SECTION 116200 LABORATORY EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: The following built-in laboratory and miscellaneous equipment:

1. Steam Sterilizer.

2. Glassware Washer

2. Canopy Hood.

B. Related Sections:

1. Architectural Woodwork: Section 064023.

2. HVAC: See drawings.

3. Plumbing: See drawings

4. Electrical: See drawings.

1.02 REFERENCES

A. The following standards are cited in this Section. They govern the work of this Section only to the extent specified in each citation.

B. American Society for Testing and Materials (ASTM).

C. Federal Occupational Safety and Health Act (OSHA) for safe handling of flammable/volatile solvents.

D. National Fire Protection Association (NFPA).

E. American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code.

F. National Electric Manufacturer's Association (NEMA), Standards Publication No. LD3 including revisions 1 through 4.

1.03 WARRANTIES

A. All equipment shall be guaranteed for a period of one year from the date of acceptance thereof against defective materials, design, and workmanship. All motors included in any specified equipment shall be provided with a five-year guarantee.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturers shall have an established organization and production facilities specializing in the manufacture of the equipment. They shall have the demonstrated ability to produce the specified equipment of the required

quality and the proven capacity to complete an installation of this size and type within the required time limits.

2. Any deviations from the specifications, including type of finish as set forth herein, must be listed in detail separate from other literature submitted.

3. The Contractor is responsible for any alterations to the mechanical or electrical service necessary to accommodate substitute manufacturer's product requirements.

1.05 SUBMITTALS

A. Shop Drawings: Submit large scale drawings indicating dimensions, materials, thicknesses, relation to adjoining work, locations of utility connections, and other details necessary to fully illustrate each item.

B. Product data: Submit manufacturer's specifications which describe the construction, features, operation, capacity, output, utility requirements, controls, and available options of each item.

C. Operating Manuals: Submit step-by-step operating instructions complete with trouble-shooting recommendations, emergency manufacturer contacts, maintenance schedule and instructions.

1.06 PROJECT CONDITIONS

A. Examine project for conditions that affect work. Do not begin installation until unsatisfactory conditions are corrected. Defects caused by unsatisfactory conditions or untimely installation shall be corrected at not cost to the Owner.

PART 2 - PRODUCTS

2.01 STEAM STERILIZER

A. Sterilizer shall be Model 9200, by Buxton Medical Equipment Corporation, Lindenhurst, New York (631-957-4500), or approved equal, in stainless steel cabinet enclosure (with stainless steel removable panels), single door type, with chamber sized 20" w x 20" h x 38" l (8.8 cu. ft. volume).

B. Pressure Vessel: Details of chamber design, material, and construction shall meet or exceed the requirements of Section VIII, Division 1 of the ASME Code (Unfired Pressure Vessels). The vessel shall bear the ASME stamp of compliance, and the applicable UL label of approval. The inner shell shall be designed for an internal working pressure of 40 psig. Jacket exterior shall be insulated with a one-inch thick foil-covered blanket of glass fiber held in place with 20ga. aluminum sheeting and secured with adequate fasteners.

C. Body: Double shell construction. Chamber shall be of all-welded construction with all interior longitudinal corners radiused. Gasket sealing surfaces of chambers shall be true and flat to assure a close, neat fit.

D. Door: Constructed from a single solid piece of type 304 or 316 stainless steel, designed to meet or exceed the requirements of the ASME code. A single-acting closing mechanism with central low heat conducting handles actuates radial locking arms to extend and clamp the arms in a continuous motion. Radial holding arms prevent leaks

by exerting pressure on the gasket. Stainless steel hinge is pivot-bearing type, self-adjusting for accurate gasket alignment. See plans for swing of door.

E. Finish: The interior surfaces of the chamber and door and all non-machined stainless steel surfaces shall have a matte finish. Door cover, fascia, and cabinet shall be stainless steel with No. 4 brushed finish.

F. Cycle Controls:

1. Controls shall be conveniently located and shall not be exposed to the heat, vapor and condensate resulting from the sterilization process. Controls shall be electromechanical in design with a chamber temperature controller and printer.

G. Utility Requirements:

1. Cold Water: 3/4" NPT, 30-50 PSIG, 12 GPM.

2. Steam Supply: 3/4" NPT, 40-60 PSIG, 120 lbs./hr. supplied by a 20 KW Electric Steam Generator with automatic blowdown mounted within the framework of the sterilizer.

3. Drain: 1" NPT, open, piped to floor drain.

4. Electrical: 120V, 60 Hz, 15A, 1P for Sterilizer, and 208 V., 60 Hz., 3 Ph., 55.6 A. for the Electric Steam Generator

H. Accessories (each sterilizer):

1. Rack.

2. Two shelves.

I. Condensate cooler: Cool condensate to below 140 degrees F. prior to discharging from unit.

2.02 GLASSWARE WASHER WITH ELECTRIC DRYER

A. Glassware washer shall be Model 4 by Buxton Medical Equipment Corporation, Lindenhurst, New York (631-957-4500), or approved equal, with steam coil and sump and external steam heat exchanger, pure water rinses without a storage tank, front loading, in stainless steel cabinet enclosure type unit with stainless steel removable panels, fully automatic programmed cycle of washing and rinsing treatments for laboratory glassware.

