instructions for equipment furnished under other Sections.
1. Determine all equipment connection locations and requirements and verify that proper power supply is available prior to subcontractor's ordering equipment.
2. Sequence rough-in of electrical connections to coordinate with installation of equipment.
3. Sequence electrical connections to coordinate with start-up of equipment.

B. Verify and coordinate all requirements and installation details of all materials and equipment prior to rough-in.
C. Verify proper voltage, phase, and current rating of power supply and immediately report any discrepancies.
D. Responsibility for verification of proper power supply voltage and any damage resulting from incorrect connections shall rest with this Contractor.
E. Any conflicts arising from lack of coordination shall be this Contractor's responsibility.

PART 2 PRODUCTS

2.01 CORDS
A. Description: Multi-conductor flexible cord Type SO for dry and damp locations or Type SOW in wet locations.
B. Conductor Quantity: As required for the load served; include identified equipment grounding conductor.
C. Conductor Insulation Rating: As required for the voltage of the load served.
D. Conductor Ampacity: No less than the rating of the overcurrent protection device protecting the circuit.

2.02 CORD CAPS: Match cord cap to receptacle configuration at outlet provided for equipment.
2.03 OTHER MATERIALS: Provide all disconnect switches, wiring devices, conduit, wire and cable, and boxes required.

PART 3 EXECUTION

3.01 ELECTRICAL CONNECTIONS
A. Make electrical connections in accordance with equipment manufacturer's instructions.
B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
D. Provide receptacle outlet to accommodate connection with attachment plug.
E. Provide cord and cap where field-supplied attachment plug is required.
F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
H. Install terminal block jumpers to complete equipment wiring requirements.
I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
J. Cut and seal conduit openings in freezer and cooler walls, floors, and ceilings where applicable.

END OF SECTION

SECTION 262726 – WIRING DEVICES

PART 1 GENERAL

1.01 PREPARATION: Contact the Architect to determine colors of all wiring devices, cover plates, and carpet and tile flanges, locations where stainless steel cover plates are required, and locations where carpet and tile flanges are required.

PART 2 PRODUCTS

2.01 RECEPTACLES
A. All Receptacles:
1. Color as selected by Architect.
2. Provide tamper-resistant receptacles where denoted "TR" on the Drawings and otherwise required.
3. Provide ground-fault circuit interrupter receptacles where denoted "GFCI" on the Drawings and otherwise required.
4. Provide receptacles with factory-applied permanent controlled receptacle marking where denoted "CR" on the Drawings and where controlled by automatic shutoff controls.
a. Field-applied controlled receptacle markings, such as those made by a label maker, are not acceptable.
5. Provide NEMA receptacle indicated with two integral Type A, 5 ampere, 5 volt USB ports where denoted "USB" on the Drawings.
6. Provide identified weather-resistant receptacles for receptacles installed outdoors.
7. NEMA 5-15R unless indicated otherwise.

B. Standard NEMA 5-15R Duplex: Hubbell #BR15 unless indicated otherwise.
C. Standard NEMA 5-20R Duplex: Hubbell #BR20 unless indicated otherwise.
D. Interior GFCI Duplex: Hubbell #GF20 unless indicated otherwise.
1. Provide GFCI receptacles with audible alarm when the receptacle serves a sump pump.

E. Exterior GFCI Duplex: Hubbell #GFTR20 unless indicated otherwise.
F. Isolated Ground Duplex: Hubbell #IG20CR unless indicated otherwise.
G. Surge Protection Receptacles: Hubbell #HBL5362SA unless indicated otherwise.
H. Clock Hanger Receptacles: Hubbell #HBL5235 unless indicated otherwise.
I. Other NEMA Configurations: As required by the load served.

2.02 FACELESS GFCI: Hubbell #GFBFST20; color as selected by Architect.
2.03 MULTI-OUTLET ASSEMBLY: Wiremold Plugmold 2000 Series with receptacles at 6 inches on center unless indicated otherwise. Provide all fittings required for a complete installation. Coordinate device and channel finish color with the Architect.
2.04 WALL SWITCHES
A. All Switches:
1. Color as selected by Architect.
2. Horsepower rated when used as motor disconnecting means.

