# GENERAL

* 1. RELATED DOCUMENTS
		1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this Section.
	2. DESCRIPTION OF WORK
		1. The extent of Basic Materials and Methods is indicated by the drawings and specifications. Basic materials are defined but not limited to cable and conduit seals, outlet boxes, pull boxes, conduit fittings, safety switches, lockout pushbuttons and fuses.
	3. QUALITY ASSURANCE
		1. Manufacturers: All materials shall be new, unused, and unweathered, and of the quality specified. Materials shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design.
		2. Installer: All equipment and materials shall be installed in a neat and workmanlike manner, shall be complete in both effectiveness and appearance, whether finally concealed or exposed and shall be executed by experienced mechanics.
	4. REFERENCES
		1. The electrical work shall conform to all applicable sections of standards, codes and specifications promulgated by organizations listed below.
			1. Occupational Safety and Health Standard, National Consensus Standards and Established Federal Standards
			2. National Electrical Code (NEC)
			3. National Electric Manufacturer's Association (NEMA)
			4. American Society for Testing of Materials (ASTM)
			5. Underwriters Laboratories, Inc. Standards (UL)
			6. Factory Mutual Engineering Corporation or other Recognized National Laboratories
	5. SUBMITTALS
		1. Shop drawings: Prepare a set of shop drawings showing manufacturers product data for all component parts specified in this Section.
1. **PRODUCTS**
	1. Equipment and Materials Furnished by Others: Certain materials and equipment for this project will be furnished under other divisions. These materials and equipment, which are shown or noted on the plans, will be installed and/or connected under this Division. It shall be incumbent upon this Contractor to become familiar with all of the materials and equipment that will be furnished under other Divisions, but which will be installed and/or connected under this Division.
	2. Cable and Conduit Seals: Seals shall be provided around all conduits and cables which penetrate smoke walls, fire walls, and floors. Nelson Flameseal System shall be used to seal penetrations of electrical cables and conduits.
		1. Materials used shall be flameseal putty, ceramic fiber insulation and where rigid support on large oversized openings is required, ceramic fiber board. Board shall be rigid and able to withstand temperatures in excess of 2000 degrees F.
		2. Accessory hardware shall be provided as required on oversized openings.
		3. Follow manufacturer’s instructions in selecting the type of seals and accessories. Also follow the manufacturer’s instructions on installation of the cable and conduit seals. Equal quality equipment by OZ Gedney and 3M shall be acceptable.
	3. Outlet Boxes, Pull Boxes and Conduit Fittings: Furnish and install outlet boxes, pull boxes, and conduit fittings as described below. Catalog numbers shown are Appleton Electric Company; Steel City, O.Z. Gedney, and Raco, are equally acceptable.
		1. OUTLET BOXES
			1. Lighting Boxes (concealed) No. 40-3/4
			2. Lighting Boxes (concrete) OCR Series
			3. Lighting Boxes (exposed) 4S-3/4 or 40-3/4
			4. Flush Switches, Receptacles No. 4S-3/4 with separate

Telephone and Flush extension plaster ring; M\*-250

Junction Boxes in masonry construction (\* refers

 to number of devices in the box)

* + - 1. Weatherproof type Switch, FS Series w/FS cover and

Receptacle and Telephone neoprene gasket.

Boxes (exposed)

* + - 1. Switch, Receptacle and 4S-3/4 with 8360 or 8370

Telephone Boxes (exposed) series raised surface cover.

