ECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

A. GROUNDING AND BONDING.

B. CONNECTION OF UTILIZATION EQUIPMENT.

C. SUPPORTS.

D. IDENTIFICATION.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR REVIEW; PROVIDE CATALOG DATA FOR GROUNDING AND BONDING DEVICES.

1.3 REGULATORY REQUIREMENTS

A. CONFORM TO REQUIREMENTS OF NFPA 70.

B. FURNISH PRODUCTS LISTED BY UL OR OTHER TESTING FIRM ACCEPTABLE TO AUTHORITY HAVING JURISDICTION.

C. FLORIDA BUILDING CODE

1.4 PROJECT CONDITIONS

A. EXISTING PROJECT CONDITIONS INDICATED ARE BASED ON CASUAL FIELD OBSERVATION AND EXISTING RECORD DOCUMENTS.

B. VERIFY FIELD MEASUREMENTS AND CIRCUITING ARRANGEMENTS ARE AS SHOWN ON DRAWINGS.

C. VERIFY REMOVAL OF EXISTING ELECTRIC WORK.

D. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION.

PART 2 PRODUCTS

2.1 GROUNDING MATERIALS

A. GROUND ROD: COPPER-CLAD STEEL 3/4-INCH DIAMETER 10 FEET LENGTH.

B. MECHANICAL CONNECTORS: BRONZE. ABOVE GRADE ONLY.

C. EXOTHERMIC WELDS: BELOW GRADE CONNECTORS.

2.2 BASIC MATERIALS

A. STEEL CHANNEL: GALVANIZED

B. MISCELLANEOUS HARDWARE: TREAT FOR CORROSION RESISTANCE.

C. NAMEPLATES: ENGRAVED THREE-LAYER LAMINATED PLASTIC, BLACK LETTERS ON WHITE BACKGROUND.

D. WIRE AND CABLE MARKERS: CLOTH MARKERS, SPLIT SLEEVE OR TUBING TYPE.

PART 3 EXECUTION

.1 INSTALLATION

A. INSTALL WORK ACCORDING TO NECA "STANDARD OF INSTALLATION."

B. PROVIDE BONDING TO MEET REGULATORY REQUIREMENTS.

C. MAKE ELECTRICAL CONNECTIONS TO UTILIZATION EQUIPMENT IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

1. VERIFY THAT WIRING AND OUTLET ROUGH-IN WORK IS COMPLETE AND THAT UTILIZATION EQUIPMENT IS READY FOR ELECTRICAL CONNECTION, WIRING, AND ENERGIZING.

2. MAKE WIRING CONNECTIONS IN CONTROL PANEL OR IN WIRING COMPARTMENT OF PRE-WIRED EQUIPMENT. PROVIDE INTERCONNECTING WIRING WHERE INDICATED.

3. INSTALL AND CONNECT DISCONNECT SWITCHES, CONTROLLERS, CONTROL STATIONS, AND CONTROL DEVICES AS INDICATED.

4. MAKE CONDUIT CONNECTIONS TO EQUIPMENT USING FLEXIBLE CONDUIT. USE LIQUIDTIGHT FLEXIBLE CONDUIT IN DAMP OR WET LOCATIONS.

5. INSTALL PRE-FABRICATED CORD SET WHERE CONNECTION WITH ATTACHMENT PLUG IS INDICATED OR SPECIFIED, OR USE ATTACHMENT PLUG WITH SUITABLE STRAIN-RELIEF CLAMPS.

6. PROVIDE SUITABLE STRAIN-RELIEF CLAMPS FOR CORD CONNECTIONS TO OUTLET BOXES AND EQUIPMENT CONNECTION BOXES.

D. INSTALL SUPPORT SYSTEMS SIZED AND FASTENED TO ACCOMMODATE WEIGHT OF EQUIPMENT AND CONDUIT, INCLUDING WIRING, WHICH THEY CARRY.

1. FASTEN HANGER RODS, CONDUIT CLAMPS, AND OUTLET AND JUNCTION BOXES TO BUILDING STRUCTURE USING PRECAST INSERT SYSTEM BEAM CLAMPS.

2. USE TOGGLE BOLTS OR HOLLOW WALL FASTENERS IN HOLLOW MASONRY, PLASTER, OR GYPSUM BOARD PARTITIONS AND WALLS; EXPANSION ANCHORS OR PRESET INSERTS IN SOLID MASONRY WALLS; SELF-DRILLING ANCHORS OR EXPANSION ANCHOR ON CONCRETE SURFACES; SHEET METAL SCREWS IN SHEET METAL STUDS; AND WOOD SCREWS IN WOOD CONSTRUCTION.