B. Single Pole Toggle: Hubbell #1221 unless indicated otherwise.
C. Three-Way Toggle: Hubbell #1223 unless indicated otherwise.
D. Four-Way Toggle: Hubbell #1224 unless indicated otherwise.
E. Single Pole Toggle with Pilot Light: Hubbell #HBL1221PLC unless indicated otherwise.
F. Single Pole Keyed: Hubbell #HBL1221L unless indicated otherwise.
G. Three-Way Keyed: Hubbell #HBL1223L unless indicated otherwise.
H. Four-Way Keyed: Hubbell #HBL1224L unless indicated otherwise.

2.05 WALLBOX DIMMERS
A. All Wallbox Dimmers: Color as selected by Architect.
B. LED Dimmers:
1. All LED Dimmers: Dimmer utilized shall be tested and listed by the LED manufacturer as a compatible dimmer.
2. 0-10 Volt Dimmers:
a. Up to 16 Amps: Lutron Maestro #[illegible] with Lutron [illegible]-TVI power interface unless indicated otherwise.
3. Electronic Low Voltage Dimmers:
a. Up to 16 Amps: Lutron Maestro #MAF-6AM with Lutron #PHPM-[illegible]-DV-WH power interface unless indicated otherwise.
4. Magnetic Low Voltage Dimmers
a. Up to 16 Amps: Lutron Maestro #MAF-6AM with Lutron #PHPM-WBX-DV-WH power interface unless indicated otherwise.

2.06 POWERPOLES: Wiremold AMDTP series unless indicated otherwise with wiring devices indicated. Provide lengths, device covers, ceiling trim plates, and mounting foot as required for a complete installation.
2.07 COVER PLATES
A. All Cover Plates:
1. Color and material as selected by Architect.
2. Provide cover plates appropriate for the wiring devices installed within the box.
a. Use combination plates when wiring devices are ganged together.

B. Wall Plates:
1. Provide standard-size nylon wall plates unless indicated otherwise; mid-size or jumbo wall plates are not permitted.
2. Provide stainless steel coverplates where requested by the Architect.
3. Provide galvanized steel cover plates on outlet boxes and junction boxes located in unfinished areas, above accessible ceilings, and on surface mounted outlets.
4. Provide gasketed, cast metal, hinged cover plates for all exterior locations, where denoted "WP" on the Drawings, and where otherwise required.
5. Provide weatherproof while-in-use covers which are listed and identified as "extra-duty" for all receptacles installed in wet locations.

PART 3 EXECUTION

3.01 EXAMINATION: Verify that outlet boxes are installed at proper heights and that openings are neatly cut and will be completely covered by the coverplates or flanges.
3.02 PREPARATION
A. Provide extension rings to bring wall-mounted outlet boxes flush with finished surface.
B. Adjust floor boxes to bring floor boxes flush with finished floor.

3.03 MOUNTING HEIGHTS
A. General: All mounting heights are to the centerline of the outlet box.
B. Receptacles:
1. Install receptacles at 18 inches above finished floor unless indicated otherwise.
2. Install receptacles at countertops at the lesser of 44 inches above finished floor or 3 inches above any sidesplashes or backsplashes unless indicated otherwise.

C. Wall Switches: Install wall switches including wallbox dimmers, wall switch occupancy sensors, and low voltage switches associated with programmable relay panels and room controllers at 46 inches above finished floor unless indicated otherwise.
D. Telecommunications Outlets:
1. Install telecommunications outlets including telephone, data, and television outlets 18 inches above finished floor unless indicated otherwise.
2. Install telephone outlets for side-reach and forward-reach wall telephone 46 inches above finished floor unless indicated otherwise.

E. Modify mounting heights in masonry walls as required to locate the outlet box at the joint in the masonry unit to avoid multiple or split-cut masonry units.

