

ELECTRICAL SPECIFICATIONS (CONTINUED)

SECTION 16170 - GROUNDING AND BONDING

PART 1 - PRODUCTS

- 1.01 ROD ELECTRODES
A. MATERIAL: COPPER-CLAD STEEL
B. DIAMETER: 3/4" INCH
C. LENGTH: 10 FEET
1.02 MECHANICAL CONNECTORS
A. MATERIAL: BRONZE
1.03 GROUNDING CONDUCTOR (WIRE)
A. MATERIAL: STRANDED COPPER, SIZED TO MEET NFPA 70, ARTICLE 250 REQUIREMENTS.

PART 2 - EXECUTION

- 2.01 INSTALLATION
A. INSTALL ROD ELECTRODES AT LOCATIONS INDICATED. INSTALL ADDITIONAL ROD ELECTRODES AS REQUIRED TO ACHIEVE RESISTANCE TO GROUND OF LESS THAN 25 OHMS.
B. PROVIDE GROUNDING ELECTRODE CONDUCTOR AND CONNECT TO REINFORCING STEEL IN FOUNDATION FOOTING.
C. PROVIDE BONDING TO MEET REGULATORY REQUIREMENTS.
D. BOND TOGETHER EACH METALLIC RACEWAY, PIPE, DUCT AND OTHER METAL OBJECTS.
E. PROVIDE ISOLATED GROUNDING CONDUCTOR FOR CIRCUITS SUPPLYING ALL ISOLATED GROUND OUTLETS. INSULATION SHALL BE GREEN WITH YELLOW STRIPE. SIZE PER NEC TABLE 250.95. THIS ISOLATED GROUNDING CONDUCTOR SHALL RUN IN ADDITION TO EQUIPMENT GROUNDING CONDUCTOR AND ALONG WITH THE BRANCH CIRCUIT CONDUCTORS.
2.02 GROUNDING
A. GROUND ELECTRICAL SYSTEM IN ACCORDANCE WITH ARTICLE 250, NATIONAL ELECTRICAL CODE, AND LOCAL AUTHORITIES HAVING JURISDICTION.
B. INSTALL A #3/0 BARE COPPER WIRE BOND ACROSS THE WATER METER, SAME TO BE ATTACHED TO GROUND CLAMPS ON WATER LINE ON EACH SIDE OF METER. ARRANGEMENTS SHALL BE MADE TO DO THIS WORK AT THE TIME THE WATER METER IS INSTALLED.
C. FROM THE POINT OF ENTRANCE OF THE WATER MAIN INTO THE BUILDING AND ON THE METER SIDE OF THE MAIN INSIDE WATER VALVE AND UNION INSTALL A STRANDED COPPER CABLE #3/0 IN 1/4" CONDUIT TO THE MAIN DISTRIBUTION PANEL. CONNECT THE CABLE TO THE EQUIPMENT GROUND BUS.
D. INSTALL A GREEN EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY, SIZED PER NEC TABLE 250-122. TERMINATE ON EQUIPMENT GROUND BUS WITHIN PANELBOARD SERVING LOAD.
E. INSTALL #6 AWG COPPER GROUNDING CONDUCTOR FROM GROUND BAR IN MAIN TELEPHONE BOX TO GROUND NEUTRAL BUS IN MAIN DISTRIBUTION PANEL.
F. ALL SEPARATE GROUNDING ELECTRODE CONDUCTORS SHALL BE BONDED TOGETHER TO LIMIT POTENTIAL DIFFERENCES BETWEEN THEM AND BETWEEN THEIR ASSOCIATED WIRING SYSTEMS. THIS INCLUDES THE POWER SYSTEM, TELEPHONE SYSTEM, ETC.
2.03 FIELD QUALITY CONTROL
A. INSPECT GROUNDING AND BONDING SYSTEM CONDUCTORS AND CONNECTIONS FOR TIGHTNESS AND PROPER INSTALLATION.

