and disconnect container for removal and emptying.
4. Filter unit is to be located in the technical area and is to be designed to separate air-borne dust from the air going back to the vacuum pump. Dust is to remain outside of the filtering element while clean air is to be drawn inside the filters.
  - a. Material of the enclosure: AISI 304L Stainless Steel.
  - b. Filters are to be sleeve type and made of pleated polyester cartridges.
  - c. Filter cleaning is to be performed by a compressed air reverse pulse. Fines are discharged by gravity into a waste bin.
  - d. To be designed and manufactured in accordance with ATEX 94/9/CE directive.
5. Main Vacuum Pump is to be located in the technical space and is sized to generate the required vacuum to transport material from the wash area to the waste bin.
  - a. Twin impeller pump type with a capacity of 1300 m<sup>3</sup>/h (45900 ft<sup>3</sup>/h).
  - b. Provide a vacuum relief valve to insure cooling of the motor and pump when all vacuum outlets are closed.
  - c. Pump is equipped with thermal overload protection.
  - d. The vacuum unit is to be mounted in a stainless steel chassis and enclosed with insulated and water proof panels. The sound level will not exceed 75 dBA at one meter distance from the chassis.
6. HEPA and Charcoal filters to be located in the technical space. To be designed to be placed in-line of the system after the main filter but before the vacuum pump. Charcoal filter to be sized to eliminate odors prior to discharge.
7. Main Electrical Control Panel
  - a. Hardware:
    - 1) Standard, commercially available PLC control with operator interface control panel.
  - b. System Features:

- 1) Controls system functions, monitors operation and alerts operator of alarm conditions as it occurs or on demand.
- 2) Indicate alarm conditions in visual and audio mode.
- 3) Lite View Interface: Allow access via Smartphone or Tablet app to mirror touchscreen functions, view data, pass messages, and allow Supervisor access to settings and adjustment of cycle settings.

c. Control Panel Features:

- 1) Microprocessor, PLC controller and electronic components shall be housed in insulated control box
- 2) Control box is UL and CE compliant.
- 3) Control panel to IP55 minimum

d. Operator interface:

- 1) Backlit color touch screen LCD digital display.
- 2) Language: English, and Spanish required.

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

- 1) Run status
- 2) Real time in-process performance data.

D. Integration With Bedding Management Feature

1. Provide ability to accept waste bedding from dedicated connection to tunnel washer for removal of bedding captured in the tunnel washer wash module.

E. Safety:

1. The Bedding Disposal System is equipped with the following active safety devices in order to protect both operators and maintenance personnel and to disable the machine in the event of component failure:
  - a. General security switch installed on the door of the control cabinet.
  - b. Emergency pushbuttons are located on the main electrical cabinet, the waste funnel control panel and the waste container.
  - c. Manual operations and modifications are only allowed via the Supervisor's password.
  - d. Air pressure switch on the compressed air line.
  - e. Protection panels covering all the electromechanical equipment.
  - f. Air pressure switch mounted on the filter unit.

F. Required Utilities

CE	SERVICE	CONNECTION	SERVICE REQUIREMENTS
E ds	Electrical supply	Electrical Box - Disposal Station / Wash Area	Voltages & Frequency: 480V 60Hz Type: 3PH+ground FLA: 12 A Required Fusible Disconnect: 15 A
Econt	Electrical supply	Electrical Box - Loading Dock / Container	Voltages & Frequency: 115V 60 Hz Type: 1PH+ground FLA: 2.5 A Required Fusible Disconnect: 15 A

E	Electrical supply	Electrical Box - Technical area	Voltages & Frequency: 480V 60Hz Type: 3PH+ground FLA: 52 A Required Fusible Disconnect: 70 A
A1	Compressed air	Ø 12 mm - Technical Area	Dynamic pressure: 87 PSI Min flow rate:3.2gal/m at 87 PSI Quality: filtered, dry and oil free
A1	Compressed air	Ø 12 mm - Disposal Station	Dynamic pressure: 87 PSI Min flow rate:3.2gal/m at 87 PSI Quality: filtered, dry and oil free
SE	Exhaust	Thimble - Technical Area	Min flow rate: 915 CFM

## 2.2 VACUUM BEDDING DISPENSING SYSTEM - EASYBHS - CLEAN SIDE

- A. 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. <sup>(ADD#02)</sup>

~~Sole Source Manufacturer:~~ <sup>(ADD#02)</sup>

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### B. Operation

1. Clean animal bedding material is emptied into the loading funnel located in the designated storage area. The central vacuum unit pneumatically draws the clean bedding materials from the loading funnel via vacuum to the bedding dispenser in the cage-wash area. The loading funnel shall allow the use of large tote bedding bags (e.g. 1.3yd3).