3.04 INSTALLATION
A. Install wall switches with OFF position down.
B. Install receptacles vertically with ground pin on bottom unless indicated otherwise.
C. Ground-Fault Circuit Interrupter (GFCI) Receptacles:
1. Provide a separate GFCI receptacle for every instance where denoted "GFCI" on the Drawings and otherwise required by Code; do not GFCI-protect receptacles from the load side of an upstream GFCI receptacle.
2. Install all GFCI receptacles in in a readily accessible location.
a. Provide faceless GFCI device in a readily accessible location when the receptacle will not be readily accessible and connect receptacle to load side of faceless GFCI.

D. Wallbox Dimmers:
1. Install wallbox dimmers to achieve full rating; do not break heatsink fins off.
2. Install power interfaces in concealed accessible location.
3. Provide a separate neutral conductor for each branch circuit serving wallbox dimmers; do not connect wallbox dimmers to multiwire branch circuits.
4. Provide all control wiring and communications cabling including all 0-10V control wiring, whether or not shown on the Drawings, per manufacturer's recommendations and as required for a complete and operational system.

E. Install wiring devices in outlet boxes and connect wiring device grounding terminal to branch circuit equipment grounding conductor.
F. Connect wiring devices by wrapping conductor around screw terminal; do not use back-wired push-in terminals.
G. Install cover plates on all outlet boxes including blank outlets.
H. Use flat-head screws, clips, and straps to fasten multi-outlet assembly channel to surfaces and use suitable insulating bushings and inserts at connections to outlets and corner fittings.

END OF SECTION

SECTION 262813 – FUSES

PART 1 GENERAL – NOT USED

PART 2 PRODUCTS

2.01 FUSES:
A. Up to 600 Amps: Dual-element time-delay Class RK1 unless indicated otherwise or otherwise required for the switch in which the fuse is installed.
B. Greater than 600 Amps: Dual-element time-delay Class L unless indicated otherwise indicated otherwise or otherwise required for the switch in which the fuse is installed.
C. Site Lighting: Class CC with in-line fuseholder.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 262818 – ENCLOSED SWITCHES

PART 1 GENERAL – NOT USED

PART 2 PRODUCTS

2.01 SAFETY SWITCHES
A. 240 Volt Class: Square D Class 3130 general duty unless indicated otherwise.
B. 600 Volt Class: Square D Class 3110 heavy duty unless indicated otherwise.
C. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
D. Fuse Clips: Class R cartridge fuse clips where fuses are installed.
E. Enclosure: Manufacturer's standard enclosure suitable for the environment in which the switch is installed.
F. Accessories: Provide grounding kit for all enclosed switches.

2.02 BOX COVER UNITS: Bussmann #SSU unless indicated otherwise.

PART 3 EXECUTION

3.01 INSTALLATION
A. All Enclosed Switches:
1. Install in locations that provide all working space required by NFPA 70.
2. Install 5 feet to the operating handle.
3. Install fuses in fusible disconnect switches.
4. Provide nameplate indicating equipment designation, NEMA fuse class, and fuse size installed.