SECTION 16190 - SUPPORTING DEVICES AND HANGERS

PART 1 - PRODUCTS

- 1.01 ACCEPTABLE MANUFACTURERS
A. SUPPORTING DEVICES AND HANGERS SHALL BE MANUFACTURED BY RAYCO FASTENERS.

PART 2 - EXECUTION

- 2.01 INSTALLATION
B. SECURE CONDUITS TO WITHIN 3" OF EACH OUTLET BOX, JUNCTION BOX, CABINET, FITTING, ETC. AND AT INTERVALS NOT TO EXCEED TEN FEET (10') AND IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE. IN SEISMIC ZONES, SUPPORT CONDUITS 1' AND UNDER AT 6' INTERVALS.
C. INSTALL CLAMPS SECURED TO STRUCTURE FOR FEEDER AND OTHER CONDUITS ROUTED AGAINST THE STRUCTURE. USE DROP RODS AND HANGERS OR RACKS TO SUPPORT CONDUITS RUN APART FROM THE STRUCTURE.
D. PROVIDE AND INSTALL SUITABLE ANGLE IRON, CHANNEL, IRON OR STEEL METAL FRAMING WITH ACCESSORIES TO SUPPORT OR BRACE ELECTRICAL EQUIPMENT INCLUDING SAFETY SWITCHES, FIXTURES, PANELBOARDS, ETC.
E. USE OF CHAINS, PERFORATED IRON, BALING WIRE, OR TIE WIRE FOR SUPPORTING CONDUIT RUNS IS NOT PERMITTED.
F. FOR SUPPORT OF LOW VOLTAGE WIRING NOT REQUIRED TO BE IN CONDUIT, BUNDLE CABLES TOGETHER IN A NEAT MANNER USING APPROVED NYLON TIE WRAPS. BUNDLED CABLES SHALL BE SUPPORTED WITH 'J' HOOKS ON TELEPHONE TYPE BRIDLE RINGS, A MINIMUM OF 6 FEET ON CENTERS. CLEARLY IDENTIFY ALL DIFFERING TYPES OF CABLES BEING RUN AND TAG WITH TAPE TAGS REGARDING TELEPHONE, PAR, MUSIC/COMMUNICATION SECURITY, ETC. FOR VARIOUS SYSTEMS UTILIZING SAID CABLE. IDENTIFICATION TAPE SHALL BE PROVIDED AT MINIMUM INTERVALS OF 25 FEET ON CENTER AND WITHIN EACH BUILDING SPACE.
G. PROVIDE A SYSTEM OF SUPPORTING DEVICES AND HANGERS TO INSURE SECURE SUPPORT OR BRACING FOR CONDUIT, ELECTRICAL EQUIPMENT, INCLUDING SAFETY SWITCHES, FIXTURES, PANELBOARDS, OUTLET BOXES, JUNCTION BOXES, CABINETS, ETC.

SECTION 16441 - ENCLOSED SWITCHES

PART 1 - PRODUCTS

- 1.01 MANUFACTURERS
A. SQUARE D.
B. GENERAL ELECTRIC.
C. CUTLER-HAMMER.
1.02 ENCLOSED SWITCHES
A. NONFUSIBLE SWITCH ASSEMBLIES: NEMA KS I, TYPE GENERAL DUTY FOR 208 VOLT LOAD INTERRUPTER ENCLOSED KNIFE SWITCH WITH EXTERNALLY OPERABLE HANDLE INTERLOCKED TO PREVENT OPENING FRONT COVER WITH SWITCH IN ON POSITION. HANDLE LOCKABLE IN OFF POSITION. PROVIDE EQUIPMENT GROUND LUG IN EACH SWITCH.
B. ENCLOSURES: NEMA KS I.
1. INTERIOR DRY LOCATIONS: TYPE I.
2. EXTERIOR LOCATIONS: TYPE 3R.