* + 1. Where space is limited, No. 4CS-3/4 handy boxes may be used for switch, receptacle and telephone outlets with specific approval only.
		2. Extension and plaster rings shall be installed as required by the NEC.
		3. Outlet boxes shall comply with the National Electrical Code in regard to the allowable fill.
	1. PULL BOXES
		1. Pull boxes shall be fabricated of code gauge galvanized sheet metal and shall be sized in accordance with the National Electrical Code requirements or as shown on the drawings. Provide removable cover on the largest access side of the box. In-line conduit pull boxes may be O.Z., Type PBW, or equal. Provide pull boxes at all code required locations, and as needed to aid in cable pulling.
	2. SAFETY SWITCHES
		1. Furnish and install heavy duty type safety switches, having the electrical characteristics, ratings and modifications shown on the drawings. All switches shall have:
		2. NEMA 1 general purpose enclosures unless otherwise noted for all interior applications;
		3. NEMA 3R rainproof enclosures unless otherwise noted for all exterior applications;
		4. Metal nameplates, front cover mounted that contain a permanent record of switch type, catalog number and H.P. ratings with both standard and time delay fuses;
		5. Handle that is padlockable in "OFF" position;
		6. Non-teasible, positive quick-make, quick-break mechanism;
		7. UL approval and shall bear the UL label;
		8. All fusible switches shall have Class R Fuse rejection clips.

**NOTE TO SPECIFIER: REVISE LIST OF MANUFACTURERS AS REQUIRED.**

* + 1. Safety switches, as manufactured by the following, will be equally acceptable, but all safety switches furnished by this Contractor shall be the product of one manufacturer:
			1. Square D Company
			2. General Electric
			3. Cutler Hammer
			4. Siemens
	1. FUSES
		1. Fuses shall be furnished and installed in each fused switch, and shall be rated as shown on the drawings.

**NOTE TO SPECIFIER: REVISE THE LIST OF FUSE TYPES AS REQUIRED.**

* + 1. Provide fuses according to the following and in accordance with recommendations of manufacturers whose equipment is being protected:
			1. Provide UL Class L current limiting time-delay fuses rated 600-volts, 60 Hz, 601 to 6000 amps, with 200,000A RMS symmetrical interrupting current rating for protecting transformers, motors and circuit breakers. (Similar to Buss Low-Peak fuses.)
			2. Provide UL Class L current limiting fast-acting fuses rated 600-volts, 60 Hz, 601 to 6000 amps, with 200,000A RMS symmetrical interrupting current rating for protecting service entrances and main feeder circuit breakers. (Similar to Buss Limitron fuses.)
			3. Provide UL Class RK1 current limiting, dual-element, time-delay fuses rated 600-volts, 60 Hz, 1/10 to 600 amps, with 200,000A RMS symmetrical interrupting current rating for protecting motors and circuit breakers. (Similar to Buss Low-Peak fuses.)
			4. Provide UL Class RK1 current-limiting fuses rated 250-volts, 60 Hz, 1/10 to 600 amps, with 200,000A RMS symmetrical interrupting current for protecting motors and circuit breakers. (Similar to Buss Low-Peak fuses.)
			5. Provide UL Class J current-limiting fuses rated 600-volts, 60 Hz, 1 to 600 amps, with 200,000A RMS symmetrical interrupting current rating for protecting circuits with no heavy inrush current where reduced dimension devices are required.
			6. Provide UL Class H fuses rated 600-volts, 60 Hz, 1/10 to 600 amps, with 10,000A RMS symmetrical interrupting current rating for protecting general purpose light duty feeders.
			7. Provide UL Class T fuses rated 600-volts, 60 Hz, 1 to 1,200 amps, with 200,00A RMS symmetrical interrupting current rating for protection of non-motor loads where reduced dimension devices are required.
		2. Three spare fuses shall be furnished for each size and type used. Each fused switch shall be provided with a mastic backed label clearly identifying the type and size of fuse required.
1. **EXECUTION**
	1. PRODUCT INSTALLATION, GENERAL
		1. Except where more stringent requirements are indicated, comply with product manufacturer’s installation instructions and recommendations, including handling, anchorage, assembly, connections, cleaning and testing.
	2. MOUNTING HEIGHTS
		1. Mounting heights to the center of the box above finished floor for the items listed below shall be as follows, unless otherwise shown. All other device mounting heights shall be as shown on the drawings. All devices shall be mounted in accordance with ADA (Americans with Disabilities Act) requirements.
		2. Flush tumbler switches 48"
		3. Switches in concrete block 46"
		4. Switches over wainscot 6" above 48" wainscot
		5. Convenience outlets 18" mounted vertically with ground prong slot at bottom
		6. Safety switches 54"
		7. Motor controllers 54"
		8. Panelboards to top 72"
		9. Telephone Outlets 18"
		10. Telephone outlets 54" for non-ADA type

