

1 ELECTRICAL SPECIFICATIONS

SECTION 16001 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. PROVIDE ALL MATERIALS, LABOR AND EQUIPMENT REQUIRED TO FURNISH AND INSTALL A COMPLETE ELECTRICAL SYSTEM AS INDICATED ON DRAWINGS AND AS SPECIFIED HEREIN.

1.02 REGULATORY REQUIREMENTS

- A. EQUIPMENT FURNISHED SHALL BE UL LISTED WHERE SUCH LABEL IS AVAILABLE. INSTALLATION SHALL CONFORM TO UL STANDARDS WHERE APPLICABLE.
 - B. ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS, NEC AND NFPA CODES IN EFFECT AT PROJECT LOCATION, STATE AND LOCAL ELECTRICAL AND BUILDING CODES AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS WITHIN COMPLETE INSTALLATION.
 - C. OBTAIN PERMITS AND CERTIFICATES OF APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION OVER THE INSTALLATION AND PAY ALL FEES REQUIRED.
- #### 1.03 SUBMITTALS
- A. SUBMIT LIST OF MATERIALS AND EQUIPMENT PRIOR TO MANUFACTURE, ORDER OR INSTALLATION AND WITHIN TWENTY DAYS AFTER AWARD OF CONTRACT FOR APPROVAL. INCLUDE EACH ITEM OF MATERIAL AND EQUIPMENT WHETHER OR NOT SHOP DRAWINGS ARE ALSO REQUIRED. LIST SHALL INCLUDE NAME OF MANUFACTURER, CATALOG NUMBER AND OTHER COMPLETE IDENTIFICATION AS WELL AS DIMENSIONS AND DETAILED DATA. SUBMITTALS SHALL INCLUDE FOR THE FOLLOWING:
 - LIGHTING FIXTURES
 - PANELBOARDS/BREAKERS
 - WIRING DEVICES AND DEVICE PLATES
 - ENCLOSED SWITCHES
 - B. CERTIFIED SHOP DRAWINGS AND SUBMITTALS SHALL BEAR STAMP OF APPROVAL OF CONTRACTOR AS EVIDENCE THAT DRAWINGS HAVE BEEN CHECKED. DRAWINGS SUBMITTED WITHOUT THIS STAMP OF APPROVAL WILL NOT BE CONSIDERED AND WILL BE RETURNED FOR PROPER RESUBMISSION.
 - C. IF SUBMITTALS SHOW VARIANCES OR SUBSTITUTIONS FROM REQUIREMENTS OF CONTRACT, CONTRACTOR SHALL MAKE SPECIFIC MENTION OF SUCH VARIATION IN HIS LETTER OF TRANSMITTAL IN ORDER THAT, IF ACCEPTABLE, SUITABLE ACTION MAY BE TAKEN FOR PROPER ADJUSTMENT. OTHERWISE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR EXECUTING WORK IN ACCORDANCE WITH CONTRACT EVEN THOUGH SUCH SUBMITTALS HAVE BEEN APPROVED.

1.04 SITE VISIT

- A. VISIT JOB SITE PRIOR TO BID DATE TO DETERMINE ACTUAL CONDITIONS UNDER WHICH WORK SHALL BE DONE, TO FAMILIARIZE ONESELF WITH PROJECT AND TO VERIFY TOTAL SCOPE OF WORK REQUIRED. FAILURE TO DO SO SHALL NOT CONSTITUTE A REASON FOR AN EXTRA CHARGE.