SECTION 16470 - PANELBOARDS

PART 1 - PRODUCTS

- 1.01 MANUFACTURERS (THRU A NATIONAL ACCOUNTS PROGRAM)
A. SIEMENS - SUNCOAST ENVIRONMENTAL CONTROLS (SEC) - SCOTT DYER, 877.544.6679.
B. SQUARE-D (THRU GRAYBAR-ATLANTA) - MICHAEL BROWN, 678.291.5207, EMAIL: MICHAEL.BROWN@GRABAR.COM
1.02 PANELBOARD FEATURES
A. PANELBOARDS SHALL HAVE A MINIMUM SYMMETRICAL INTERRUPTING RATING TO MEET OR EXCEED THE AVAILABLE SYMMETRICAL INTERRUPTING FAULT CURRENT AT THE DEVICE INTENDED TO INTERRUPT CURRENT.
B. BUS BARS SHALL BE COPPER OR TIN PLATED ALUMINUM.
C. PROVIDE FACTORY-INSTALLED COPPER GROUND BUS IN EACH PANELBOARD WITH LUGS OR CONNECTORS ON BAR.
D. PROVIDE ELECTRICALLY ISOLATED, FACTORY INSTALLED, NEUTRAL BUS IN EACH 3 PHASE, 4 WIRE OR 1 PHASE 3 WIRE PANELBOARD.
E. IN ADDITION TO THE GROUND BUS REQUIRED BY PARAGRAPH 1.02D, PROVIDE FACTORY INSTALLED, ELECTRICALLY ISOLATED, COPPER GROUND BUS IN EACH PANELBOARD SERVING ISOLATED GROUND RECEPTACLES.
F. MAIN LUGS AND MAIN CIRCUIT BREAKER LUGS SHALL BE UL LISTED FOR USE WITH BOTH ALUMINUM AND COPPER CONDUCTORS.
G. PROVIDE PANELBOARD DOORS WITH CHROME-PLATED LOCKS AND CATCHES. ALL LOCKS SHALL BE KEYPED ALIKE. PROVIDE TWO KEYS FOR EACH LOCK.
H. PROVIDE THERMAL-MAGNETIC CIRCUIT BREAKERS WHICH ARE RATED FOR 40 DEGREES C AMBIENT TEMPERATURE. BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK, TYPE TRIP WITH TRIP INDICATION SHOWN BY HANDLE POSITION OTHER THAN ON OR OFF. MULTI-POLE BREAKERS SHALL HAVE A COMMON TRIP HANDLE. TANDEM TYPE CIRCUIT BREAKERS SHALL NOT BE PERMITTED.
I. PROVIDE TYPED DIRECTORY CARD WITH CLEAR HOLDER FOR EACH PANELBOARD.

PART 2 - EXECUTION

- 2.01 INSTALLATION
A. PANELBOARDS SHALL BE MOUNTED AT HEIGHT ABOVE FINISHED FLOOR SUCH THAT THE HEIGHT OF THE TOP-MOST BREAKER IN THE PANEL IS NOT MORE THAN 6' ABOVE FINISHED FLOOR IN ITS HIGHEST POSITION PER THE NEC.
B. WHERE MULTIPLE PANELBOARDS ARE INSTALLED ON WALLS IN COMMON AREAS OF BUILDING, THE PANELBOARDS SHALL BE INSTALLED WITH THE TOP OF ALL PANELBOARDS AT THE SAME HEIGHT.
C. PROVIDE BLANK FILLER PLATES OVER ALL UNUSED SPACES IN PANELBOARDS.
D. A TYPED DIRECTORY CARD SHALL INDICATE DEVICES BEING SERVED AND THE SPACE NAME WHERE THE DEVICE IS LOCATED.
E. PROVIDE MINIMUM OF ONE (1) 3/4" EMPTY SPARE CONDUIT FOR EVERY 3 POLES OF SPARE BREAKER OR SPACE IN THE PANELBOARD. TIE CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE. LABEL CONDUIT AS SPARE AT PANELBOARD AND TERMINATION POINT.
F. NON-ISOLATED GROUND BARS SHALL BE GROUNDED TO PANELBOARD CAN AND MAIN SERVICE ENTRANCE GROUND BARS WITH A CODE-SIZED GROUNDING CONDUCTOR INSTALLED IN THE SAME CONDUIT AS THE PHASE AND NEUTRAL CONDUCTORS.
G. CIRCUITS USING NEUTRAL SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
H. INSPECT EACH PANELBOARD FOR PROPER INSTALLATION, PHYSICAL DAMAGE, TIGHTNESS AND INSTALLATION OF OVERCURRENT DEVICES. VERIFY PROPER COLOR CODING OF CONDUCTORS. CORRECT OR REPAIR ALL ITEMS FOUND IN INSPECTION.
NEUTRAL WIRES, GROUND WIRES, AND ISOLATED GROUND WIRES SHALL BE CONNECTED TO THE APPROPRIATE PANEL BUS BAR. DO NOT MIX BUS WIRE CONNECTIONS.