 (pay and wall type) 44" for ADA type

* + 1. Bracket lights (120 volt) 84"
		2. Bracket lights (277 volt) 96"
		3. Clock outlets 8' ceiling 84"

 9' ceiling 96"

* + 1. Receptacles above counters 6" above counters mounted

(horizontally)-(vertically)

* + 1. Convenience outlets in 48”

 mechanical, electrical, janitor

 and elevator machine rooms

* + 1. Telephone panels 72" to top
		2. Exterior W.P. convenience 24" above grade mounted

 outlets (horizontally) - (vertically)

* + 1. Capacitors furnished by Mech. 36" minimum
		2. Lock-out push button 36" minimum
		3. Fire alarm pull station 48"
		4. Fire alarm horn, bell chime 80"

 or light

* + 1. Intercom System Pushbutton 48"

 Stations

* + 1. Contractor shall check all equipment layouts and verify exact mounting heights.
	1. CUTTING AND PATCHING FLOORS, WALLS OR CEILINGS
		1. Cutting, patching, repairing, and finishing of carpentry work, metal work, or concrete work, etc., which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors. Holes required to be cut in floors must be drilled without breaking out around the holes. Cutting, patching, and painting shall conform to the requirements of the General Conditions section of this Specification.
		2. Cutting of structural framing, walls, floors, decks, or other members intended to withstand stress is not permitted.
		3. Sleeves through floors or walls shall be black iron pipe and shall be flush with finished faces of floors, walls or ceilings. Sleeves shall be sized to accommodate raceways indicated.
		4. Use care in piercing water proofing. After the part piercing the waterproofing has been set in place, seal openings, and make absolutely watertight.
	2. SLEEVES
		1. Sleeves shall be used to accommodate conduit or tubing where conduit or tubing pass through newly poured concrete walls or slabs.
		2. All sleeves through floors and walls shall be black iron pipe, flush with walls or finished floors; and of sizes to accommodate the raceways shown. Sleeves through outside walls above grade shall be caulked with approved caulking compound. Sleeves shall not be required through on grade slabs.
		3. For raceways which enter buildings below grade, install manufactured floor and thruwall seals, similar to Type "FSK" or "WSK" as manufactured by O.Z. Electric Manufacturing Co.
	3. INSTALLATION METHODS
		1. Conductors shall be installed in concealed raceways except as shown otherwise on the drawings or specified to be otherwise in these specifications. Exposed conduits and wires shall be installed parallel or perpendicular to building surfaces. Conduits and wires in the space above ceilings shall be supported adequately and shall not be laid on the top of ceiling systems. Conduits and wires installed above ceilings shall be considered exposed.
		2. Electrical conduits shall not be hung on hangers with any other service foreign to the electrical systems, nor shall they be attached to other foreign services.
		3. The lighting and power branch circuit conductors shall be installed in separate raceway systems unless specifically shown or noted otherwise.
		4. Equipment Bases. Provide concrete equipment bases for all floor mounted equipment furnished under this contract. Concrete bases shall be 3-1/2"-inches high unless noted otherwise and shall extend 3-inches beyond all sides of the unit. Trowel all edges at a 45 degree angle. This work shall be done in accordance with Division 3 of the specifications by the Division 16 Contractor. Bases shall be provided for switchboards, motor control centers, transformers and all other floor mounted equipment.
		5. Outlet Box Locations. Outlet boxes shall be located so they are not placed back-to-back in the same wall, and in metal stud walls, are separated by at least one stud space in order to limit sound transmission from room to room. Outlet boxes installed on opposite sides of fire rated walls shall be spaced at least 24" apart.
	4. WIRING - NUMBER OF WIRES REQUIRED
		1. The number of wires for lighting and receptacle branch circuits are not shown on the drawings. The number of wires in any circuit is determined in accordance with the National Electrical Code, and wiring is provided to perform all functions of the devices being installed. Additionally, wires shall be provided as required by the contract documents, i.e. equipment grounds, etc. Provide the number of wires required for a complete and workable system.