SECTION 16050 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 COORDINATION

- A. OBTAIN AND REVIEW SHOP DRAWINGS, PRODUCT DATA, AND MANUFACTURER'S INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER OTHER SECTIONS TO DETERMINE CONNECTION LOCATIONS AND REQUIREMENTS.
- B. SEQUENCE ROUGH-IN OF ELECTRICAL CONNECTIONS TO COORDINATE WITH INSTALLATION AND START-UP OF EQUIPMENT FURNISHED UNDER OTHER SECTIONS.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. WHERE SPECIFICATIONS LIST ONE OR MORE MANUFACTURERS AND DO NOT INCLUDE "OR APPROVED EQUAL", FURNISH MATERIALS MADE BY ONE OF MANUFACTURERS LISTED. WHERE "OR APPROVED EQUAL" IS INCLUDED, CONTRACTOR MAY SUBSTITUTE EQUAL PRODUCTS BY ANOTHER MANUFACTURER SUBJECT TO APPROVAL BY ENGINEER AND OWNER.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. MAKE ELECTRICAL CONNECTIONS TO UTILIZATION EQUIPMENT IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S INSTRUCTIONS.
- B. DRAWINGS ARE DIAGRAMATIC AND SHALL NOT BE SCALED FOR EXACT SIZES OR LOCATIONS. THEY ARE NOT INTENDED TO DISCLOSE ABSOLUTE OR UNCONDITIONAL KNOWLEDGE OF ACTUAL FIELD CONDITIONS.
- C. PROTECT WORK AND MATERIALS FROM DAMAGE BY WEATHER, ENTRANCE OF WATER AND DIRT. CAP CONDUIT DURING INSTALLATION. AVOID DAMAGE TO MATERIALS AND EQUIPMENT IN PLACE.
- D. SATISFACTORILY REPAIR OR REMOVE AND REPLACE DAMAGED WORK WITH NEW MATERIALS. DELIVER EQUIPMENT AND MATERIALS TO JOB SITE IN ORIGINAL, UNOPENED, LABELED CONTAINERS. STORE FERROUS MATERIALS TO PREVENT RUSTING. STORE FINISHED MATERIALS AND EQUIPMENT TO PREVENT STAINING AND DISCOLORING.
- E. TRENCHES SHALL BE EXCAVATED 6" BELOW ELEVATION OF BOTTOM OF CONDUIT.
- F. FAILURE TO ROUTE CONDUIT THROUGH BUILDING WITHOUT INTERFERING WITH OTHER EQUIPMENT AND CONSTRUCTION SHALL NOT CONSTITUTE A REASON FOR AN EXTRA CHARGE. EQUIPMENT, CONDUIT, AND FIXTURES SHALL FIT INTO AVAILABLE SPACES IN BUILDING AND SHALL NOT BE INTRODUCED INTO BUILDING AT SUCH TIMES AND MANNER AS TO CAUSE DAMAGE TO STRUCTURE OR EQUIPMENT. REQUIRING SERVICE SHALL BE READILY ACCESSIBLE.

3.02 TESTING AND EQUIPMENT SERVICING

- A. MAKE TEST TO ENSURE THAT ENTIRE SYSTEM IS IN PROPER OPERATING CONDITION, AND THAT ADJUSTMENTS AND APPARATUS SETTING OF CIRCUIT BREAKERS, FUSES, CONTROL EQUIPMENT AND APPARATUS HAVE BEEN MADE. CORRECT DEFECTS DISCOVERED DURING TESTS.

3.03 REMOVAL OF DEBRIS

- A. REMOVE SURPLUS MATERIALS AND DEBRIS CAUSE BY, OR INCIDENTAL TO, ELECTRICAL WORK. REMOVE SUCH DEBRIS AT FREQUENT INTERVALS. KEEP JOB AREA CLEAN DURING CONSTRUCTION.

3.04 IDENTIFICATION OF EQUIPMENT

- A. IDENTIFY ELECTRICAL DISTRIBUTION EQUIPMENT, PANELS, AND CONTACTORS WITH BLACK LAMINATED PLATE OR NAME PLATES, ATTACHED WITH TWO SCREWS, ENGRAVED WITH 1/4" HIGH, WHITE LETTERS.

3.05 TEMPORARY LIGHTING AND POWER AREAS OF CONSTRUCTION

- A. PROVIDE, MAINTAIN AND REMOVE AFTER CONSTRUCTION IS COMPLETED, TEMPORARY LIGHTING ADEQUATE FOR WORKMAN SAFETY AND TEMPORARY POWER FOR ALL TRADES INCLUDING ANY 3 PHASE POWER REQUIRED.

- B. PROVIDE AND MAINTAIN BARRICADE LIGHTING WHERE REQUIRED TO ADEQUATELY PROTECT OWNER AGAINST LIABILITY FOR DAMAGE TO PUBLIC OR PERSONNEL. ALL LAMPS USED IN BARRICADE SHALL BE 60 WATT RED, INSTALLED IN WEATHERPROOF SOCKET WITH WIRE GUARD. ALL WIRING SHALL BE APPROVED FOR WEATHERPROOF INSTALLATION.