END OF SECTION

SECTION 264313 – SURGE PROTECTIVE DEVICES

PART 1 GENERAL – NOT USED

PART 2 PRODUCTS

2.01 SURGE PROTECTION DEVICES
A. Description: Square D Surgelogic EMA series Type 2 surge protective device with the following ratings unless indicated otherwise:
1. Minimum Peak Surge Current Rating:
a. Service Entrance Equipment: 240 kA per phase
b. Power Distribution Panelboards: 160 kA per phase
c. Branch Panelboards: 120 kA per phase
2. Maximum Voltage Protection Ratings:
a. 120/208 Volt, 3 Phase, 4 Wire Systems:
1. L-N: 700 volts.
2. L-G: 700 volts.
3. N-G: 700 volts.
4. L-L: 1200 volts.
b. 277/480 Volt, 3 Phase, 4 Wire Systems:
1. L-N: 1200 volts.
2. L-G: 1200 volts.
3. N-G: 1200 volts.
4. L-L: 2000 volts.
3. Enclosure: Manufacturer's standard enclosure with integral disconnect switch and suitable for the environment in which the surge protective device is installed.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install surge protective devices directly adjacent to and within 6 inches of the associated switchboard or panelboard to keep conductor length absolutely minimized.
B. Comply with manufacturer's written recommendations for conductor and overcurrent protection device size for connecting surge protective devices to the electrical distribution system.
C. Install wiring between surge protective device and associated overcurrent protection device as short and straight as possible. Do not exceed manufacturer's recommended lead length.
D. Coordinate location to allow adequate clearances for maintenance.
E. Do not bond neutral and ground.
F. Do not integrate surge protective device within switchboards or panelboards unless indicated otherwise; see IEEE-1100 Section 8.4.2.5.
G. Do not energize or connect electrical system distribution equipment to their sources until surge protective devices are installed and connected.
H. Disconnect all surge protective devices before performing any Megger or high-potential testing of electrical distribution equipment.

END OF SECTION

SECTION 265100 – INTERIOR LIGHTING

PART 1 GENERAL

1.01 QUALITY ASSURANCE
A. Verify all ceiling systems for proper coordination of luminaires and accessories including any drywall frames, bar hangers, flanges, trim rings, etc. required for a complete, finished installation.
B. Provide only luminaires that are listed for the environment in which they are installed.
1. Luminaires shall carry damp location and/or wet location ratings as required.
2. Luminaires shall be insulated ceiling (IC) rated when recessed into insulated ceilings; coordinate locations of all insulated ceilings with the Architectural plans.

C. Coordinate exact locations of all luminaires with the Architectural Reflected Ceiling Plan(s); luminaire locations on the Architectural Reflected Ceiling Plan(s) take precedence over locations indicated on the electrical lighting plans.
D. Coordinate mounting heights of all wall-mounted luminaires with the Architect prior to rough-in.
E. Confirm all luminaire and accessory finishes with the Architect prior to ordering.
F. Coordinate luminaire dimensions with the wall and/or ceiling thickness prior to ordering.
G. Coordinate mounting location, number of faces, and directional arrows of exit signs as required to mark paths of egress to the satisfaction of the Authority Having Jurisdiction.

PART 2 PRODUCTS

2.01 LUMINAIRES
A. Provide as indicated on the Drawings.
B. The acceptability of any substitute fixtures lies solely with the Architect and Engineer.
C. The specified luminaire shall be provided at no additional cost where a substitute fixture is not accepted by the Architect or Engineer.

2.02 NON-DIMMING BALLASTS, TRANSFORMERS, AND DRIVERS
A. All Ballasts, Transformers, and Drivers
1. Provide low-temperature ballasts when installed in locations where ambient temperature can fall below 10 degrees C (50 degrees F).

B. LED Drivers: As required for and compatible with the associated LED module.

2.03 DIMMING BALLASTS AND DRIVERS
A. All Dimming Ballasts and Drivers:
1. Provide appropriate dimming ballasts/drivers in all fluorescent and LED luminaires controlled by wallbox dimmer switches or dimming systems whether or not specifically indicated within the specified luminaire's catalog number.
2. All dimming ballasts/drivers shall be compatible with associated wallbox dimmer switches or centralized dimming system control units.
3. Dimming Range: 100 percent to 5 percent.
4. Voltage: Universal (120 through 277 volts).
5. Power Factor: Greater than 0.95.
6. Total Harmonic Distortion: Less than 10 percent.
7. Sound Level Rating: Class A.