SECTION 16500 - LIGHTING FIXTURES

PART 1 - GENERAL

- 1.01 ACCEPTABLE MANUFACTURERS AND VENDORS
A. LIGHTING FIXTURES INDICATED ON LIGHTING FIXTURE SCHEDULE ARE TO BE PURCHASED FROM THE CHICK-FIL-A NATIONAL ACCOUNT VENDOR FOR THE REGION OF THE PROJECT:
ACCU-SERV LIGHTING - NORTH REGION AND SOUTH-EAST REGION. CONTACT AT ACCU-SERV: BOB HARPRING AT 877-707-7378, FAX - 502-961-0357, EMAIL - BHARPRING@ACCU-SERV.COM
VILLA LIGHTING - CENTRAL REGION, SOUTH-WEST REGION, AND WEST REGION. CONTACT AT VILLA LIGHTING: DAVE CHRISTANEL AT 800-325-0963, FAX - 314-531-8720, EMAIL - DAVE@VILLALIGHTING.COM
B. BALLASTS TO BE ADVANCE MARK III ENERGY SAVING ELECTROMAGNETIC BALLAST OR EQUAL BY JEFFERSON OR UNIVERSAL.
C. LAMPS TO BE OSRAM-SYLVANIA, NORTH AMERICAN PHILLIPS, OR GENERAL ELECTRIC.
1.02 FIXTURE REQUIREMENTS
A. PROVIDE REGULATING, I-PF BALLASTS IN ALL HID LIGHTING FIXTURES. HID LAMP TYPES SHALL BE AS SHOWN IN PHOTOMETRIC TEST DATA.
B. PROVIDE CLASS 'P' UL LABELED, I-PF, ENERGY SAVING BALLASTS IN ALL FLUORESCENT LIGHTING FIXTURES. RECESSED FLUORESCENT LIGHTING FIXTURE BALLASTS SHALL BE PROVIDED WITH INTEGRAL THERMAL PROTECTION.
C. PROVIDE RAPID START LAMPS FOR ALL FLUORESCENT FIXTURES.
D. ALL LAMPS AND BALLASTS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE NATIONAL ENERGY POLICY ACT OF 1992.
E. ALL COMPONENTS OF RECESSED FIXTURES SHALL BE ACCESSIBLE WITHOUT REMOVING FIXTURE IN OR ON CEILING.
F. ENERGY SAVING BALLASTS AND ENERGY SAVING LAMPS PROVIDED SHALL BE COMPATIBLE FOR OPERATION TOGETHER.
G. EXTERIOR FIXTURES AND POLES SHALL BE SUITABLE FOR EXTERIOR USE, SHALL BE UL LISTED AND SHALL BE A STANDARD DESIGN FOR EXTERIOR APPLICATION.
H. EXTERIOR POLES FOR FIXTURES WITH LUMINAIRES INSTALLED SHALL BE DESIGNED FOR MAXIMUM CONSTANT VELOCITY WIND LOAD WITH LUMINAIRES INSTALLED, APPLICABLE TO THE GEOGRAPHIC AREA.
1.03 CONTROLS
A. LIGHTING CONTACTORS SHALL BE CUTLER-HAMMER OF TYPE AND QUANTITY SHOWN ON DRAWINGS, EXCEPT THOSE FURNISHED WITH THE SWITCHGEAR AS PART OF THE NATIONAL ACCOUNT PROGRAM BY SUNCOAST ENVIRONMENTAL CONTROLS (SEC).
1.04 EMERGENCY LIGHTING FIXTURES
A. BATTERIES SHALL SUPPLY EMERGENCY POWER FOR LIGHTING WITH MINIMUM OPERATING TIME OF 1-1/2 HOURS.
B. EMERGENCY LIGHTING SHALL BE AUTOMATICALLY OPERATIONAL UPON NORMAL UTILITY POWER FAILURE.