3.06 GUARANTEE-WARRANTY

- A. GUARANTEE WORK TO BE FREE FROM DEFECTS OF MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF BUILDING. REPAIR AND REPLACE DEFECTIVE WORK AND OTHER WORK DAMAGED THEREBY WHICH BECOMES DEFECTIVE DURING TERM OF GUARANTEE-WARRANTY. FURNISH OWNER WITH THREE WRITTEN COPIES OF GUARANTEE-WARRANTY.

SECTION 16111 - RACEWAYS AND CONDUIT SYSTEMS

PART 1 - PRODUCTS

1.01 ACCEPTABLE MANUFACTURERS

- A. RIGID IMC, AND EMT CONDUIT SHALL BE HOT-DIPPED, GALVANIZED, OR ELECTROGALVANIZED STEEL BY ALLIED, REPUBLIC, TRIANGLE, WHEATLAND, OR APPROVED EQUAL.
 - B. PVC CONDUIT SHALL BE CARLON, SCHEDULE 40, 90 DEGREES C, RATED, UNLESS OTHERWISE NOTED.
 - C. MC CABLE SHALL BE MANUFACTURED BY AFC CABLE SYSTEMS OR APPROVED EQUAL. TYPE "AC-90" IS NOT ALLOWED. ALL MC CABLES SHALL HAVE A GREEN EQUIPMENT GROUND CONDUCTOR AND AN ISOLATED GROUND (GREEN + YELLOW STRIP) CONDUCTOR. CABLES FOR DATA SYSTEMS POWER CIRCUITS SHALL BE AS SPECIFIED ON PLANS.
 - D. ASSOCIATED COUPLINGS, CONNECTORS AND FITTINGS SHALL BE STEEL, AS MANUFACTURED BY RACO OR EQUIVALENT. CATALOG NUMBERS USED BELOW ARE THOSE OF RACO.
 - E. ERICKSON COUPLINGS, SERIES 1502, SHALL BE USED WHERE NEITHER LENGTH OF CONDUIT CAN BE ROTATED.
 - F. INSULATED BUSHINGS SHALL BE SERIES 1402.
 - G. EMT BOX CONNECTORS SHALL BE COMPRESSION FITTINGS.
 - H. CONDUIT, CONNECTORS, COUPLINGS AND FITTINGS SHALL BE UL LISTED AND LABELED.
- #### 1.02 ELECTRICAL METALLIC TUBING (EMT)
- A. USE ELECTRIC METALLIC TUBING (EMT) WHERE DRAWINGS CALL FOR CONDUIT TO BE:
 1. CONCEALED IN WALLS.
 2. INSTALLED ABOVE SUSPENDED CEILINGS.
 3. INSTALLED EXPOSED, ABOVE 6 FEET.
- #### 1.03 INTERMEDIATE METAL CONDUIT (IMC)
- A. USE INTERMEDIATE METAL CONDUIT (IMC) WHERE DRAWINGS CALL FOR CONDUIT TO BE:
 1. INSTALLED FOR PANELBOARD FEEDERS.
 2. INSTALLED IN WET LOCATIONS (INTERIOR AND EXTERIOR).
 3. INSTALLED EXPOSED BELOW 6 FEET.
- #### 1.04 POLYVINYL CHLORIDE (PVC) RACEWAY
- A. USE PVC RACEWAY FOR:
 1. UNDERGROUND SERVICE ENTRANCE CONDUITS FOR TELEPHONE AND POWER.
 2. EXTERIOR BRANCH CIRCUITS INSTALLED UNDERGROUND.
 3. INTERIOR BRANCH CIRCUIT CONDUITS INSTALLED IN CONCRETE SLAB ON GROUND FLOOR.

1.05 RIGID STEEL CONDUIT (RSC)

- A. USE RIGID STEEL CONDUIT FOR:
 1. INSTALL UNDERGROUND FOR POWER SERVICE ENTRANCE ELBOWS PENETRATING FLOOR SLAB.
 2. EXPOSED TO PHYSICAL DAMAGE.

