

DIVISION 260000

REQUIREMENTS FOR ELECTRICAL WORK

Systems Description and Performance Criteria for Design/Build Procurement

PART 1 - GENERAL

1.1 SUMMARY

- A. The electrical contractor shall be responsible for the electrical design and construction of the building and provide electrical specifications and construction drawings stamped by an electrical engineer licensed to practice in the State of Maine. The electrical work includes providing all labor, materials, equipment, consumable items, supervision, administrative tasks, tests and documentation required to provide complete and fully operational electrical systems. The electrical contractor shall completely coordinate the work of this section with the work of other trades.
- B. The electrical contractor shall file documents, obtain permits and licenses, pay fees and obtain necessary inspections and approvals from all applicable authorities that have jurisdiction.
- C. The electrical contractor's work shall begin at the utility supplied transformer secondary side. Electrical work shall be complete from point of service to each outlet, fixture or device with all accessory construction and materials required to make each item of equipment or system complete and ready for operation. Electrical systems shall include the following:
 1. Complete power distribution system.
 - a. Electrical service shall be 120/208V, 400A, 3 phase, 4 wire. Meter shall be on the exterior of the building where described on the exterior elevation drawings. Main distribution panel shall be located inside the Mechanical Room behind the door. See architectural plans.
 - b. Provide a minimum of one duplex receptacle in each of the following rooms or areas: corridors, men's rooms, women's rooms, housekeeping, tel/data, and mechanical rooms. No location in these rooms shall be more than 25 feet from the nearest receptacle.
 - c. Provide a minimum of one power receptacle per wall in each of ALL spaces except storage, restrooms and closets. No location in these rooms shall be more than 6 feet from the nearest receptacle. Provide outlets at 12 inches on center above all countertops. GF were applicable per NEC. Each treatment room will be equipped with a power operated exam table supplied by the dental equipment supplier. All dental equipment in treatment rooms coordinate with dental equipment vendor. Coordinate all outlet locations with Owner prior to bid.
 - d. Provide each office and treatment room with a separate circuit. Other large load, 120V equipment shall have 20A dedicated circuits. All circuits shall have separate neutrals.
 - e. Provide power to HVAC equipment air handling unit, exterior condensing units, miscellaneous building equipment, residential equipment and appliances described by either the drawings or specifications. Coordinate with Mechanical contractor and dental equipment vendor.
 - f. Provide power for vacuum pump and air compressor provide by dental equipment supplier Henry Schein.

2. Complete interior lighting system including fixtures, exit signs, emergency lights, wiring, lamps, controls, trim and accessories.
 - a. Provide 2'x2' recessed fluorescent fixtures with acrylic lenses in bathrooms.
 - b. Provide 2'x2' recessed fluorescent fixtures with direct/indirect in all other rooms and areas with suspended acoustic ceilings.
 - c. Provide 1'x4' surface mounted fluorescent fixtures with wrap-around acrylic lenses in mechanical rooms.
 - d. Provide 1'X2' surface mounted fluorescent fixtures mounted above the door at all closets. Control fixture with door switch.
 - e. Provide recessed fluorescent downlights with black stepped baffles in gypsum soffits and ceilings except where noted above.
 - f. Provide installation of owner supplied exam lights, one per treatment room.
 - g. Provide sufficient fixtures to meet IES standard lighting levels.
 - h. Coordinate all fixture locations and types with architect. Reference the fixture layout described on the reflected ceiling plan.
3. Exterior lighting at new exterior entry doors including fixtures, wiring, lamps, controls, trim and accessories. Exterior lighting shall be controlled by photocell/time clock combination.
4. Provide recessed ceiling mounted speakers and associated wiring, trim and accessories for a sound system. Wiring shall terminate at the reception area to receive head-end equipment connection. Coordinate location of wire termination with the owner. Provide speakers in waiting.
5. Provide building security system consisting of door contacts on all exterior doors, motion sensors located throughout corridors, waiting rooms and administrative suite. Locate system control panel in tel/data closet, and keypad at vestibule.
6. Provide temporary power and lighting during construction and until the project is accepted as substantially complete by the owner. Coordinate temporary power and light requirements with the general contractor.
7. Provide cable TV cable and jack/plate at waiting are – location to be determined by owner.

1.2 SUBMITTALS

- A. The following information shall be submitted to the architect in a timely manner allowing for review and revision as may be necessary before work is begun:
 1. Name, address and telephone number of the licensed electrical engineer.
 2. Detailed engineering documents, drawings and specifications, as prepared and stamped by the engineer of record.
- B. Manufacturer's product data and installation instructions for each material and product proposed for use in areas exposed to view.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes, regulations, standards and guidelines, including but not necessarily limited to the following:
 1. National Electrical Code (NEC)
 2. National Electrical Safety Code (NESC)
 3. International Building Code (IBC)
 4. National Fire Protection Association (NFPA)
 5. Occupational Safety and Health Act
 6. Americans with Disabilities Act
- B. All materials and equipment shall be listed by Underwriters Laboratories (UL), and approved for intended service.

- C. All materials shall be new and free from defects at the time of installation. Install materials and equipment in conformance with manufacturer's written requirements.

