## pART 1 GENERAL

1.1 DESCRIPTION

A. Provide detailed electrical design documents as indicated in these specifications and plans.

1.2 QUALITY ASSURANCE

A. All systems designs shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations.

B. Whenever the requirements of the Specifications exceed those of the applicable code or standard, the requirements of the Specifications shall govern.

C. Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:

1. American National Standards Institute (ANSI)

2. National Electric Code (NEC) with state and local amendments

3. National Electrical Manufacturer's Association (NEMA)

4. Institute of Electrical and Electronics Engineers (IEEE)

5. International Building Code (UBC) with state and local amendments

6. National Fire Code (NFC) with state and local amendments

D. Products specified shall in all cases be listed and labeled by a nationally recognized electrical safety testing organization.

## PART 2 DESIGN

2.1 DESIGN CRITERIA

A. System Voltages: Facility shall have a 480/277V, three phaseAC power service with transformation to 208Y/120V, three phase.

B. Utilization Voltages:

1. Lighting:

a. Light Emitting Diode (LED): 277V or 120V, single phase.

b. Fluorescent: 277V or 120V, single phase.

c. Incandescent: 277V of 120V, single phase.

d. High-intensity Discharge: 277V or 208V, single phase.

2. Mechanical Equipment and Motors:

a. Motors, 1 HP and Above: 480V, three phase.

b. Motors, Less than 1 HP: 120V, single phase.

c. Controls: 120V, single phase.

3. Where single phase power is taken from a three phase source, the loads shall be balanced among the three distribution phases.

C. System Capacity: Power shall be supplied from a single building electrical service. The building electrical service shall be of sufficient capacity to power all loads, with spare capacity for future loads.

D. Power Distribution: The distribution system shall be designed so that failure of any one feeder or branch overcurrent device, conductor, or raceway will not result in total disruption of the building electrical service.

E. Instrumentation and Metering: Electrical supply metering shall conform to the requirements of the serving electrical utility.

F. Overload Coordination: Phase overcurrent and ground fault devices shall be coordinated such that ground faults, short circuits, or overloads will trip only the immediate upstream protective device from the point where the fault or overload occurs.

G. Fault Current Rating: All equipment and devices shall be rated to withstand the fault current available.

H. Emergency Power Sources: Emergency power sources shall be selected on the basis of reliability, performance, and lowest life-cycle cost. Possible sources include gen-sets, central battery inverters, and light fixtures with internal battery backup.

I. Power Receptacles:

1. Provide power receptacles to allow a convenient power source for the daily operation of the facility. Follow code rules for minimum receptacles required in dwelling units.

2. Circuits for power receptacles shall be 20A/1P, and shall contain no more than six general purpose duplex receptacles each. Circuits for special-use duplex receptacles (computers, refrigerators, copiers, etc.) shall be rated for the equipment.

J. Motors: Motor loads 1 HP and larger shall not be connected to the same branch panels as lighting or general purpose receptacles.

K. Lighting:

1. Conform to the following codes, standards, and recommendations.

a. Illuminating Engineering Society (IES) Lighting Handbook and Rps.

b. International Building Code with state and local amendments.

2. Lighting control shall be designed to use energy efficiently. Automatic and manual control arrangements shall ensure efficient utilization of energy and maintenance procedures.

3. All luminaires and lamp types shall be standardized facility-wide to provide design and perceptual unity and simplify maintenance requirements.

4. Illumination levels and uniformity shall conform to current IES recommendations.

## PART 3 CONSTRUCTION DOCUMENTS

3.1 CRITERIA

A. Develop construction documents for power, lighting, control, communication, and other electrically-related systems.

B. Installation Drawings: Prepare complete installation drawings for approval prior to commencement of work. Installation drawings shall be the same size as the architectural drawings, and shall include the following information:

1. Conduit layout and sizes.

2. Conductor sizes and quantities.

3. Lighting fixture layouts with fixture type and circuiting information.

4. Receptacle layouts with circuiting information.

5. Motor and equipment layouts with circuiting information.

6. One-line diagram, including fault calculations.

7. Panel locations.

8. Telephone/data outlet locations.

9. System and equipment grounding provisions.

10. Panel schedules, indicating circuit breakers, circuit loads, and total panel loads.

11. Energy code compliance forms (may be indicated on Drawings or on separate 8‑1/2” by 11” sheets).

C. Installation drawings shall be prepared by or under the supervision of a professional engineer registered in the state where the work is to be performed. The Engineer shall have been trained and presently be specializing and practicing in the field of electrical power and lighting design. The Engineer shall stamp and sign all submitted drawings.

D. Prepare technical specifications indicating materials and methods to be used in the installation.

END OF SECTION