1.06 FLEXIBLE METAL CONDUIT

- A. PROVIDE FLEXIBLE METAL CONDUIT FOR TERMINATION AT EQUIPMENT SUBJECT TO MOTION AND VIBRATION.
- B. LENGTH SHALL NOT EXCEED 6 FEET IN ACCESSIBLE CEILING AREAS.
- C. SHALL NOT BE CONCEALED IN WALLS.
- D. WHERE EXPOSED TO CONTINUOUS OR INTERMITTENT MOISTURE, CONDUIT SHALL BE UL TYPE EF LIQUID TIGHT.
- E. FOR CONNECTION TO CEILING MOUNTED LIGHTING FIXTURES FROM OUTLET BOXES.

1.07 MC (METAL-CLAD) CABLE

- A. MC CABLE MAY BE USED, CONCEALED ABOVE CEILING AND IN WALLS, WHEN ALLOWED BY LOCAL CODES AND ARTICLE 330 OF THE NATIONAL ELECTRICAL CODE FOR THE CONNECTION OF THE POINT OF SALES SYSTEM EQUIPMENT ONLY.

PART 2 - EXECUTION

2.01 INSTALLATION

- A. MINIMUM SIZE CONDUIT SHALL BE 1/2 INCH.
- B. RUN CONCEALED CONDUITS IN DIRECT LINE WITH LONG SWEEP BENDS OR OFFSETS. RUN EXPOSED CONDUITS PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES. GROUP MULTIPLE CONDUIT RUNS IN TRAYS.
- C. CAP ENDS OF CONDUITS TO PREVENT ENTRANCE OF WATER AND OTHER FOREIGN MATERIAL DURING CONSTRUCTION.
 1. PROVIDE NO. 12 AWG COPPER PULL WIRES OR NYLON CORD IN ALL EMPTY CONDUITS. STEEL WIRE NOT ACCEPTABLE AS PULL WIRE.
 2. WHERE IMC CONDUIT ENTERS A CABINET, JUNCTION BOX, OR PULL BOX, CONDUCTORS SHALL BE PROTECTED BY AN INSULATED BUSHING. LOCKOUTS SHALL BE INSTALLED ON CONDUIT OUTSIDE AND INSIDE ENCLOSURE.
 3. IN AREAS WHERE ENCLOSED AND GASKETED FIXTURES AND WEATHERPROOF DEVICES ARE SPECIFIED, WHERE RIGID CONDUIT ENTERS A SHEET METAL ENCLOSURE, JUNCTION BOX AND OUTLET BOX, AND NOT TERMINATED IN A THREADED HUB, A STEEL OR MALLEABLE IRON NYLON INSULATED HUB, COMPLETE WITH RECESSED SEALING "O" RING OR SEALING LOCKOUT SHALL BE USED.
 4. PROVIDE SEAL-OFF FITTING IN ALL CONDUITS ENTERING A COLD TEMPERATURE AREA SUCH AS FREEZERS AND DRY REFRIGERATORS.
 5. IN CONCRETE SLABS, BLOCK UP CONDUIT FROM FORMS AND SECURELY FASTEN IN PLACE. ALL CONDUITS IN SLABS SHALL HAVE A MINIMUM OF 4" INCHES CONCRETE COVERAGE ABOVE.
 6. FAILURE TO ROUTE CONDUIT THROUGH BUILDING WITHOUT INTERFERING WITH OTHER EQUIPMENT, AND CONSTRUCTION SHALL NOT CONSTITUTE A REASON FOR AN EXTRA CHARGE. EQUIPMENT, CONDUIT, AND FIXTURES SHALL FIT INTO AVAILABLE SPACES IN BUILDING AND SHALL NOT BE INTRODUCED INTO BUILDING AT SUCH TIMES AND MANNER AS TO CAUSE DAMAGE TO STRUCTURE OR EQUIPMENT. EQUIPMENT REQUIRING SERVICING SHALL BE READILY ACCESSIBLE.

2.02 EMT (ELECTRICAL METALLIC TUBING) RACEWAY

- A. DO NOT USE ELECTRIC METALLIC TUBING IN CINDER CONCRETE OR CINDER FILL OR WHERE CONDUIT SYSTEM IS IN CONTACT WITH DISSIMILAR METALS OR IN WET LOCATIONS.

