

SECTION 11 71 00
MEDICAL REPROCESSING AND STERILIZATION EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTIONS

This section specifies Medical Reprocessing and Sterilization Equipment including washer/disinfectors, cart washers, ultrasonic cleaners, sterile drying cabinets, steam sterilizers, ethylene oxide (EtO) abator, ethylene oxide (EtO) monitoring stations, detergent dispensing system, water filtration system, steam gun, air guns, and sterilizer enclosure panels (modular walls).

1.2 DEFINITIONS

- A. Ultrasonic Cleaner: A mechanical system that uses sound waves, water and detergent to loosen soil from instruments. Both countertop and floor units are available.
- B. Washer/Disinfector: An automated washing unit that uses high-temperature water and detergent to clean and high-level disinfect instruments and trays.
 - 1. Cube Model - Single chamber washer/disinfector.
 - 2. Tunnel Model - Multiple chamber washer/disinfector.
- C. Cart Washer: An automated washing unit that uses high-temperature water and detergent to clean and high-level disinfect carts and equipment.
- D. Endoscope Drying Cabinet: Freestanding cabinet used to dry endoscopes with forced, filtered air within the cabinet, as well as through the channels of the scopes.
- E. Equipment Drying Cabinet: Freestanding cabinet used to dry equipment with forced, filtered air and variable temperature settings. There are single door and pass-thru units available.
- F. Automated Endoscopic Re-Processor (AER): Automated washing unit that uses water and EPA-approved high level disinfectants to clean and high level disinfect immersible, flexible endoscopes.
- G. Steam Sterilizer: A machine used to sterilize instruments and equipment by subjecting them to high-pressure steam up to 275°F. Sterilizers are available in both cart-loading and floor-loading models. They can be either freestanding or recessed, with single or double doors (pass-thru). Steam sterilizers are also known as autoclaves.
- H. Ethylene-Oxide (EtO) Sterilizer/Aerator Combination: A machine that combines the sterilization and aeration process into one unit. Ethylene

Oxide gas is used to sterilize heat-sensitive instruments and equipment by subjecting them to a temperature of up to 130°F, and an aeration cycle immediately follows the sterilization cycle. ETO sterilizers can be freestanding or recessed, with single doors. A dedicated exhaust system is required for Ethylene Oxide.

- I. Ethylene Oxide (EtO) Disposal System (Abator): A machine used as a pollution-control device, that converts ethylene oxide gas exhausted from sterilizer/aerator units to CO2 and water vapor through a heated catalytic process.
- J. Ethylene Oxide (EtO) Monitoring Station: A continuous monitoring device (Single point or multi-point system) used to detect Ethylene Oxide leakage into the room.
- K. Gas Plasma Sterilizer: A machine that uses hydrogen peroxide gas plasma to sterilize heat-sensitive instruments and equipment. These sterilizers are available as either floor, cart, or counter-mounted.
- L. Liquid Chemical Sterilizer: A machine that uses a low-temperature liquid chemical sterilant to process heat-sensitive rigid and flexible endoscopes.
- M. Water Treatment System: A mechanical system for use with steam sterilizers, washer/disinfectors and cart washers, that decreases the contaminants in the municipal water to reduce boiler scaling and instrument spotting.
- N. Detergent Dispensing System: A mechanical system that dispenses measured doses of detergent or other chemicals directly to washer disinfectors and cart washers.
- O. Steam Gun: Refer to Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING.
- P. Endoscope Pre-Processing Sink: Refer to Section ~~22-40-00~~ 12 31 00, PLUMBING-FIXTURES MANUFACTURED METAL CASEWORK.
- Q. Air Gun: A fully assembled self-storing poly-urethane compressed air blowing device.
- R. Decontamination Adjustable-Height Clean-up Counter: Refer to Section 12 31 00, MANUFACTURED METAL CASEWORK.

1.3 RELATED WORK

- A. Section 22 11 00, FACILITY WATER DISTRIBUTION and Section 22 13 00, FACILITY SANITARY SEWERAGE Section 22 66 00, CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES: Plumbing Connections.
- B. Section 22 40 00, PLUMBING FIXTURES.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- D. Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Steam Connections, Steam Gun.
- E. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Remote monitoring of the Steam Sterilizers and EtO Monitoring system.
- F. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Electrical Connections.

1.4 PERFORMANCE REQUIREMENTS

- A. Equipment shall have built-in monitoring for timed cycles, and control devices for proper 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.