	5. PROTECTION FROM WEATHER
		1. Raceway stub ups shall be capped or otherwise protected from moisture and debris until such time that the conductors are pulled. Conductors shall not be installed in raceways until the building is protected from the weather, all concrete and plastering is completed, and raceways in which moisture has collected have been swabbed or blown out.
	6. ELECTRICAL ROOM COORDINATION
		1. Where a number of electrical panels and/or related electrical items are shown, the Electrical Contractor shall coordinate the physical sizes with his equipment suppliers to ensure that there is adequate space for the items shown to be installed in those areas and that all Code required clearances are maintained.
		2. The Contractor shall rearrange the equipment layout to achieve full use of the available space prior to installing conduit stub ups. Where a conflict or rearrangement exists, the Contractor shall submit a proposed revised layout of the area to the Architect.
	7. NAMEPLATES
		1. Nameplates shall be provided for all items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards and motor control centers, control devices and other significant equipment
		2. Nameplates shall be 1"x 2-1/2" laminated black phenolic resin with a white core with engraved lettering, a minimum of 3/16-inch high. Manufacturers factory installed nameplates shall be acceptable provided all information is furnished.
		3. Nameplates shall identify the equipment item that the device is serving and also from where the device is being fed from. Nameplates shall also identify the system voltage of the item of equipment.
	8. RACEWAY SUPPORTS
		1. Raceways shall be securely supported and fastened in place with pipe straps, wall brackets, caddy clips, hangers or trapeze hangers at intervals specified in Section 260533 "RACEWAYS" or:
			1. As shown on the drawings.
			2. As may be required by special adverse field conditions.
		2. Fastenings shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws or welded threaded studs on steel work. Nail-type nylon anchors or threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine wood screws. Threaded C-clamps shall not be used. Raceways or pipe straps shall not be welded to steel structures. Holes cut in reinforced concrete beams or in concrete joists shall avoid cutting the main reinforcing bars. Holes not used shall be filled. In partitions of light steel construction, sheet-metal screws may be used, and bar hangers may be attached with saddle ties of not less than No. 16 AWG double strand zinc-coated steel wire. No raceway shall be attached to the suspended ceiling construction. Conduits shall be fastened to all sheet-metal boxes and cabinets with two locknuts and insulating bushings.
	9. BOX SUPPORTS
		1. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel work. Plastic expansion shields shall not be used. Threaded studs driven in by powder charge and provided with lockwashers and nuts may be used in lieu of wood screws, expansion shields, or machine screws. In open overhead spaces, cast metal boxes threaded to raceways need not be separately supported except where used for fixture support; cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers. Raceways shall be supported with an approved type fastener not more than 24-inches from the box. Penetration into reinforced concrete beams and into reinforced-concrete joists shall avoid cutting any main reinforcing steel.
	10. LIGHTING FIXTURE SUPPORTS
		1. Lighting fixtures shall be supported as follows and in accordance with all applicable Codes and Regulations:
			1. By fixture studs or other devices securely attached to outlet box, or;
			2. By special hangers designed and intended for use as lighting fixture supports, or;
			3. By a special clip or device attached to the ceiling system grid designed to secure the lighting fixture in place or;
			4. By other methods and devices designed and intended for use as lighting fixture support, or;
			5. As shown on the drawings.
		2. The lighting fixture support system detail shall be submitted with and be a part of the lighting fixture shop drawing submittal.
		3. Lighting fixtures shall not be supported from the leg of pre-cast pre-stressed concrete.

END OF SECTION 260501