PART 2 - EXECUTION

- 1.01 INSTALLATION
A. LIGHTING FIXTURES SHALL BE STRUCTURALLY SUPPORTED. FLUORESCENT FIXTURES MOUNTED IN DROPPED CEILINGS SHALL BE SUPPORTED BY AND ATTACHED TO CEILING SYSTEM AS REQUIRED BY NEC 410-16(C). IN ADDITION, FLUORESCENT TROFFERS SHALL BE SUPPORTED AT TWO OPPOSITE CORNERS TO BUILDING STRUCTURE.
B. RECESSED FIXTURES IN DROPPED CEILING AREAS SHALL BE CONNECTED TO POWER SOURCE USING FLEXIBLE CONDUIT. FLEXIBLE CONDUIT SHALL CONTAIN A SEPARATE INSULATED GREEN NO. 12 COPPER GROUND WIRE. FLEXIBLE CONDUIT SHALL BE CONNECTED TO JUNCTION BOX AND FIXTURE. GREEN GROUND WIRE SHALL PROVIDE GROUND CONTINUITY BETWEEN CONDUIT SYSTEM AND FIXTURE. GROUNDING CONDUCTORS SHALL BE PERMANENTLY AND MECHANICALLY CONNECTED BETWEEN FIXTURE AND CONDUIT SYSTEM SO AS TO BE ELECTRICALLY CONTINUOUS.
C. FIXTURES SURFACE MOUNTED ON EXPOSED TEE BAR CEILINGS SHALL USE GRIP CLAMPS ON TEE BARS TO SUPPORT FIXTURES.
D. LOCATE NO SPLICE OR TAP WITHIN AN ARM, POST, OR POLE. WIRE SHALL BE CONTINUOUS FROM SPLICE IN OUTLET BOX OF BUILDING WIRING SYSTEM TO LAMP SOCKET OR BALLAST TERMINALS.
E. MAINTAIN THE INTEGRITY OF ENCLOSURES ON ENCLOSED AND GASKETED FIXTURES. MINIMIZE THE NUMBER OF ENCLOSURE PENETRATIONS AND MAKE SUCH PENETRATIONS WATER AND DUST TIGHT WITH APPROPRIATE GASKETS AND FITTINGS.
F. CONCRETE BASES SHALL BE PROVIDED FOR ALL EXTERIOR GROUND MOUNTED OR POLE MOUNTED FIXTURES.
G. INSTALL ACCESSORIES FURNISHED WITH EACH FIXTURE.
H. WIRING FROM POLE BASES TO POLE MOUNTED LUMINAIRE SHALL BE NO. 12 WITH FUSE PROTECTION BY A 30 AMP, 600 VOLT WATERPROOF FUSE-HOLDER WITH BUSSMAN LIMITRON FUSE OF AMPERE RATING 3 TIMES THE LOAD CURRENT.
I. SURFACE AND RECESSED FIXTURES ON OR IN PLASTERED OR DRYWALL CEILINGS SHALL BE SUPPORTED BY SUPPORT CHANNELS. SUPPORT CHANNELS SHALL SPAN ACROSS MAIN SUPPORT CHANNELS AND SHALL NOT DEPEND UPON CEILINGS FOR SUPPORT.
3.02 FIELD QUALITY CONTROL
A. RELAMP FIXTURES THAT HAVE FAILED LAMPS AT SUBSTANTIAL COMPLETION.