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.
- 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 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 that 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: Installer is authorized representative of sterilizer manufacturer and employs factory-trained personnel to install sterilizers. Installer is licensed as may be necessary by regulatory organizations.
- H. Steam Sterilizers: Comply with the most current version of ANSI/AAMI ST8.
- I. Ethylene-Oxide Sterilizers: Comply with the most current version of ANSI/AAMI ST24.

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 medical reprocessing equipment.
 - 2. Optional auxiliary equipment and controls.
 - 3. Catalog or model numbers for each component.
 - 4. Utility requirements.
- 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.

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):
 - ST8-2008.....Hospital Steam Sterilizer, 3rd edition

ST24-1999 (R2009).....Automatic, General-Purpose Ethylene Oxide
Sterilizers and Ethylene Oxide Sterilant
Sources Intended for Use in Health Care
Facilities

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

1.8 WARRANTY

Comply with FAR clause 52.246-21 in all areas except for warranty period, which shall be two years for all equipment.

1.9 GUARANTEE PERIOD SERVICES

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 ULTRASONIC CLEANER

A. Standards:

- a. EMC Directive 89/336/EEC, 93/68/EEC
- b. Low Voltage Directive 73/23/EEC, 93/68 EE
- c. ETL Listed
- d. UL Standard 61010-1
- e. UL Standard 61010A-2-010

B. Features: Basis of Design: Caviwave Sonic Console Washer to match existing, or equal.

- a. Supply all components necessary to obtain a complete working unit ready for installation and connection to facility service lines.
- b. Optimum Ultrasonic Cleaning power ensured by constant power output generators operating at 132kHz and complemented with complex resonance frequencies to ensure lock-box cleaning

efficiency. Generators to be mounted with individual slide out modules for ease of service. Transducer modules are to be bonded to the wash tank providing maximum energy transmission for instrument cleaning.

- c. Automatic Lid and Load Tray Elevator should elevate loading trays to convenient working height and oriented laterally for ease of loading heavy trays.
- d. Port Flushing system to process up to six rigid lumened surgical devices with both ultrasonic energy and internal flushing.
- e. Instrument Lubrication Cycles to help keep instruments functioning properly and promote efficiency in the surgical suite, to be injected into the rinse phase.
- f. Illuminated Main Controls to include power on/off, automatic fill, drain alert with cycle counter, adjustable wash cycle timer, drain actuator, and lid actuator.
- g. Locking Caster Wheels for ease of movement.
- h. Large Capacity Process Tanks to accept a variety of instrument trays. 20 gal. should accommodate 35lbs of instruments.
- i. Automatic Pushbutton Ultrasonic Drain with indicator light and built-in counter to provide wash cycle number tracking, alerts operator when ultrasonic tank needs draining. Adjustable drain count (default 12 cycles).
- j. Toe Touch Control lowers the instruments into the cleaning solution and starts the processing cycle. When the cycle is complete, the lid automatically opens and the tray is raised to unload position.
- k. Two Chemical Probes are to be provided for one gallon containers of detergent and/or lubricant
- l. Safety Interlocks and Controls to ensure operator safety.
- m. Front and Side Service Access Doors are to be provided for ease of maintenance, Access doors are to be scratch and dent resistant and sound dampened. Front doors should have automatic power cut-off feature to protect components when doors are opened.
- n. Distilled Water and Instrument Lubricating Spray provides proper instrument lubrication.

- o. Rinse Chamber should provide the following:
 - i. External water spray.
 - ii. Internal flushing.
 - iii. Pure water rinse and lubrication.
 - iv. Filtered compressed air through lumen devices.
 - v. Heated circulate air through tank chamber.

C. Utility Requirements:

- a. Electrical: 208/240 Volt, 60Hz, 1-phase (4 wire) or 3-Phase (5 wire including neutral and ground).
- b. Drain: 1 ½" NPT CPVC Male Slip
- c. Distilled Water: ½" NPT CPVC Male Slip (15-50 psi); 100-120F
- d. Hot Water: ½" NPT CPVC Male Slip (15-50 psi); 100-120F
- e. Cold Water: ½" NPT CPVC Male Slip (15-50 psi); 40-60F
- f. Air: ½" NPT Brass (25-30 psi) (5-7 cfm).