B. Washer shall be constructed with drop down door, and shall accommodate loads approximately 21-25" high x 26-28" wide x 26-28" deep.

C. Treatments: Programmable for unlimited rinses.

D. Controls: Washer shall be operated by an Allen Bradley SLC 500 programmable microprocessor control system with diagnostic panel. The programmer shall provide cycles for wash, rinses, mineral free water rinses, and drain. The programmer shall include power on/off, cycle start, cycle advance, cycle hold, power mineral free rinses, and a mode for automatic detergent dispensing. The controller shall be of modular interchangeable design to facilitate repairs and/or replacements. Diagnostic panel

shall signal non-standard operation.

E. Construction: Washing chamber and tank shall have coved corners and be constructed of 14 gauge type 304 stainless steel, heli-arc welded, with all welds polished. A channel base plate shall support pump motor and associated equipment. Channel cross members shall be painted with rust resistant paint. All interior and exterior surfaces shall have a polished finish.

1. Tank shall be designed to use minimum water quantity without pump captivation. Fresh water supply line shall be located at a height sufficient to prevent back siphoning. Tank shall be provided with an overflow. Floor of chamber shall be pitched to drain into tank through a removable stainless steel debris basket and pump suction screen.

2. Washing chamber shall be fitted with a 1-1/2" ID quick locking device with "O" ring for automatic connection of interchangeable holders to pump circulatory piping. Floor of chamber shall be provided with tracks matching those on interior of door to align holders with quick lock.

F. Overhead Spray System: Washing and rinsing treatments shall be applied through a stainless steel nozzle that produces a shower-like, full cone spray pattern. The nozzle shall provide large flow capacities with small droplets.

G. Door: Manually operated, drop down type with observation window. Door shall be constructed of 14-gauge, type 304 stainless steel. A safety switch shall automatically stop washer operation if door is opened during cycle.

H. Piping and Valves: All circulatory piping shall be type 304 stainless steel, sanitary constructed, with strainer and screen to prevent broken glassware from entering the washing holder. A separate debris screen removes suspended particles from circulating water. Strainer is back flushed each time machine drains. Drain valve shall be stainless steel motorized ball valve. All other valves are electric solenoid type. Pneumatically operated valves are not acceptable. Provide effluent cool-down system to ensure drain discharge does not exceed 140 F.

I. Pump and Motor: Pump shall be all 316 L stainless steel, sanitary constructed, centrifugal type with mechanical seal, powered by a closed, coupled 2.0 HP Tri-Wound motor, with a stainless steel shaft capable of delivering 80 gpm at 62 feet head pressure. Motor shall be protected by appropriate magnetic starter with overload protection and shall meet all NEMA standards.

J. Utility Requirements:

1. Electrical: 208V, 60 Hz, 3-phase, 11.5 kw, (35A circuit), plus 120 V, 20A. circuit for control, and 208 V., 60 Hz., 3 Ph., 83.0 A. for the Electric Steam Generator

2. Hot Water: 3/4" NPT 30 GPM (maximum 300 gallons/hour).

3. Drain: 1-1/2" NPT closed connection to drain (by manufacturer), 12 gallons in 10 seconds.

4. DI Water: 3/4" NPT, 15 GPM (maximum16 gallons/cycle).

5. Overflow: 1-1/2" NPT pipe to open floor drain.

6. Cold Water: ¾" NPT, 15 GPM, 30-45 PSIG (effluent cool down).

7. Steam: 1" NPT, 125 lbs./hr. @ 20-60 PSIG, supplied by a 30 KW Electric Steam Generator with automatic blowdown mounted within the framework of the washer)

8. Condensate Return: ¾" NPT.

K. Accessories:

1. 49 spindle holder for items up to 3-3/8" in diameter, and frame for 49 spindle holder.

2. Pipette holder (capacity: 400 1-ml pipettes per load) with insert holder.

3. Circular holder with rack to support basket lots of ware.

4. 6" x 6" x 6" test tube baskets. Nine (9) Baskets with adjustable covers required.

5. Transport carriage.

2.03 STAINLESS STEEL CANOPY HOOD

A. Provide stainless steel canopy hood above sterilizer and glassware washer. Provide all necessary ceiling and wall trim angles, leveling devices, vertical, horizontal and slopping surfaces for a complete and tight installation. All components shall be Type 304, 24-gage (minimum) stainless steel, No. 4 finish, with stiffeners and supports as required. All joints shall be butt-welded and ground smooth. Canopy hood suspension shall comply with seismic design requirements. Coordinate canopy hood with all equipment cutouts with selected autoclave/washer vendor's submittal data.

2.04 VENTILATED CYLINDER CABINETS WITH REGULATOR ASSSEMBLY

A. Gas Cabinet with Regulator Assembly to be housed in a cylinder gas cabinet enclosure: Model F4001 by Spectra Gases, Div. Linde Electronics and Specialty Gases; contact : John Cannestro 908-387-0300 x 4224, or approved equal. Cabinet frame and door to made of 11 gauge cold rolled steel.