PART 2 - PRODUCTS

2.01 RACEWAYS AND FITTINGS

- A. Rigid steel conduit, electric metallic tubing, (elbows, couplings and fittings) shall be hot dipped galvanized steel and shall conform to the latest ASA Standards.
- B. Flexible metal conduit shall be galvanized steel (NEC-350). Liquid tight flexible conduit shall be UL listed (NEC-351).
- C. Fittings for rigid steel conduit shall be cast or malleable iron bodies, cadmium or zinc plated, with taper threads and tapped holes for screw attached cover plates for installation in moist or wet locations, and shall have gaskets of an approved material.
- D. Conduit boxes, outlet, switch, junction, pull boxes, extension rings, adapters, and cover plates shall be sherardized galvanized or cadmium plated. Boxes for concealed work shall be stamped steel with stamped steel accessories. Boxes for exposed work shall be cast or malleable iron. UL listed PVC boxes and fittings may be used for concealed construction where permitted by the NEC.
- E. Rigid non-metallic conduit shall be used underground only and comply with NEC-347. Approved PVC solvent shall be used for welding PVC conduit and fittings. Furnish listed PVC expansion joints for PVC conduit runs per manufacturer's recommendations.

2.02 CONDUCTORS

- A. Conductors shall be copper Type NM were allowed by NEC.
- B. Grounding conductors shall be copper with green insulation.
- C. Copper conductors #2 and larger may be aluminum providing the following items are adhered to:
 - 1. The ampere capacity, voltage drop and conduit fill is in accordance with the NEC and equal to copper conductors specified herein.
 - 2. Prior to making any connection the aluminum wire is to be brushed and an oxide inhibitor applied.
 - 3. Lugs and connectors are to be rated cu/al compression type.
 - 4. Termination of aluminum conductors at heat producing equipment such as motors or heaters is not acceptable.

2.03 COLOR CODING OF CONDUCTORS

- A. The building power wiring shall be color coded for insulated 120/240 volt conductors where applicable. The neutral shall be white. Use green for grounding conductors.

2.04 PANELBOARDS AND BOXES

- A. Panels, cabinets, and boxes shall be code gauge steel. Boxes shall comply with NEC requirements. Concealed outlet boxes shall be of code gauge galvanized or sherardized metal not less than #14 gauge. Junction boxes shall be of code gauge steel, cast, or PVC.
- B. Panelboards shall be furnished with active breakers, spare breakers and spaces as required. Panels shall have an equipment ground bus and when indicated shall also have an insulated and isolated ground bus for computer circuits. Panels shall have main breaker or main lugs as required by the NEC. Panels shall be provided with 20% future growth capacity in mains and quantity of branch breakers.
 - 1. Each subpanel shall have a hinged door with lock and typed directory.
 - 2. Terminal connectors shall be UL listed al/cu type.
 - 3. Flush and surface mounted panels shall have factory furnished trim. Panel boxes shall be galvanized steel, code gauge, primed and painted manufacturer's standard finish. Flush panels shall be furnished with 6-3/4" empty conduits stubbed up into hung ceiling space and capped for future use.
 - 4. Panel breakers shall be UL listed quick make, quick break, thermal magnetic type. Breakers shall have interrupting ratings capable of interrupting the available short circuit fault current. HVAC refrigeration loads require HACR rated breakers. Connect panel breakers to insure proper load balance between phases.
- C. Fused and unfused switches shall be General Duty or as required. Fuses shall be furnished for fused disconnect switches. Fuses shall be dual-element of required or specified voltage and current rating. Furnish Owner with one set of spare fuses for each type installed.

2.05 GROUNDING SYSTEMS

- A. Grounding conductors shall be copper and sized per N.E.C. Article 250 - Tables 250-66 and 250-122. Green grounding conductors shall be run in all raceways and cables shall include a green grounding conductor.
- B. Panelboards shall be furnished with equipment ground bus. Panelboards supplying computer receptacles shall also be furnished with insulated/isolated ground bus. Install an isolated grounding conductor back to main ground connection point.

2.06 ELECTRIC SERVICE

- A. Contractor shall provide complete installation including meter enclosure and coordination with Central Main Power. Furnish and install the main service ground in compliance with Article 250 in the NEC.
- C. Individual feeders shall be installed from the main panel to the respective panels and/or equipment.

2.07 LIGHTING FIXTURES

- A. Fluorescent fixtures shall have electronic low harmonic distortion ballasts and T8 lamps.

- C. All lighting fixtures shall be approved by Architect/Engineer.
- D. IES Lighting handbook guidelines shall be used to determine light levels in all areas. Light level calculations shall be provided for review by the Engineer.

2.08 TELEPHONE SYSTEM

- A. Empty boxes and conduit system. Cable and terminations by Others. Quantity and locations of junction boxes shall be coordinated with the Architect and Owner.

2.09 FIRE ALARM SYSTEM

- A. Notifier, Gamewell, Simplex or equal.

2.10 COMPUTER/DATA SYSTEM

- A. Empty boxes and conduit system. Cable and terminations by Others. Quantity and locations of junction boxes shall be coordinated with the Architect and Owner.

2.11 SECURITY SYSTEM

- A. Ademco or equal.

PART 3 EXECUTION

3.01 INSTALLATION OF PANELBOARDS

- A. Set panelboards and boxes plumb with the building lines. Mount panelboards so that the top of the panel is not higher than 6'-6" AFF.
- B. Panelboards shall have engraved plastic nameplates fastened with screws.

3.02 INSTALLATION OF GROUNDING SYSTEMS

- A. Grounding shall be in strict compliance with the National Electrical Code, Article 250 and 517.
- B. Metallic conduit shall be grounded in accordance with NEC requirements; and equipment grounding conductors shall also be furnished and installed in all branch circuit and feeder raceways. Cables shall include a separate, insulated grounding conductor.
- C. Equipment grounding conductors shall be insulated copper with green jacket as covered by the NEC.
- D. The green grounding screw on all wiring devices shall be used for grounding connections.

END OF OUTLINE SPECIFICATION