2.2 WASHER/DISINFECTORS

- A. Features: Basis of Design: Steris Reliance Synergy Washer/Disinfector to match existing, or equal.
- a. Standards:
 - i. UL 61010-1 ,2nd ed.
 - b. Exterior Dimensions: Approx. 42"w x 80"h x 36"d
 - c. Interior Chamber: Must be compatible with facilities existing 2-shelf racks and trays (Steris Reliance).
 - d. Doors:
 - i. Automatically operated doors, operated using touch pads located on the control panel, may be opened manually in the event of power failure.
 - ii. A door interlock shall be provided to prevent cross contamination
 - iii. Vertically Sliding doors with tempered and tinted glass to allow view of chamber with doors closed.
 - e. Pump:
 - i. Stainless steel dual-speed motor. High speed shall provide the equivalent capacity of a 7.5 hp motor, 240 gal./min. at 70ft head pressure. Low speed provides the equivalent of 2.0 hp motor, 90 gal./min. at 25ft head pressure. Pump impeller shall be mounted directly on the motor shaft without additional bearings. Motor

- shall be equipped with a drip proof frame, magnetic starter, overload protection, and sealed bearings.
- ii. Pump, spray system, and all recirculating piping are to be stainless steel.
- f. Heating Coil shall maintain water temperature up to 180F during Wash phase, and 203F during the Thermal Rinse phase.
- g. Rotary Spray assemblies shall be positioned at top and bottom of chamber. Manifold shall have Bi-directional rotary arms positioned at the top and bottom of each load shelf.
- h. Luminaire shall be provided within an explosion/vapor proof enclosure to illuminate chamber interior.
- i. Wash Chamber shall be constructed of stainless steel, argon-welded, of sanitary-type design for complete drainability. All horizontal fixed surfaces shall be sloped, with no dead legs more than 6x pipe diameter. Complete drain water sensor detects the presence of water in the piping.
- j. Chamber exterior shall be constructed of double-walled insulated stainless steel.
- k. Chemical injection pumps for automatic enzyme and detergent injection shall be provided.
- l. Low-level sensor is to be included to indicate when detergent level is low.
- m. Pulsed enzyme treatment, following the Pre-wash phase, is proceeded with hot tap water. Enzyme level is to be adjustable between ½ to 2.0 oz./gal.
- n. Drying system, circulating HEPA filtered air through piping, accessories, and chamber, shall include 1.5 hp blower at 60 Hz. Three electric heaters totaling 10.1 hp heat maintain chamber air temperature at 180F or 210F.
- o. Vent chamber exhaust through 3" OD vent connection on top of chamber.
- p. All chamber incoming air shall pass through a HEPA filter during drying phase to prevent contamination.
- q. Control Panel, mounted at eye level to the right of chamber, shall provide pre-programmed, adjustable cycles as well as custom programmable cycles. Once cycle is started, programmed

values are locked in and cannot be changed until the cycle is completed.

- r. Decontamination cycle shall be provided for descaling chamber, piping, and accessories.
- s. Top utility connections are to be provided. Piping, valves, and electrical componentry shall be accessible through access panels. Ports shall be provided on the cold, hot, and pure water lines so gauges can be installed to monitor utilities.
- t. Operation:
 - i. Pre-Wash: Cold water spray cycle with adjustable recirculation time.
 - ii. Pulsed Enzyme: Hot water and enzyme detergent spray/soak alternating pattern with programmable intervals and duration.
 - iii. Wash: Hot water and detergent solution, heated to set programmable temperature and continuously sprayed for programmable interval.
 - iv. Neutralizer: Hot water heated to programmable temperature with neutralizing solution continuously sprayed for programmable interval.
 - v. Rinse: Hot water heated to programmable temperature continuously sprayed for programmable interval.
 - vi. Thermal Rinse: Hot water heated to programmable temperature is sprayed for programmable interval
 - vii. HEPA filtered Drying: Hot filtered air at programmable temperature is recirculated over equipment for programmable duration.
- u. Controls:
 - i. Power-Off/Standby
 - ii. Printer:
 - 1. Printer shall have capability of printing actual chamber water temperature and air temperature during Drying
 - 2. Printer shall generate a complete printout of all currently set cycles and cycle values.