B. LED Dimming Drivers: Advance Xitanium series or equal.

2.04 EMERGENCY POWER SUPPLIES
A. Provide appropriate emergency battery in all fluorescent and LED luminaires indicated as emergency fixtures whether or not specifically indicated within the specified luminaire's catalog number.
1. Battery Type: Sealed nickel calcium (NiCad) with 7-year, minimum, life expectancy.
2. Illumination Time: 90 minutes minimum.
3. Voltage: Universal (120 through 277 volts).
4. Test Switch: Two-wire with LED indicator.
5. Lamp Operation: Two-lamp operation for luminaries equipped with more than one lamp.
6. Minimum Initial Illumination Rating:
a. Linear Fluorescent: 1400 lumens per luminaire.
b. Compact Fluorescent: 1100 lumens per luminaire.
c. Integrated LED 1000 Lumens and Less: 10 watt output.
d. Integrated LED Greater than 1000 Lumens: 20 watt output.

2.05 LAMPS
A. LED: As indicated on the Drawings.

2.06 ACCESSORIES
A. Provide all supplementary items, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation including, but not limited to:
1. Dimming ballasts for fluorescent and LED luminaires that are served by wallbox dimmer switches or dimming systems.
2. Emergency power supplies for fluorescent and LED luminaires indicated as emergency fixtures.
3. Multiple ballasts for fluorescent luminaires where indicated to have multi-level switching.
4. All trim rings, extensions, stems, canopies, cords, pendant feeds, connectors, bar hangers, fittings, hold-down clips, alignment clips/joiners, etc. necessary to mount the luminaires in a proper and approved method.
5. All necessary low-voltage transformers, connectors, mounting hardware, etc. for a complete low-voltage lighting system.
6. All necessary connectors, feeds, end caps, pendants, mounting hardware, fittings, etc. for a complete track lighting system.
7. Chain hangers for all suspended luminaires in unfinished areas.
8. Drywall frames for all linear fluorescent luminaires that are recessed into drywall ceilings.
9. Wireguards for any wall-mounted luminaires, including emergency lighting unit equipment and exit signs, located in gymnasiums or where otherwise exposed to physical damage.
10. Fire-rated luminaire covers (tents) for luminaires installed in fire-rated ceiling assemblies; coordinate locations of fire-rated ceiling assemblies with the Architectural plans.
11. Any seismic bracing and/or restraints required by the Authority Having Jurisdiction.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install luminaires in locations shown on the Architectural Reflected Ceiling Plan(s); luminaire locations on the Architectural Reflected Ceiling Plan(s) take precedence over locations indicated on the electrical lighting plans.
B. Install luminaires plumb and level and align with building lines and adjacent luminaires.
C. Support all luminaires completely independent of any suspended ceiling systems.
D. Connect luminaires to branch circuit.
1. Circuit all exit signs, emergency lights, and nightlights ahead of any switching.
2. Do not use multiwire branch circuits for circuits serving emergency lighting equipment such as emergency batteries or emergency lighting unit equipment.

E. Provide all additional emergency lighting and/or exit signs determined necessary by the Authority Having Jurisdiction during inspections.
F. Install all remote ballasts, low voltage transformers, and drivers in concealed accessible areas in close proximity to the associated luminaires and connect to the associated luminaires per the manufacturer's recommendations, including adjusting wire sizes for voltage drop if required.
G. Prevent insulation from being installed above or within 3 inches away from any luminaire that is recessed into an insulated ceiling but is not insulated ceiling (IC) rated.
H. Install fire-rated luminaire covers (tents) for luminaires installed in fire-rated ceiling assemblies; provide fire-rated boxes around luminaires when fire-rated luminaire covers (tents) are not available.
I. Burn-in all fluorescent lamps controlled by wallbox dimmers or dimming systems for a minimum of 100 hours prior to connecting to dimmer.

3.02 CLOSEOUT
A. Replace any lamps and ballasts that expire before the Owner's acceptance of the project.
B. Aim and adjust all luminaires to provide illumination levels, focusing, and distribution patterns to the Owner's satisfaction.

END OF SECTION

SECTION 271005 – TELEPHONE AND DATA SYSTEMS

PART 1 GENERAL

1.01 PREPARATION
A. Coordinate all demarcation locations with the serving utility and/or the Landlord.
B. Hold meeting with the Owner prior to commencing work.
1. Determine Scope of Work and Division of Responsibility.
2. Determine quantities of phone drops and data drops are required at each outlet box.
3. Confirm all cabling, termination, cross-connection equipment, enclosure, and jack requirements.