2.03 PVC RACEWAY

- A. USE THREADED FITTINGS FOR ALL CONNECTORS AND ADAPTERS.
- B. PROVIDE 1/4-INCH NYLON PULL ROPE IN ALL PRIMARY POWER AND INCOMING TELEPHONE SERVICE ENTRANCE CONDUITS.
- C. PVC CONDUIT SHALL CONVERT TO GALVANIZED RIGID METAL PER DETAIL #4 ON SHEET E1.2.

2.04 FLEXIBLE METAL CONDUIT

- A. WHERE FITTINGS FOR LIQUID TIGHT FLEXIBLE CONDUIT ARE BROUGHT INTO AN ENCLOSURE WITH A KNOCK-OUT, A GASKET ASSEMBLY, CONSISTING OF ONE PIECE "O" RING, WITH BUNA-N SEALING MATERIAL, SERIES 3400, SHALL BE INSTALLED ON OUTSIDE OF BOX. FITTINGS SHALL BE MADE OF EITHER STEEL OR MALLEABLE IRON ONLY, AND SHALL HAVE INSULATED THROATS OR INSULATED BUSHINGS.
- B. IN DRY LOCATIONS, WHERE FINAL CONNECTIONS TO MOTORS AND OTHER EQUIPMENT MAY BE MADE WITH FLEXIBLE METAL CONDUIT, FITTINGS SHALL BE OF STEEL OR MALLEABLE IRON ONLY WITH INSULATED THROATS OR INSULATED BUSHINGS, AND SHALL BE OF WEDGE AND SCREW TYPE HAVING AN ANGULAR WEDGE FITTING BETWEEN CONVOLUTIONS OF CONDUIT.

SECTION 16123 - CONDUCTORS

PART 1 - PRODUCTS

1.01 CONDUCTORS

- A. PROVIDE 98% CONDUCTIVITY COPPER CONDUCTORS WITH 600-VOLT INSULATION. FOR CONDUCTORS NO. 12 AWG AND NO. 10 AWG, PROVIDE SOLID TYPE. FOR ALL CONDUCTORS NO. 8 AWG AND LARGER, PROVIDE STRANDED TYPE. ALL CONDUCTORS SHALL HAVE TH-N/TWHN INSULATION UNLESS NOTED OTHERWISE.
- B. CONDUCTORS SHALL BE MANUFACTURED BY TRIANGLE, AMERICAN, ROME, SOUTHWIRE OR APPROVED EQUAL.
- C. PROVIDE NO. 14 AWG TYPE TH-N FIXTURE CONDUCTORS, FOR CONDUCTORS ENTERING FIXTURES.
- D. BRANCH CIRCUIT CONDUCTORS SHALL BE MINIMUM #12 AWG, COPPER.

PART 2 - EXECUTION

2.01 INSTALLATION

- A. INSTALL PULL BOXES IN CIRCUITS OR FEEDERS OVER 100' LONG.
- B. MAKE ALL SPLICES OR CONNECTIONS ONLY AT OUTLET, PULL OR JUNCTION BOXES.
- C. ALL CONDUCTORS AND CONNECTIONS SHALL TEST FREE OF GROUNDS, SHORTS, AND OPENS PRIOR TO ENERGIZING CIRCUIT.
- D. PROVIDE NO. 10 WIRE IN LIEU OF NO. 12 WIRE FOR ANY BRANCH CIRCUIT IN EXCESS OF 300 FEET LINEAR LENGTH TO PREVENT EXCESSIVE VOLTAGE DROP.
- E. USE IDEAL WING NUTS, SCOTCHLOK TYPE Y, R, G, OR B, OR APPROVED EQUIVALENT CONNECTORS FOR FIXTURE CONNECTIONS AT OUTLET BOXES.
- F. MAKE FEEDER TAPS AND SPICES WITH ONE TYPE T, PT, PM OR PTD OR APPROVED EQUIVALENT CLAMP CONNECTORS AS MANUFACTURED BY KLEINER, OR WITH APPROVED COMPRESSION SLEEVES. WRAP CONNECTORS WITH NO. 10 ELMEN SEALER OR APPROVED EQUIVALENT PLASTIC FILLER AND VINYL TAPE.
- G. LEAVE A MINIMUM OF #12 BLACK WIRE IN EVERY OUTLET BOX.
- H. PROVIDE COLOR CODED WIRING WITH A DIFFERENT COLOR FOR EACH PHASE AND NEUTRAL AND GROUND AS FOLLOWS: PHASE A, B, C: BLACK, RED AND BLUE RESPECTIVELY; NEUTRAL: WHITE; ISOLATED GROUND: GREEN WITH YELLOW STRIPES; APPROVED COLOR TAPE IS ACCEPTABLE FOR WIRES USING LARGER THAN #6 CONDUCTORS.
- I. ALL CONDUCTORS SHALL BE CONTINUOUS FROM ORIGIN TO PANEL, OR EQUIPMENT TERMINATION WITHOUT SPLICES WHERE POSSIBLE. WHERE SPLICES AND TAPS ARE NECESSARY OR ARE REQUIRED, THEY SHALL BE MADE IN SPLICE BOXES WITH SUITABLE CONNECTORS.
- J. TIGHTEN ALL ELECTRICAL CONNECTORS AND TERMINALS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT INDICATED, TIGHTEN CONNECTORS AND TERMINALS TO COMPLY WITH TIGHTENING TORQUES SPECIFIED IN UL486A AND UL486B.