3. Printer shall provide a printed record of whether loads are properly rinsed at the preset temperature
 4. Printer shall provide a complete list of the alarm and abort in-cycle messages.
- iii. Control Panel shall consist of display window and membrane-type touch pads, and shall have the following characteristics:
1. Operable on both load and unload side of equipment.
 2. Status indicator showing cycle status, time, temperature, warnings and messages, and shall indicated abnormal conditions which may exist when a cycle is in progress. Messages shall be complete readouts with no codes to be cross-referenced.
 3. Manual operation and status touch pads shall provide the ability to view available cycle menus, and to double cycle time during processing, acknowledge alarm conditions, and open or close the power chamber doors.
 4. PIN code access for supervisors/operators.
- iv. Emergency Stop switches shall be provided on load and unload sides of washer/disinfectors.
- v. Device shall be compatible with facilities independent monitoring equipment and building automation systems.
- vi. Remote Air Compressor
- vii. Drain Discharge Cool Down: Reduce drain water temperature at drain not to exceed 140F.
- viii. Steam Condensate Return Cool Down: Reduce condensate return temperature not to exceed 140F
- ix. Seismic Tie-Down Kit:
- x. ProConnect Response Center: Compatible with facility equipment in use at this time.
- xi. Utility Connections:
1. Steam:
 - a. ½" NPT,

- b. 30-80 psig dynamic
 - c. Max static pressure 90 psig
 - d. Max flow rate 300 lbs/hr at 80 psi.
 - 2. Condensate Return:
 - a. ½" NPT.
 - b. Peak flow rate 0.67 gal./min. with no back pressure
 - 3. Air:
 - a. 1/8" NPT,
 - b. 65 static to 125 dynamic psi.
 - c. Max. flow rate 1 scfm.
 - d. Max. particle size: 40 micron.
 - e. Max particle density 10 mg/m3.
 - f. Oil concentration 25 mg/m3.
 - g. Max dewpoint for water content 45F per ISO-8573-1
 - 4. Ventilation:
 - a. 3" O.D. connection.
 - b. Max. flow rate 60 scfm.
 - 5. Drain:
 - a. 1 ½" NPT CPVC male slip
 - 6. Electrical
 - a. 208v, 60Hz, 3 Phase, 4 Wire
 - b. 27 Amps
 - 7. Telecommunications
 - a. Coordinate with facility requirements based on selected model. Independent monitoring is required.
- B. Conveyor System: Must be compatible mechanically and electronically with existing and new washer/disinfectors (Steris Reliance Synergy SCS System). System includes:
 - 1. Conveyor Extension Module
 - 2. Semi-Automated Conveyor Module
 - 3. Return window
 - 4. Motorized Washer Tray Return
 - 5. Motorized Conveyor Module

2.3 CART WASHERS

- A. Interior: Stainless steel.
 - 1. Chamber Capacity: 186 cu. ft.
- B. Doors:
 - 1. Quantity: Double (Pass-thru).
 - 2. Operation: Sliding Automatic.
- C. Controls: Microprocessor Based.
- D. Heat Source: Steam.
- E. Electrical Requirements: 208V / 3 phase / 60 hz / 50A.
- F. Standard Cycles: Wash, Rinse, Dry.
- G. Optional Cycles: Thermal Disinfection Rinse.
- H. Installation Options: Pit mount.
- I. Temperature:
 - 1. Wash Cycle: 120 - 180°F.
 - 2. Rinse Cycle: 180 - 194°F.
- J. Loading: Manual.
- K. Required Features:
 - 1. Sliding Doors
 - 2. External dimensions: Height 102in, Width 120in, Length 151.5in
 - 3. Chamber net usable dimensions: 106.5" L x 39.25" W x 78.75" H.
 - 4. Must be capable of washing, rinsing and drying case carts, sterilization containers, basin racks, and similar items.
 - 5. Washer must be equipped to spray carts from 360°.
 - 6. Washer must be capable of washing carts of different heights.
 - 7. Chamber doors must not drip outside of chamber when open.
 - 8. Washer must recycle wash water.
 - 9. Tracks must tilt a minimum of 8" for better water runoff.
 - 10. Washer must be flush with floor with a 5" deep pit.
 - 11. Total cycle time: approx. 7 minutes.
 - 12. Air exhaust must be vented.
 - 13. Washer must include stainless steel panels to cover opening from wall to wall, and floor to ceiling, on both the clean and decontam sides.
 - 14. Final rinse temperature: > 95° Celsius.
 - 15. Water consumption must not exceed 11 gallons per load.
 - 16. Must have a minimum of two emergency stops inside chamber and two on the outside.