### C. System description

1. The system shall consist of the following main components:
  - a. In-line bedding dispenser for tunnel washer applications
  - b. Loading funnel for large tote bags applications
  - c. Bulk bag lifter/hoist assembly designed to fit under ceilings of minimum 9' in height
  - d. Integral technical skid including filter unit, electrical control panel, vacuum pump managed via inverter. Entire skid to be able to be moved with pallet jacks for move-in and installation.
2. The system shall be designed to cover the following scenario:



- a. The system shall be design to be monitored and controlled via internet connection with any portable device, it shall also include teleservice capability for remote diagnostic and problem solving activities performed by the supplier.

	Value	Unit of measurements
Max number of RODENT cages	10.000	#/week
<b>Transportation Line (from loading funnel to dispenser) - Case 1:</b>		
Max horizontal distance	131	Feet
Max vertical distance	26	Feet
Max number of large radius bends	5	#
<b>Air Return Line (from dispenser to technical box) - Case 1:</b>		
Max horizontal distance	131	Feet
Max vertical distance	26	Feet
Max number of elbows	5	#

- b. The system shall be designed following the ATEX 94/9/CE directive/NFPA directive and the components used will be compliant with ATEX 94/9/CE directive/NFPA directive.

#### D. System Features

##### 1. Bedding Dispenser: In-line dispenser with cage inverter:\_

- a. The dispenser will be located in the clean side of the washing area at the end of the tunnel washer. The unit shall feature:
- 1) an AISI304 S/S motorized roll conveyor
  - 2) a pneumatic prismatic gripper to automatically invert upside down cage bases with 100% accuracy and repeatability
  - 3) as alignment system to precisely present cage bases under the individual dispensing points
  - 4) a minimum of 3 dispensing point inclusive of dust containing system. The dispensing is automatically triggered by the system. No "rain fall" dispensing admitted.
  - 5) two vibration level sensors for high and low bedding volumes. The unit will automatically shut off the flow of material when it is full and it will switch on the flow of material when it is empty
  - 6) operator shall collect cage bases at the end of the line to an height which is minimum 35.5''
- b. Provide safety enclosure around cage inverter to protect operator from moving parts. Include access doors for removal of inverter if needed. Access door to be protected via proximity sensors tied into the emergency circuit.

##### 2. Loading Funnel:

- a. The loading funnel is located in the designed storage area. It is the point of entry for clean bedding material into the pneumatic transportation system. The loading funnel shall be provided with:
- 1) A control panel (to activate/deactivate the system, visualize and reset alarm status)

- 2) A vibration level sensor to detect automatically when the funnel is empty and rise a consequent warning message
  - 3) Anti-vibration pads to prevent transmission to the floor
  - 4) False-air line to dilute product
  - 5) An intercept valve to separate conveying line and funnel
  - 6) A flushing system for cleaning of the conveying line after every transportation from funnel to dispenser
3. Bulk Bag Lifter/Hoist Assembly:
- a. The lifter assembly is located in the designed storage area. It is the mechanism for ergonomically lifting bedding into place for entry into the system. The assembly shall be:
    - 1) Bulk bag lifter frame to be of painted steel construction
    - 2) Hoist to be rated for minimum 1 ton of weight
4. Vacuum Pump:
- a. Vacuum pump will be located in the technical area and shall be sized in order to generate the required vacuum to transport material from the loading area to the wash area. The technical box shall feature:
    - 1) a vacuum relief valve to ensure cooling of the pump when all vacuum outlets are closed
    - 2) a safety filter to protect the pump in case of main filter malfunctioning
    - 3) an epoxy-coated carbon steel chassis
    - 4) sound level does not exceed 80dBA at one meter distance from the chassis
    - 5) an inverter to manage the vacuum pump
    - 6) a visual pressure gauge for service purposes
    - 7) a motor size of minimum 9.5kW
    - 8) a pump thermal overload protection
5. Filter Unit:
- a. Filter unit will be located in the technical area and shall be designed to separate air-borne dust from the air going back to the vacuum pump. Dust is to remain outside of the filtering element whilst clean air is to be drawn inside the filters. The filter unit shall feature:
    - 1) a minimum of 80ft<sup>2</sup> filtration area with quick disconnect cartridges
    - 2) self-cleaning capability be performed by compressed air reverse pulse
    - 3) a S/S304L bin to collect the dust removed by the self-cleaning operations
6. Control Panel:
- a. Hardware:
    - 1) Standard, commercially available PLC control with operator interface control panel.