SECTION 16130 - OUTLET AND JUNCTION BOXES

PART 1 - GENERAL

1.01 PROJECT CONDITIONS

- A. VERIFY FIELD MEASUREMENTS ARE AS SHOWN ON DRAWINGS.
- B. VERIFY LOCATIONS OF FLOOR BOXES AND OUTLETS IN WORK AREAS PRIOR TO ROUGH-IN.

PART 2 - PRODUCTS

2.01 OUTLET BOXES

- A. SHEET METAL OUTLET BOXES: GALVANIZED STEEL.
- B. CAST BOXES: TYPE FS, CAST FERRALLOY, PROVIDE GASKETED COVER BY BOX MANUFACTURER.
- C. MANUFACTURERS: NATIONAL, APPLETON, GENERAL ELECTRIC, RACO, OR STEEL CITY.
- D. PROVIDE BOXES FOR FIXTURES WITH FIXTURE STUDS IN CENTER.
- E. OUTLET BOXES FOR LIGHTING, SWITCHES AND RECEPTACLES IN INTERIOR AREAS WITH EXPOSED CONDUIT SHALL BE PRESSED STEEL, AND IN EXTERIOR AREAS WITH EXPOSED CONDUIT SHALL BE CAST METAL WITH THREADED HUBS, "FS" TYPE. USE GALVANIZED STEEL FOR CONCEALED BOXES. BOXES SHALL BE 1/2" DEEP MINIMUM.

2.02 PULL AND JUNCTION BOXES

- A. SHEET METAL BOXES: GALVANIZED STEEL.
- B. SURFACE-MOUNTED CAST METAL BOX: TYPE 4, FLAT-FLANGED, SURFACE-MOUNTED JUNCTION BOX.
 1. MATERIAL: GALVANIZED CAST IRON.
 2. COVER: FURNISH WITH GROUND FLANGE, NEOPRENE GASKET, AND STAINLESS STEEL COVER SCREWS.
- C. IN-GROUND CAST METAL BOX: INSIDE FLANGED, RECESSED COVER BOX FOR FLUSH MOUNTING.
 1. MATERIAL: GALVANIZED CAST IRON.
 2. COVER: NONSKID COVER WITH NEOPRENE GASKET AND STAINLESS STEEL COVER SCREWS.
 3. COVER LEGEND: ELECTRIC.
- D. MANUFACTURERS: NATIONAL, APPLETON, GENERAL ELECTRIC, RACO, OZ-GEORNEY OR STEEL CITY.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. INSTALL ELECTRICAL BOXES AS SHOWN ON DRAWINGS, AND AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND COMPLIANCE WITH REGULATORY REQUIREMENTS.
- B. INSTALL PULL BOXES AND JUNCTION BOXES ABOVE ACCESSIBLE CEILINGS.
- C. IN ACCESSIBLE CEILING AREAS: INSTALL OUTLET AND JUNCTION BOXES NO MORE THAN 6 INCHES FROM CEILING ACCESS PANEL, OR FROM REMOVABLE RECESSED LIGHT FIXTURE.
- D. USE FLUSH MOUNTING OUTLET BOXES IN FINISHED AREAS.
- E. USE STAMPED STEEL BRIDGES TO FASTEN FLUSH MOUNTING OUTLET BOX BETWEEN STUDS.
- F. INSTALL FLUSH MOUNTED BOX WITHOUT DAMAGING WALL INSULATION OR REDUCING ITS EFFECTIVENESS.