17. Maximum heat transfer to the room must not exceed 800W on each side.
18. External noise level must be less than 70 dB(A).
19. Washer must be controlled by a microprocessor with program parameters adjustable by the end user.
20. Cart washer shall use a tank wash system to reduce water use and include the ability to automatically empty and refill the tank on a daily basis

2.4 STERILE DRYING CABINETS

- A. Chamber:
 1. Interior: Stainless Steel.
 2. Capacity: Up to 10 Endoscopes.
 3. Side Venting.
- B. Doors:
 1. Quantity: 2 Double Doors.
 2. Operation: Automatic (timer)
 3. Configuration: Pass Through.
- C. Loading: Manual.
- D. Heat Source: Electric
 1. Cabinet Temperature: Adjustable up to 158 degrees F.
 2. Standard Drying Time: Up to 120 minutes.
- E. Cabinet Filtration: HEPA filtered air through chamber and internal endoscope channels. Ventilation to be through side of cabinet.
- F. Air Flow Monitoring: Constant.
- G. Electrical Requirements: 120V.

2.5 STEAM STERILIZER:

- A. Product Features: Basis of Design: Steris Amsco Evolution Steam Sterilizer to match existing, or equal.
 1. Right Hand hinged doors, compatible with existing sterilizers (AMSCO Evolution NA Medium Steam Sterilizer)
 2. Plumbing components mounted to free-standing, modular rack.
 3. PC-based control system
 4. Touch-screen display and controls on equipment face
 5. Integral printer
 6. Standard communication interface with most PC compatible peripheral devices.
 7. Automatic check of control program and cycle data.

8. Pre-vacuum type operation
 9. Recessed door
 10. ProConnect response center
- B. Standards:
1. ASME VIII, Div. 1 for unfired pressure vessels. Provide ASME Form U-1. Device shall be constructed to withstand working pressure of 45 psig.
 2. UL Standard 61010-1
- C. Chamber sized to allow for use of existing rack/tray system.
- D. Automatic door, with fast-operating, low-effort manual lock mechanism. Provide interlock to prevent possibility of cross-contamination.
- E. Control system shall provide printed record of all calibration data for verification to current readings.
- F. Utilities Conservation Features:
1. Resistive Thermal Detectors (RTD) shall be installed for temperature control and conservation of utilities. Temperature shall be monitored at chamber drain line, within jacket space, and within chamber. RTDs shall provide accurate control inputs and readouts throughout entire cycle.
 2. Electronic water saving control to minimize water used in condensing exhausted chamber steam and condensate.
 3. Automatic utilities start-up/shutdown shall be programmed to activate at the end of any designated cycle or time of day. When activated, system shall automatically shut off all utility valves, conserving steam and water usage. Sterilizer utilities shall be restarted either by programmed time or manual operation.
 4. Insulation sleeve shall be fitted around exterior of the sterilizer vessel. Insulation shall be asbestos and chloride free, silicone impregnated, oil & water resistant.
 5. 2 Stage vacuum pump shall be supplied to pull chamber to specific vacuum levels.
- G. Processing Cycles: Pre-programmed cycles validated to AAMI/ANSI ST-8. Additional cycles shall be programmable to specific facility standards.
1. Prevacuum Cycles: for efficient, high-volume processing of heat and moisture stable materials. These process incorporate a series of vacuum/pressure pulses to condition the load prior to sterilization.
 2. Gravity Cycles:

3. Steam Flush Pressure Pulse:

4. Testing Cycles:

H. Control System

1. System shall monitor and control all sterilizer operations and functions. Preprogrammed and operator programmable cycles shall be operable from operator-accessible control functions by touch screen Operator interface control panel, on the load end of the sterilizer. Non-operating End Control Panel shall include displays found on Primary control panel, as well as emergency stop.
2. Printer shall provide documentation at beginning and end of each cycle recording all pertinent information required to verify proper execution of the cycle.

I. Construction:

1. Shell assembly shall be Stainless Steel Type 316L, welded double-walled sterilizer vessel. Pressure rating to 45 psig min.
2. Drain system shall be designed to prevent pollutants from entering into the water supply system.
3. Sterilizer shall be piped, valved, and trapped to receive building supplied steam delivered at 50-80 psig dynamic.

J. Utility Connections:

1. Drain: 2" ODT drain terminal
2. Electric: Control and Vacuum PumpL: 208-240 volt, 3-phase, 12 Amps/phase. 16A breaker.
3. House Steam: ¾" NPT, 50-80 psig dynamic, condensate free, 97%-100% vapor quality.
4. Water: ¾" NPT, 20-50 psig dynamic. 59F max. temperature
5. Compressed Air: ¾" NPT, 80-120 psig, oil-free, dehumidified, 3 cfm.