1. Gaskets: Neoprene.

2. Air flow requirements: 275 scfm @ 0.1 inch water column.

3. Ventilation: Diffusion plate. Average upward air velocity is 75 feet / min. Minimum inlet velocity is 200 feet per minute.

4. Flue: One six inch diameter flue.

5. Door: Self-closing, self-latching door

6. Paint: Two coats of weather resistant white polyurethane

7. Access: Access port designed to maintain a minimum air velocity of 200 feet/ minute when wide open.

8. Window: ¼" reinforced safety glass

9. Unistruts: Vertical type for positioning panels and cylinder holders

10. Cylinder Brackets: Qty. 1 per single cabinet

11. Floor: 11 gauge cold rolled steel w/ rubber mat

12. Bolting: Four (4) holes permit bolting cabinet to floor

B. Regulator Assembly for Single Cylinder Set ups: Single Station Regulator Assembly is designed for applications that do not warrant multiple cylinder operation. The regulator assembly shall be factory-installed inside gas cabinet and shall be complete with a Regulator, multi turn outlet valve, stainless steel dual braid flexible hose 36" long pigtail with CGA Cylinder connection with integral check valve.

1. Regulator Assembly for Acetylene Gas Cylinder (at Ventilated Cylinder Cabinet in Room G427) Regulator Assembly Model 3711 in F4001 gas cabinet by Spectra Gases, Div. Linde Electronics and Specialty Gases.

    a. Cylinder regulator type Brass bar stock body and S.S. diaphragm, Teflon or Kel-F seats, Metal to Metal seals, High purity diffusion resistant type, rated at 3,000 psig maximum inlet pressure, 0-15 psig outlet pressure, Model 7130 Series Single Stage by Linde Gases.

    b. Check valves are integral to the CGA connection with Viton O-rings.

    c. Gauges: Type Brass $2^{1/2}$ inch case. Inlet: 0-400 psig b. Outlet 30"-0-30 psig Redlined.

    d. Isolation valves: Type Brass, diffusion resistant, S.S. diaphragm, packless with multi-turn handle.

    e. Cylinder leads: Dual braid stainless steel flexible type with check valves w/ CGA 510 Cylinder connection. 3,000 psig working pressure.

    f. Model 4161-FF Flash arrestor Installed on the outlet of system. Body shall be brass w/ butyl rubber seats and O rings. Maximum outlet pressure is 15 psig.

    g. Aluminum Back Mounting Plate: 12" W x 16"H; Thickness is 3/8 inch, clear anodized and functionally labeled.

    h. Entire assembly shall be helium leak checked to 10^{-5} sccs outboard with a mass spectrometer. Dead end pressure tested for 24 hours for creep.

2. Regulator Assembly for Oxygen Gas Cylinder (at Ventilated Cylinder Cabinet in Room G429) Regulator Assembly Model F37231xx001 (Old Part # 71BR-01-C-B) in F4001 gas cabinet by Spectra Gases, Div. Linde Electronics and Specialty Gases.

    i. Cylinder regulator type Brass barstock body and S.S. diaphragm, Teflon or Kel-F seats, metal to metal seals, high purity diffusion resistant type, rated at 3000 psig maximum inlet pressure, 0-100 psig outlet pressure, Model 7140-100 Two Stage by Spectra Gases.

    j. Check valves are integral to the CGA connection with Viton O-rings.

k. **Gauges: Type Brass Bourdon, $2^{1/2}$ inch case. Inlet: 0-3000 psig b. Outlet 0-100 psig.**

l. **Isolation valves: Type Brass, diffusion resistant, S.S. diaphragm, packless with multi-turn type. Note: Panel shall have 1/4" Tube compression fitted outlet.**

m. **Cylinder leads: Dual braid stainless steel flexible type with CGA 580 cylinder connection w/ integral check valve.**

n. **Aluminum Back Mounting Plate: 12" W x 10"H; Thickness is 3/16 inch, clear anodized and functionally labeled.**

o. **Entire assembly shall be helium leak checked to 10^{-5} sccs outboard with a mass spectrometer. Dead end pressure tested for 24 hours for creep.**

PART 3 - EXECUTION

3.01 EXAMINATION

A. Check project for conditions that affect work. Do not begin installation until unsatisfactory conditions are corrected. Defects caused by unsatisfactory or untimely installation shall be corrected at no cost to the Owner.

3.02 INSTALLATION

A. Deliver to the project, uncrate, place in location, and assemble all specified equipment.

B. Remove and legally dispose of all debris and crating material.

C. Coordinate with mechanical and electrical trades to assure that utilities provided are correct and that hookups are accomplished correctly.

3.03 ADJUSTING, CLEANING, AND PROTECTION

A. Correct nonconforming, poorly fitting, and damaged work. Remove and replace work that cannot be satisfactorily corrected at the Project.

B. Cover equipment for protection during remainder of construction period. Remove covering at completion of construction, inspect, and make any required final adjustments or repairs.

3.04 DEMONSTRATION

A. Demonstrate operation and maintenance of equipment to designated members of RCNJ staff.

END OF SECTION