PART 2 PRODUCTS

2.01 ENCLOSURES
A. Backboards: Provide 3/4 inch thick UL-labeled, fire-retardant, interior grade plywood; size as indicated on the Drawings.
B. Equipment Racks: Only if required pursuant to meeting with the Owner:
1. Wall-Mounted Racks: Chatsworth Products Standard Swing Gate series; 19 inches wide, depth as required for installed components, and height as required for installed components plus 50 percent.
2. Floor-Mounted Racks: Chatsworth Products 50120 QuadraRack series with vertical and horizontal cable management, top and bottom cable troughs, and grounding lug; 19 inches wide, 29 inches deep, and height as required for installed components plus 50 percent.

2.02 OUTLET BOXES
A. Wall: 4-square by 2-1/8 inch deep outlet box with single gang mud ring and cover plate unless indicated otherwise or otherwise required.
B. Floor: As indicated on the Drawings or within Section 260537 unless indicated otherwise or otherwise required.
C. Wall Plates:
1. Provide standard-size nylon blank wall plates unless indicated otherwise; color as selected by the Architect. Mid-size or jumbo wall plates are not permitted.
2. When cabling is to be provided by this Contractor, provide standard-size nylon modular keystone jack cover plates compatible with the associated modular keystone jacks and with appropriate number of jacks unless indicated otherwise; color as selected by the Architect.

2.03 PATHWAYS
A. All Pathways:
1. See Section 260534 for permitted conduit types.
2. Provide pullstring in each conduit.

B. Service Entrance: Conduit with extended radius sweeps; size as indicated or otherwise required.
C. Branch Wiring: Provide 3/4 inch minimum conduit from all outlet boxes to accessible ceiling space unless indicated otherwise.

2.04 COPPER CABLES, PLUGS, AND JACKS: Only if required pursuant to meeting with the Owner:
A. Data:
1. All Data Cabling: Unshielded twisted pair (UTP) Category 6A unless indicated otherwise or otherwise required.
2. Backbone (Riser) Cabling: Type CMR when installed in conduit and Type CMP when not installed in conduit; gray jacket unless indicated otherwise or otherwise required.
3. Horizontal Cabling: Type CM when installed in conduit and Type CMP when not installed in conduit; blue jacket unless indicated otherwise or otherwise required.
4. Plugs: Category 6A UTP non-keyed 8-wire modular plugs unless indicated otherwise or otherwise required.
5. Jacks: Category 6A UTP non-keyed 8-wire RJ45 modular keystone jack unless indicated otherwise or otherwise required; color as selected by the Owner.

B. Telephone:
1. All Telephone Cabling: Unshielded twisted pair (UTP) Category 3 unless indicated otherwise or otherwise required.
2. Horizontal Cabling: Type CM when installed in conduit and Type CMP when not installed in conduit; blue jacket unless indicated otherwise or otherwise required.
3. Plugs: Category 3 UTP non-keyed 8-wire modular plugs unless indicated otherwise or otherwise required.
4. Jacks: Category 3 UTP non-keyed 8-wire RJ45 modular keystone jack unless indicated otherwise or otherwise required; color as selected by the Owner.

2.05 CROSS-CONNECTION EQUIPMENT: Only if required pursuant to meeting with the Owner:
A. Connector Blocks for Category [illegible] Cabling: Type [illegible] insulation displacement connectors unless indicated otherwise or otherwise required with capacity sufficient for cables to be terminated plus 25 percent spare.
B. Connector Blocks for Category 5e Cabling: Type 110 insulation displacement connectors unless indicated otherwise or otherwise required with capacity sufficient for cables to be terminated plus 25 percent spare.
C. Patch Panels for Copper Cabling: Panduit DP5e series UTP patch panel unless indicated otherwise or otherwise required with quantity of ports sufficient for cables to be terminated plus [illegible] percent spare.
D. Patch Cords: Provide one Category 5e patch cord for each pair of patch panel ports.

