SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section describes specific requirements, products, and methods of execution, which are typical for electrical work at ANC. Additional requirements for the specific systems may be required in addition to these requirements.

1.2 COORDINATION

A. Lay out all the work in advance and avoid conflict with other work. Physical dimensions shall be determined from existing conditions. Verify locations for junction boxes; disconnect switches, stub-ups, etc., for connection to equipment.

1.3 SERVICEABILITY OF PRODUCTS

A. Furnish all products to provide the proper orientation of serviceable components to access space.

B. Coordinate installation of panels, equipment, system components, and other products to allow proper service areas for all items requiring periodic maintenance, inspection or replacement.

1.4 ACCESSIBILITY OF PRODUCTS

A. Arrange all work to provide access to all serviceable and/or operable products. Layout work to optimize net usable access space within confines of space available. Advise ANC, in a timely manner, of areas where proper access cannot be maintained. Furnish layout drawings to verify this claim, if requested.

B. Provide access doors in ceilings, walls, floors, etc., for access to junction boxes, automatic devices, and all serviceable or operable equipment in concealed spaces.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT FURNISHED IN DIVISION 16

A. Materials furnished and installed in permanent construction shall be new, full-weight, standard in every way, and in first class condition.

B. Materials shall conform with the standards of an organization acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. Only materials designed for the purpose employed shall be used.

C. Materials shall be identical with apparatus or equipment that has been in successful operation for at least two years. All materials of similar class or service shall be of one manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All work that falls under the jurisdiction of the electrical trade shall be performed by Licensed Electricians.

B. Skilled craftsmen shall install all materials and equipment. The norms for execution of the work shall be in conformity with NEC Chapter 3 and the National Electrical Contractors' Association "National Electrical Installation Standards".

C. Repair all surfaces and furnish all required material and labor to maintain fireproof, airtight and waterproof characteristics of the construction.

D. Installation of all equipment shall be in accordance with manufacturers' instructions.

E. Conduit shall be concealed to the greatest extent possible. Surface mounted conduit may only be installed in finished areas where specifically approved by ANC. Where specfically approved to be installed in a finished area, surface-mounted conduit, junction boxes, pull boxes, outlet boxes, etc., shall be painted to match the surrounding surfaces.

3.2 SUPPORT SYSTEMS

A. Fixed-in-place products shall be seismically braced or supported or both to conform to the requirements for Seismic Zone 4.

B. Pipe straps and hanger rods shall be fastened to concrete by means of inserts, expansion bolts, or power-driven fasteners, to brickwork by means of expansion bolts, and to hollow masonry by means of toggle bolts.

C. Hanger rods with spring steel fasteners may be used for 1-1/2 inch EMT and smaller conduits in dry locations.

D. Cable trays, multi-conduit runs, etc., shall be supported by double rods at each point of support and shall be supported independently of any other building system.

E. Refer to Section 16190 for additional requirements.

3.3 MOUNTING HEIGHTS

A. Mounting height shall be to center of box above finished floor (AFF) as noted below unless otherwise approved by ANC.

Lighting switches	48 inches
Convenience outlets and similar devices	16 inches (see note below)
Convenience outlets in mechanical rooms, boiler rooms, baggage makeup/handling areas and workrooms	48 inches
Motor controllers	60 inches to top
Panelboards	76 inches to top
Telephone panels	72 inches to top
Bracket lights	84 inches
Exterior WP convenience outlets	24 inches AFF

Wall mounted microphone stations	54 inches
Wall mounted speakers	90 inches
Telecommunications (Data/Telephone) outlets	16 inches (see note below)
Range outlets	6 inches (or as required for access through drawer)
Dryer outlets	36 inches
Welder outlets	48 inches
Door bell push buttons	48 inches
ACS card readers	48 inches
All bells, chimes, strobes, and similar signal devices	80 inches
Fire alarm manual station	48 inches to highest operable part of device
Fire alarm control panel	72 inches to top
Fire alarm remote annunciator	72 inches to top

B. NOTE: In locations where baseboard-heating enclosures are to be installed, outlet-mounting height shall be raised to 6 inches above top of enclosure or outlets shall be mounted in toe space below baseboard enclosure.

3.4 CUTTING & PATCHING

A. Obtain written permission from ANC before cutting or piercing structural members.

B. Sleeves through floors and walls shall be galvanized steel pipe, flush with walls, ceilings or finished floors, sized to accommodate the raceway. Grout all sleeve penetrations through concrete walls or floors. Holes through existing concrete shall be core drilled. Seal openings with UL Listed fire resistant resilient sealant.

3.5 VAPOR BARRIER PENETRATIONS

A. Penetrations of the building vapor barrier caused by the installation of electrical equipment shall be minimized, and where they are necessary, the opening in the vapor barrier shall be cut smaller than the penetrating object, so that the penetration will be a stretch fit. The penetration shall then be securely sealed with vapor-barrier tape or an adhesive or caulk compatible with the surfaces being sealed.

3.6 FIRESTOPPING

A. Where electrical raceways or other features penetrate fire-rated building surfaces, they shall be securely sealed to the surrounding surface with 3M Fire Barrier Caulk No. CP25, Fire Barrier Putty No. 303, or other accepted equal.

B. Floor penetrations shall be sealed with Nelson CMP firestop compound.

C. All firestopping shall be applied according to the manufacturer's recommendations, and in a manner that is listed by a nationally-recognized independent testing agency (such as UL) as preserving the fire time-rating of the construction.

3.7 PROTECTIVE FINISHES

A. Take care not to scratch or deface factory finish of electrical apparatus and devices. Repaint all marred or scratched surfaces.

B. Provide hot dip galvanized components for ferrous materials exposed to the weather.

3.8 SEPARATION OF SYSTEMS

A. Conductors and equipment of different voltage levels, frequency, current characteristics (AC & DC) or functions (normal vs. emergency, etc.) shall not share the same raceways or enclosures unless specifically approved by ANC, or inherently necessary for correct system function (i.e., at transfer switches, transformers, etc.)

3.9 TESTING

A. Prior to final test, all switches, panelboards, devices, and fixtures shall be in place.

B. Test all electrical systems. They shall be free from short circuits and unintentional grounds.

C. Make all changes necessary to balance the actual electrical loads on the complete system. Arrange for balanced conditions of circuits under connected load demands, as contemplated by the normal working conditions. Final load and balance test shall be demonstrated in the presence of the ANC electrical department.

D. Feeder cables shall be megger tested prior to final termination. The megger test procedure shall be in accordance with the Appendix to Insulated Cable Engineers Association (ICEA) Standard (S-73-532). The test voltage shall be 1000 volts DC. Replace all cables that do not satisfy ICEA Standards and the following requirement. The measured insulation resistance in megohms shall be greater than 2000 megohm-ft/circuit length in feet. Submit logs to the ANC electrical department.

E. Conduct a performance test of ground-fault protection systems in accordance with NEC Article 230-95(c) and the equipment manufacturer's instructions. Prior to the actual ground-fault protection system test, each service shall be de-energized, the neutral bus-link opened, and the entire 480V system neutral megger-tested to ensure that it is free of grounds downstream of the ground-fault sensing. Grounds detected shall be located and removed, so that the neutral tests clear of grounds, before proceeding with the ground-fault testing.

F. Furnish one (1) copy of certified test results to the ANC electrical department prior to final inspection.

3.10 CLEAN-UP

A. Throughout the work keep the work area reasonably neat and orderly by frequent periodic cleanups.

END OF SECTION