SECTION 16751 - SPECIAL SYSTEMS

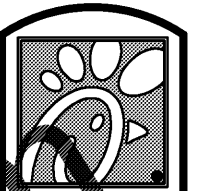
PART 1 - GENERAL

- 1.01 WORK INCLUDED
A. FURNISH AND INSTALL RACEWAY SYSTEM FOR MUSIC/COMMUNICATIONS SECURITY, CCTV POINT OF SALES, AND OTHER OWNER-FURNISHED SYSTEMS, CONSISTING OF EMPTY CONDUITS, JUNCTION BOXES, OUTLET BOXES, AND DEVICE PLATES, ETC., AS SPECIFIED AND SHOWN ON OWNER SELECTED VENDOR WIRING SCHEMATICS. CABLE, EQUIPMENT, AND INSTALLATION OF THE INTERIOR SYSTEM WILL BE PROVIDED BY THE OWNER'S SYSTEM VENDOR.
B. INTERIOR SYSTEM EQUIPMENT WILL BE FURNISHED BY OWNER'S VENDOR.
C. INSTALL SPECIAL BACKBOXES FURNISHED BY THE ELECTRICAL CONTRACTOR.
PART 2 - PRODUCTS
2.01 MATERIALS
A. PROVIDE 4-1/16" SQUARE BOXES, WITH PLASTER FINISH. PROVIDE DEVICE PLATES FOR SYSTEM OUTLETS AS SPECIFIED IN SECTION 16141. PROVIDE SEPARATE CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE FROM EACH OUTLET.
B. CABLE SHALL BE IN CONDUIT WHEN INSTALLED IN WALLS OR INACCESSIBLE CEILINGS.
C. MINIMUM CONDUIT SIZE SHALL BE 3/4".
PART 3 - EXECUTION
3.01 INSTALLATION
A. FURNISH AND INSTALL CONDUITS, JUNCTION BOXES, OUTLET BOXES, AND PLATES.
B. PROVIDE ONE #8 EQUIVALENT NYLON PULL WIRE IN EACH SYSTEM EMPTY CONDUIT.
C. PROVIDE A COMPLETE RACEWAY SYSTEM IN ACCORDANCE WITH INTERIOR SYSTEM VENDOR REQUIREMENTS. INTERIOR SYSTEM VENDOR SHALL REVIEW THE DRAWINGS. CONTRACTOR SHALL PROVIDE FOR ANY ADDITIONAL OR VARYING REQUIREMENTS.
D. FINAL CONNECTIONS AND TESTING OF SYSTEMS WILL BE PROVIDED BY THE SYSTEM VENDOR. CONTRACTOR SHALL CONTACT THE OWNER'S VENDOR AND SCHEDULE THE WORK SO AS TO COMPLETE SYSTEM INSTALLATION AND TESTING PRIOR TO OCCUPANCY OF THE FACILITY.
E. TERMINATE EACH CONDUIT STUB-UP OR TERMINATION WITH NYLON INSULATED BUSHING.

CLOSE OUT DOCUMENT REQUIREMENTS

- PROVIDE THE FOLLOWING TO THE BUILDING OWNER UPON COMPLETION OF CONSTRUCTION
1. SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
2. OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
3. NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
4. A COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE.

Order Plans FOR BID ONLY



Chick-fil-A

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SHEET TITLE ELECTRICAL SPECIFICATIONS

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