- b. System Features:
    - 1) Controls system functions, monitors operation and alerts operator of alarm conditions as it occurs or on demand.
    - 2) Indicate alarm conditions in visual and audio mode.
    - 3) Lite View Interface: Allow access via Smartphone or Tablet app to mirror touchscreen functions, view data, pass messages, and allow Supervisor access to settings and adjustment of cycle settings.
  - c. Control Panel Features:
    - 1) Microprocessor, PLC controller and electronic components shall be housed in insulated control box
    - 2) Control box is UL and CE compliant.
7. Control panel to IP55 minimum
- a. Operator interface:
    - 1) Backlit color touch screen LCD digital display.
    - 2) Language: English, and Spanish required.
  - b. Information display on control panel includes but is not limited to:
    - 1) Run status
    - 2) Real time in-process performance data.
8. Vacuum Piping:
- a. The conveyance vacuum piping will be installed on an agreed route across the building. The material transport pipe-work shall feature:
    - 1) a minimum airflow of 470 CFM
    - 2) an air speed of 82fps
    - 3) a depression around -160mbar
    - 4) a S/S304L with minimum thickness of 1,5mm construction for pipes, bends and joints
    - 5) To be blasted clean by compressed air and degreased prior to installation.
    - 6) Joints are to be made of antistatic rubber lined mechanical clamps and individually grounded.
    - 7) Installation specifications to be submitted as part of the bid documentation.
9. Materials and Finishes
- a. Dispenser AISI304L stainless steel/ABS Plastic
  - b. Loading funnel AISI304L stainless steel
  - c. Vacuum pump chassis Epoxy-coated carbon steel
  - d. Filter tower AISI304L stainless steel/Epoxy-coated carbon steel
  - e. Conveyor pipes AISI304L stainless steel
  - f. Conveyor bends AISI304L stainless steel
  - g. Conveyor joints AISI304L stainless steel with antistatic rubber

10. Safety

a. The Bedding Dispensing System is equipped with the following active safety devices in order to protect both operators and maintenance personnel and to disable the machine in the event of component failure:

- 1) General security switch installed on the door of the control cabinet.
- 2) Emergency pushbuttons are located on the main electrical cabinet, the loading funnel control panel and the bedding dispenser
- 3) Safety enclosure is provided around cage inverter to protect operators from moving parts. Access doors are protected by proximity sensors that are tied into emergency circuit.
- 4) Manual operations and modifications are only allowed via the Supervisor's password.
- 5) Air pressure switch on the compressed air line.
- 6) Protection panels covering all the electromechanical equipment.
- 7) Air pressure switch mounted on the filter unit.

11. Utility requirements

CE	SERVICE	CONNECTION	SERVICE REQUIREMENTS
Ewa	Electrical supply	Washing area Electrical Box - Dispenser	Voltages & Frequency: 480V 60Hz Type: 3PH+ground Required Fusible Disconnect: 30 A
Elh	Electrical supply	Loading Hopper/Hoist	Voltages & Frequency: 480V 60Hz Type: 3PH+ground Power required:- kW Required Fusible Disconnect: 8 A
E	Electrical supply	Technical area Electrical Box	Voltages & Frequency: 480V 60Hz Type: 3PH+ground Power required: -- kW Required Fusible Disconnect: 40 A
A	Compressed air	Ø 12 mm - Technical Area	Dynamic pressure: 87 PSI Min flow rate:3.2gal/m at 87 PSI Quality: filtered, dry and oil free
SE	Exhaust	Thimble - Technical Area	Min flow rate: 470 CFM