- G. USE ADJUSTABLE STEEL CHANNEL FASTENERS FOR HUNG CEILING OUTLET BOX.

- H. DO NOT FASTEN BOXES TO CEILING SUPPORT WIRES.

- I. SUPPORT BOXES INDEPENDENTLY OF CONDUIT, EXCEPT CAST BOX THAT IS CONNECTED TO TWO RIGID METAL CONDUITS BOTH SUPPORTED WITHIN 12 INCHES OF BOX.

- J. USE GANG BOX WHERE MORE THAN ONE DEVICE IS MOUNTED TOGETHER. DO NOT USE SECTIONAL BOX.

- K. USE GANG BOX WITH PLASTER RING FOR SINGLE DEVICE OUTLETS.

- L. USE CAST OUTLET BOX IN EXTERIOR LOCATIONS AND WET LOCATIONS.

3.02 OUTLET BOXES

- A. SELECT BOXES ACCORDING TO INTENDED USE AND TYPE OF OUTLET. CEILING OUTLET BOXES SHALL BE 4" OCTAGON AND 1/2" DEEP. USE 2-1/8" DEEP OCTAGON BOXES. 2-1/2" SQUARE BOXES REQUIRED. ALL CEILING OUTLET BOXES SHALL HAVE A FIXTURE STUD OF NO. 10 WIRE. LOCKING TYPE INSTALLED IF REQUIRED TO HANG THE FIXTURE SPECIFIED AT THE OUTLET.

3.03 JUNCTION BOXES

- A. JUNCTION BOXES SHALL BE SIZED ACCORDING TO NUMBER OF CONDUCTORS IN BOX OR TYPE OF SERVICE TO BE PROVIDED. MINIMUM SECTIONAL BOXES SHALL BE 4-1/16" SQUARE AND 2-1/8" DEEP. PROVIDE SCREW COVERS FOR JUNCTION BOXES.

- B. USE CODE GALVANIZED STEEL WITH SCREW COVERS FOR PULL BOXES WITH PRIME COAT AND PROVIDE WITH SCREW COVERS FOR PULL BOXES ACCORDING TO THE NEC.

- C. PROVIDE PULL BOX EVERY 100' OF CONDUIT RUN OR WHERE EXCESSIVE NUMBER OF BENDS NECESSITATES A BOX INCREASE OF WIRE INSTALLATION.

SECTION 16141 - WIRING DEVICES AND PLATES

PART 1 - PRODUCTS

1.01 WALL SWITCHES

- A. SWITCHES SHALL BE PURCHASED FROM THE NATIONAL ACCOUNTS VENDOR INDICATED ON THE PLANS.

- B. RATINGS: 20 AMPS, 120/277 VOLTS A.C. OR AS IDENTIFIED ON DRAWINGS.

- C. DEVICES: COOPER/ARROW HART CATALOG NUMBERS ARE LISTED UNLESS NOTED OTHERWISE:

1. SINGLE POLE TOGGLE SWITCHES:
 - 20 AMP GREY DEVICE - #A4122-GY
 - 20 AMP PILOT LIGHTS ILLUMINATED WITH LOAD ON - #A4122-PL
2. DOUBLE POLE TOGGLE SWITCHES: 20 AMP GREY DEVICE - #A4122-GY

1.02 RECEPTACLES

- A. SWITCHES SHALL BE PURCHASED FROM THE NATIONAL ACCOUNTS VENDOR INDICATED ON THE PLANS.

