SECTION 11 71 02
LABORATORY WASHING

PART 1 - GENERAL

1.1 DESCRIPTIONS

This section specifies Sterilization Equipment including steam sterilizers.

1.2 DEFINITIONS

A. 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 throughout environments, autoclaves with very large floor-level chambers capable of accepting “roll-in” racks of cages or other items may be needed.

B. Sterilizer Enclosure Panels: Removable Stainless Steel metal panels used to fill the gaps between the tops and sides of freestanding sterilizers to the surrounding walls and ceilings while allowing service access.

1.3 RELATED WORK coordinate with HVAC

A. Section 01 91 00, General Commissioning Requirements
B. Section 22 11 00, FACILITY WATER DISTRIBUTION
C. Section 22 13 00, FACILITY SANITARY SEWERAGE
D. Section 22 66 00, CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES
E. Section 22 15 00, GENERAL SERVICE COMPRESSED-AIR SYSTEMS: Connections to Compressed Air System.
F. Section 22 40 00, PLUMBING FIXTURES.
G. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

H. Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Steam Connections
I. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Remote monitoring of the Steam Sterilizers.
J. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Electrical Connections.
K. Section 22 31 00, WATER SOFTENERS
L. Section 22 67 19.16, REVERSE OSMOSIS EQUIPMENT
M. Section 22 67 21, WATER DEALKALIZING SYSTEM
N. Section 23 08 00, Commissioning of HVAC System

1.4 PERFORMANCE REQUIREMENTS

A. Equipment shall have built-in monitor 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 23 05 11, 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 appropriate 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.

I. ASME Compliance: Fabricate and label steam-generating and direct steam heating equipment to comply with ASME Boiler and Pressure Vessel Code.

J. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 SUBMITTALS

A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data: Include the following:

1. Illustrations and descriptions of laboratory washing, cleaning, filling, drying, 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. Operating Instructions: Comply with requirements in specification Section 01 00 00, GENERAL REQUIREMENTS.

F. 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.

G. Air compressor systems (Provide certified compressor test data at start-up.):

1. Compressors: Manufacturer and model.
2. Characteristic performance curves.
3. Compressor operating speed (RPM).
4. Capacity: Free air delivered at indicated pressure (L/s) (SCFM).
5. Type of bearing in compressor.
6. Type of lubrication.
7. Type and adjustment of drive.
8. Electric motors: Manufacturer, frame and type.
9. Speed of motors (RPM).

10. Current characteristics and horsepower of motors.
11. Receiver capacity and rating.
12. Air silencer: Manufacturer, type and model.
13. Air filters: Manufacturer, type, model and capacity.
14. Pressure regulators: Manufacturer and capacity.
15. Dew point monitor: Manufacturer, type and model.
16. Air dryers: Manufacturer, type, model and capacity (L/s) (SCFM).
17. Carbon monoxide monitor manufacturer, type and model.
18. Aftercoolers.

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):
ST79-2006.....Comprehensive guide to steam sterilization
ST8-2008.....Hospital Steam Sterilizer, 3rd edition
ST55-2008.....Table-top Sterilizers

C. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06.....Metal Finishes Manual

D. Underwriters Laboratories):
UL Standard 61010-1

1.8 WARRANTY

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 STEAM STERILIZER

A. Chamber:
   1. Interior: Type 316 Stainless steel.
   2. Chamber Sizes: 20” x 20” opening x 28” deep.
   3. Chamber Pressure: up to 50 PSIG.
   4. Chamber Temperature: 110 – 135 degrees C (230 - 275 degrees F).
   5. Chamber Penetration: One, 1-inch welded chamber bushing for customer use.
   6. Insulation: Insulate pressure vessel per manufacturer’s standard fiberglass insulation assembly. Clad pressure vessel insulation in manufacturer’s standard sheet metal cladding.

B. Doors:
   1. Quantity: Single
   2. Operation: Power.
   3. Configuration: Vertical sliding Front opening
   4. Chamber Door: Type-316L stainless steel insulated door panel, satin finish, vertical grain. Equip with mechanical locking mechanism to ensure door cannot be opened as long as gasket is intact and energized by chamber pressure, and safety switch to prevent steam from entering chamber when door is not in closed position.
      a. Door Seal: Compressed air activated gasket, recessed in door panel. Gasket retracts automatically at end of cycle. Gasket to be capable of being manually retracted for emergency chamber access due to loss of vacuum or power. Provide integral air compressor with sterilizer.

C. Standard Cycles: Gravity and liquid.

D. Steam Source: Carbon steel electric steam generator.

E. Electrical Requirements:
   1. Control Panel: 110V.

2. Integral Steam Generator: 110V.
3. Air Compressor: 110V.

F. Loading: Manual.

G. Recorder: Integrated Printer. Verify that integrated printer hardware is protected from moisture, and readily accessible for repairs and paper changes.

H. Control Options: Integrated controls .Provide remote monitoring of the steam sterilizer via the DDC control system. Coordinate interface with Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

I. Installation Options: Floor mount with adjustable height galvanized steel frame assembly.

J. Cabinet Configuration: Enclosed/freestanding, with fascia, sides and top. Service access as indicated on Drawings.

L. Piping and Components: Manufacturer’s standard piping and components, unless otherwise indicated.
1. Effluent Controlled Configuration: Provide for sterilization of effluent, air and aerosol contaminants for biological safety level applications, prior to release to sanitary sewer. Cool the effluent prior to release.

M. Accessories:
1. Loading car and transfer carriage.
2. Seismic Restraint: Anchor and brace sterilizer to building structure; allow for leveling.

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

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 01 00 00, 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 23 08 00 – 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 23 08 00 –

COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

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