2.6 ETHYLENE-OXIDE ABATOR

- A. Must be compatible with existing 3M Steri-Vac Model 50 System.
1. 99.9% conversion efficiency, for greater than 100ppm concentration. 99.0% for concentrations less than 100ppm.
 2. Abator shall have programmable logic controller to monitor system functions throughout the process. EO flow to the unit is prohibited until the catalyst bed reaches operating temperature. The oxidation process shall be continuously monitored to ensure that oxidation stays within predetermined temperature ranges.

3. Airflow confirmation shall precede electrical heating element activation. Built in shut down delay shall allow blower to cool internal components after operation.
4. Device shall be internally wired and complete.

B. Vent Accessories:

1. Inlet Vent: Ethylene oxide vent pipe connection for vent pipe connection to sterilizer.
2. Outlet Vent: Exhaust discharge connection. Provide 3 way blender exhaust discharge fitting with exhaust duct connection to mix high temperature abator discharge with room air for low temperature abator exhaust.
3. Auxiliary Vent: Ethylene oxide emergency vent pipe connection for vent pipe connection to outdoors.

2.7 ETHYLENE-OXIDE (ETO) MONITORING STATIONS

A. System Components:

1. Electro Chemical Sensors Range 0-100 PPM (EtO/organic vapor).
2. Pre-filter to allow for greater specificity.
3. Supervisory panel where readings can be taken.
4. Alarm and strobe device (audible and visual alarm).
5. Second alarm for notification (Police, Fire Dept, etc.).
6. Provide remote monitoring of the EtO monitoring system via the DDC control system. Coordinate interface with Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

2.8 DETERGENT DISPENSING SYSTEM

- A. Configuration: Wall Mounted.
- B. Controls: Microprocessor or PC Based.
- C. Dispensing Options: Enzymatic Solution, Detergent
- D. Electrical Requirements: 120V.

2.9 WATER FILTRATION SYSTEM

- A. System to filter and de-ionize water for use in cart washers, instrument washers, and steam sterilizers.
- B. Entire system to be provided and installed by one vendor.
- C. All parts to be from the same manufacturer.
- D. Vendor to warrantee performance of entire system.

2.10 STEAM GUN

- A. Wall-mounted steam gun utilizing facility supplied steam.

- B. Steam gun is provided with a 10' high pressure steam hose, 10' detergent hose, detergent tank, two nylon brushes, and one stainless steel brush.
- C. Provides choice of steam only, steam and detergent, hot water and detergent, and hot water only.
- D. For use to clean moisture-resistant items that otherwise might require hand scrubbing.

2.11 AIR GUNS

- A. Fully assembled, self-storing polyurethane blowing unit.
 - 1. Standard version with max. dynamic blowing pressure.
 - 2. Include air shield to protect user from blowback.
 - 3. Working pressure: 10 bar.
 - 4. Working temperature range: -15 to +40 degrees C.

2.12 STERILIZER-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:
 - 1. Size panels and support members to extend from floor to finished ceiling.
- B. Panels: Fabricate panels of not less than 1.27 mm (0.050-inch) thick stainless steel, with corners welded. Insulate with 13 mm (1/2-inch) moisture-resistant, sound-deadening, material bonded to surface of back side.
- C. 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.
 - 1. Location: At each side of doors and at each vertical panel extending from floor to finished ceiling.
- D. Louvers: Stainless steel, located in panels above sterilizer doors, and with minimum clear opening area equal to 76 sq. mm/mm (3 sq. in./in.) of sterilizer width.
- E. Canopies: Locate above ethylene-oxide sterilizer doors.
 - 1. Securely attach canopies to modular wall panels to produce a tight fit.
 - 2. Join canopies, front and side panels by welding. Fabricate of same material and finish as modular wall panels.

3. Apply moisture- and corrosion-resistant coating on interior surfaces.
 4. Type: Sloping.
 5. Overhang: Overhang sterilizer doors a minimum of 305 mm (12 inches).
 6. Coordination with Air-Intake: Include air-intake opening in modular wall panel within canopy, sized to meet airflow requirements indicated on drawings.
- F. Louvered Doors: Fabricated from not less than 9.65 mm (0.38 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.
- G. 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).
- H. 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 sterilizers according to manufacturer's written instructions.
- B. Coordinate installation with related mechanical and electrical work. Provide cutouts and openings for plumbing and electrical work as indicated or as required by trades involved.
- C. Relocated equipment must meet manufacturer's requirements for new installation.

3.2 TESTS

- 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.

3.3 PROTECTING AND CLEANING

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

3.4 INSTRUCTIONS

- 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 installer.

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