- B. DEVICES: COOPER/ARROW HART CATALOG NUMBERS ARE LISTED UNLESS OTHERWISE NOTED:

1. SPECIFICATION GRADE DEVICES (GREY DEVICE COLOR IN ALL AREAS, EXCEPT FOR 1G TYPE) TO BE 20 AMP, 125 VOLTS, A.C. RECEPTACLES:
 - SINGLE (SIMPLEX) DEVICES: #1877-GY
 - DUPLEX DEVICES: #R20-GY
 - TAMPER RESISTANT DUPLEX DEVICES: #TR200-GY
 - GF (GROUND-FALLT CIRCUIT INTERRUPTER) DUPLEX DEVICES: #VGF20-GY
 - 1G (ISOLATED GROUND) DUPLEX DEVICES: #G5362-RN (ORANGE FACE)

1.03 SPECIAL DEVICES:

- A. MANUAL MOTOR STARTER SWITCH: SQ. D CLASS 2510, TYPE F, FOR USE ON MOTORS UP TO 3/4 HORSEPOWER. PROVIDE NEMA 1 ENCLOSURE IN DRY LOCATIONS, PROVIDE NEMA 3R ENCLOSURE IN WET OR EXTERIOR LOCATIONS.

1.04 WALL PLATES

- A. PROVIDE COOPER/ARROW HART, OR APPROVED EQUAL, SMOOTH SATIN STAINLESS STEEL 302-SS SERIES FOR SWITCHES AND RECEPTACLES.
- B. PROVIDE BLANK PLATES ON ALL OUTLET BOXES FOR FUTURE OUTLETS, OR OUTLETS WITHOUT DEVICES. PLATE STYLE SHALL MATCH BOXES PLATES.
- C. PROVIDE NON-METALLIC WEATHERPROOF COVERS FOR DUPLEX GF RECEPTACLES LOCATED OUTSIDE OR IN WET LOCATIONS THAT FEATURE "WHILE-IN-USE" COVER EQUIVALENT TO ARROWHART #WH-L.
- D. WHERE DEVICES INSTALLED IN EXPOSED BOXES OR CONDUIT FITTINGS, PROVIDE PROPERLY DESIGNED PLATES AND COVERS EQUAL TO ARROWHART RS-SERIES EXPOSED WORK COVERS.
- E. INSTALL GALVANIZED STEEL PLATES ON OUTLET BOXES AND JUNCTION BOXES IN UNFINISHED AREAS, ABOVE ACCESSIBLE CEILINGS, AND ON SURFACE MOUNTED BOXES.

PART 2 - EXECUTION

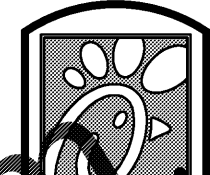
2.01 INSTALLATION

A. MOUNTING

1. MOUNT SWITCHES AND RECEPTACLES AT HEIGHT ABOVE FINISHED FLOOR AS INDICATED ON PLANS, AND LEGEND.
2. MOUNT SWITCHES ON STRIKE SIDE OF DOOR MAXIMUM 8" FROM DOOR FRAME. OUTLET BOX FOR SWITCH SHALL BE LOCATED CLEAR OF DOOR FRAME. COORDINATE WITH ARCHITECTURAL PLANS PRIOR TO ROUGH-IN.
3. INSTALL SWITCHES WITH OFF POSITION DOWN.
4. DO NOT USE THE FEED THRU FEATURE FOR THE GF TYPE RECEPTACLE, UNLESS REQUIRED BY THE PLANS.
5. USE JUMBO SIZED PLATES FOR OUTLETS INSTALLED IN MASONRY WALLS.
6. EACH RECEPTACLE SHALL BE PROVIDED WITH A #12 GREEN GROUNDING JUMPER BETWEEN THE GROUND TERMINAL OF THE RECEPTACLE AND THE OUTLET BOX.
7. THE GROUNDING CONDUCTOR TO EACH RECEPTACLE SHALL BE INSTALLED SUCH THAT THE REMOVAL OF THE DEVICE WILL NOT INTERFERE WITH THE CONTINUITY OF THE GROUND.

B. TESTING

1. TEST EACH SWITCH AND VERIFY PROPER OPERATION WITH ENERGIZED CIRCUIT.
2. TEST EACH RECEPTACLE FOR PROPER POLARITY ON ENERGIZED CIRCUIT.
3. TEST EACH GF RECEPTACLE WITH A GF RECEPTACLE TESTER AND VERIFY CIRCUIT IS OPENED BY GF DEVICE AT MILLI-AMPERE RANGES ESTABLISHED BY THE MANUFACTURER.



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Revisions:

Mark	Date	By
△	06.30.17	ISSUED FOR PERMIT

Mark	Date	By
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Mark	Date	By
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SHEET TITLE
**ELECTRICAL
SPECIFICATIONS**

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Store : 02593
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