PART 3 EXECUTION

3.01 INSTALLATION OF ENCLOSURES
A. Backboards: Install at locations indicated on the Drawings.
B. If required pursuant to meeting with the Owner:
1. Wall-Mounted Racks: Install to plywood backboard at locations directed by the Owner.
2. Floor-Mounted Racks: Permanently anchor to floor in accordance with manufacturer's recommendations at locations directed by the Owner, connect adjacent racks together, and remove interior side panels.

3.02 INSTALLATION OF OUTLET BOXES
A. Install in compliance with Section 260537.
B. Mounting Heights: See Section 262726.

3.03 INSTALLATION OF PATHWAYS
A. All Pathways:
1. Install all pathways with the following minimum clearances:
a. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
b. 12 inches from power conduits and cables and panelboards.
c. 5 inches from fluorescent and high frequency lighting fixtures.
d. 6 inches from flues, hot water pipes, and steam pipes.

B. Conduit:
1. Install conduit in compliance with Section 260534 unless indicated otherwise.
a. Do not install more than two 90 degree bends in a single horizontal cable run.
b. Leave pull cords in place where cables are not initially installed.
c. Under floor slabs, locate conduit at 12 inches minimum below vapor retarder and seal penetrations of vapor retarder around conduit.
2. Underground Service Entrance: Install conduit at least 18 inches below finish grade and encase in at least 3 inches thick concrete for at least 60 inches out from the building line.

C. Grounding and Bonding: Perform in accordance with ANSI/J-STD-607 and NFPA 70.

3.04 INSTALLATION OF CABLES, PLUGS, AND JACKS
A. Only if required pursuant to meeting with the Owner:
1. Install cables from outlet to cross-connection equipment as directed by the Owner.
2. Do not exceed 300 feet from outlet to switch.
3. Do not bend cable tighter than the greater of the manufacturer's recommended bend radius or 4 times the cable diameter.
4. Do not exceed the greater of the manufacturer's recommended cable pull tension or 25 pounds.
5. Use only lubricants approved by cable manufacturer when installing cables in conduit and do not chafe or damage outer jacket.
6. Install plugs and jacks as required.
7. Provide the following minimum extra length of cable, looped neatly:
a. At Patch Panels: 10 feet.
b. At Outlets: 12 inches.
8. Install labels complying with TIA/EIA-606 using coded identifiers:
a. Cables: Color coded labels on each end.
b. Outlets: Label each jack on its cover plate with a unique numerical identifier as to its type and function.
c. Patch Panels: Label each jack with a unique numerical identifier as to its type and function.
d. Patch Cords: Label with jack identifier corresponding to initial installation.

3.05 INSTALLATION OF CROSS-CONNECTION EQUIPMENT
A. Only if required pursuant to meeting with the Owner:
1. Install connector blocks at backboards as directed by the Owner.
2. Install patch panels in equipment racks as directed by the Owner.
3. Install labels complying with TIA/EIA-606 using coded identifiers:
a. Patch Panels: Label each jack with a unique numerical identifier as to its type and function.
b. Patch Cords: Label with jack identifier corresponding to initial installation.

3.06 TESTING
A. General: Comply with inspection and testing requirements of specified installation standards.
B. Visual Inspection:
1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.
4. Inspect patch cords for complete labels.

C. Testing of Copper Cabling and Associated Equipment:
1. Test backbone cables after termination but before cross-connection.
2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
3. Test operation of shorting bars in connection blocks.
4. Category 3 Backbone: Perform attenuation test.
5. Category 3 Links: Test each pair for short circuit continuity, short to ground, crosses, reversed polarity, operational and ring-back, and dial tone.
6. Category 5e/6 Backbone: Perform near end cross talk (NEXT) and attenuation tests.
7. Category 5e/6 Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

D. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

PROJECT COORDINATOR

idGROUP
2641 IRVING BLVD.
DALLAS, TEXAS 75207
TEL: 214-638-6800

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