**2.3 REINFORCED NEGATIVE CONTAINER**

**A.** 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. <sup>(ADD#02)</sup>

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

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- B. Unit consists of a 20 cu. yd. roll-on / roll-off vacuum rated waste container, such that as material is transported through the conveyance pipe network, it is deposited directly in the waste container.
- C. Construction: Heavy-Duty steel frame
- D. Controls: Non-proprietary PLC based remote control panel
- E. Electrical Requirements:
  - 1. Waste Container: 120V, 60 Hz, 1 phase, 1A
  - 2. Remote Control Panel: 460 VAC, 60A, 3P
- F. Options:
  - 1. Ultra-sonic transmitter to continually feed back level of waste material inside container
  - 2. Safety switches to insure hoses are properly installed after waste container is emptied
  - 3. Inspection door for easy access.
  - 4. Leveling screw to even out the material inside the container allowing for longer intervals between dumping.
  - 5. Inlet and outlet connected via cam fittings and flexible hose.

#### 2.4 CONVEYANCE PIPING NETWORK SYSTEM

- A. 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)

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- B. Stainless Steel multi-phase negative pressure piping tube system to carry either clean or waste bedding. The system shall include all components necessary for the operation such as the vacuum power unit, filters and materials receivers and microprocessor control systems.
- C. Construction:
  - 1. All conveyance pipe, sweeps and fittings are constructed of 16 gauge, 304 stainless steel with a minimum wall thickness of 0.065".
  - 2. All sweeps will maintain a center line radius of a minimum 10 times the conveyance piping diameter.
  - 3. All conveyance pipe shall be statically grounded from pick-up point to the exhaust filter.

4. All sections of the pipe or sweeps shall be joined together by three bolt compression couplings that are rubber lined and shall utilize a static grounding strap.
5. 18" long clean out ports shall be provided at various points within the conveyance piping.
6. Maintenance gate valves shall be provided at various points within the conveyance piping.
7. All pipe supports shall utilize industrially accepted trapeze supports or J-Hook clamps.

D. Controls:

1. Non-proprietary PLC based remote control panel to be integrated with the facility data collection system.
2. Maintenance functions shall include all systems sensors and a touch Screen provides for a status indicator of the sensors.

E. Electrical Requirements:

1. Central Vacuum Power Unit: 460 VAC, 50/60A, 3P, 30A
2. Control Panel: 460 VAC, 60A, 3P
3. Filter Separator: 120V, 50/60HZ, 3P, 30A
4. Allergen Dust Collector: 120V, 50/60HZ, 3P, 30A

F. Options:

1. Primary Filter Separator: To remove dust and debris down to 99.9% efficiency at 1 micron particle size.
2. Vacuum Power Unit: HEPA rated and sized to the specific requirements for the facility. Unit shall include an Odor Control Unit composed of a blend of activated carbon and ammonia media to eliminate the organic and acidic odors associated with the animal care facility.
3. Allergen Dust Collector: Hood designed to create a face velocity across the bedding disposal station and capture / control dusts and allergens as they rise up.

## 2.5 BULK BAG DISCHARGE STATION AND HOIST

- A. 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. <sup>(ADD#02)</sup>

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- B. The system consists of a motorized electric hoist and trolley system to transport 50 lbs. bedding bags to a bulk bag discharge station, before the material proceeds to the filtered material receiver.

C. Components:

1. Hoist and Trolley System
2. Bulk Bag Discharge Station (Bedding Feed Bin)
3. Filter Receiver:
4. Dust Collector System
5. Remote Control Panel

D. Electrical Requirements:

1. Hoist and trolley system: 460 VAC, 50/60A, 3P, 20A
2. Bulk Bag Discharge Station (Bedding feed Bin: 460 VAC, 50/60A, 3P, 15A
3. Filter Receiver: 460 VAC, 50/60A, 3P, 30A
4. Dust Collector System: 120V, 50/60HZ, 1P, 30A
5. Remote Control Panel: 460 VAC, 60A, 3P

**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.
- B. 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. As 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.

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