3. DO NOT FASTEN SUPPORTS TO PIPING, CEILING SUPPORT WIRES, DUCTWORK, MECHANICAL EQUIPMENT, OR CONDUIT.

4. DO NOT USE POWDER-ACTUATED ANCHORS.

5. DO NOT DRILL STRUCTURAL STEEL MEMBERS.

6. FABRICATE SUPPORTS FROM STRUCTURAL STEEL OR STEEL CHANNEL.

E. IDENTIFY ELECTRICAL DISTRIBUTION AND CONTROL EQUIPMENT, AND LOADS SERVED, TO MEET REGULATORY REQUIREMENTS AND AS SCHEDULED.

1. DEGREASE AND CLEAN SURFACES TO RECEIVE NAMEPLATES AND TAPE LABELS.

2. SECURE NAMEPLATES TO EQUIPMENT FRONTS USING SCREWS, RIVETS, OR ADHESIVE, WITH EDGES PARALLEL TO EQUIPMENT LINES. SECURE NAMEPLATE TO INSIDE FACE OF RECESSED PANELBOARD DOORS IN FINISHED LOCATIONS.

3. USE NAMEPLATES WITH 1/8 INCH LETTERING TO IDENTIFY INDIVIDUAL SWITCHES AND CIRCUIT BREAKERS, RECEPTACLE CIRCUITS, AND LOADS

4. USE NAMEPLATES WITH 1/4 INCH TO IDENTIFY DISTRIBUTION AND CONTROL EQUIPMENT.

F. INSTALL WIRE MARKERS ON EACH CONDUCTOR IN PANELBOARD GUTTERS, PULL BOXES, OUTLET AND JUNCTION BOXES, AND AT LOAD CONNECTIONS.

1. USE BRANCH CIRCUIT OR FEEDER NUMBER TO IDENTIFY POWER AND LIGHTING CIRCUITS.

2. USE CONTROL WIRE NUMBER AS INDICATED ON EQUIPMENT MANUFACTURER'S SHOP DRAWINGS TO IDENTIFY CONTROL WIRING.

SECTION 16100

WIRING METHODS

PART 1 GENERAL

1.1 SUBMITTALS

A. PRODUCT DATA: FOR REVIEW.

1. PROVIDE WIRING DEVICE CONFIGURATIONS, RATINGS, DIMENSIONS, AND COLOR SELECTIONS.

2. PROVIDE SERVICE FITTING CONFIGURATIONS, DIMENSIONS, AND FINISH AND COLOR SELECTIONS.

1.2 REGULATORY REQUIREMENTS

A. CONFORM TO REQUIREMENTS OF NFPA 70.

B. FURNISH PRODUCTS LISTED BY UL OR OTHER TESTING FIRM ACCEPTABLE TO AUTHORITY HAVING JURISDICTION.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. USE ONLY SPECIFIED RACEWAY IN THE FOLLOWING LOCATIONS:

1. UNDERGROUND INSTALLATIONS MORE THAN 5 FEET FROM FOUNDATION WALL: PLASTIC CONDUIT. PROVIDE CONCRETE ENCASEMENT WHERE INDICATED.

2. INSTALLATIONS IN OR UNDER CONCRETE SLAB, OR UNDERGROUND WITHIN 5 FEET FROM FOUNDATION WALL: PLASTIC CONDUIT.

3. IN SLAB ABOVE GRADE: PLASTIC CONDUIT.

4. EXPOSED OUTDOOR LOCATIONS: RIGID STEEL CONDUIT OR ELECTRICAL METALLIC TUBING. USE THREADED OR RAINTIGHT FITTINGS.

5. WET INTERIOR LOCATIONS: RIGID STEEL CONDUIT OR ELECTRICAL METALLIC TUBING. USE THREADED OR RAINTIGHT FITTINGS FOR METAL CONDUIT.

6. CONCEALED DRY INTERIOR LOCATIONS: RIGID STEEL CONDUIT OR ELECTRICAL METALLIC TUBING.

7. EXPOSED DRY INTERIOR LOCATIONS: RIGID STEEL CONDUIT OR ELECTRICAL METALLIC TUBING.

B. SIZE RACEWAYS FOR CONDUCTOR TYPE INSTALLED OR FOR TYPE THW CONDUCTORS, WHICHEVER IS LARGER.

1. MINIMUM SIZE CONDUIT: ½-INCH

C. USE WIRE AND CABLE IN LOCATIONS AS FOLLOWS:

1. CONCEALED INTERIOR LOCATIONS: BUILDING WIRE IN RACEWAY.
2. EXPOSED INTERIOR LOCATIONS: BUILDING WIRE IN RACEWAY.
3. ABOVE ACCESSIBLE CEILINGS: BUILDING WIRE IN RACEWAY.
4. WET OR DAMP INTERIOR LOCATIONS: BUILDING WIRE IN RACEWAY.
5. EXTERIOR LOCATIONS: BUILDING WIRE IN RACEWAYS.
6. UNDERGROUND LOCATIONS: BUILDING WIRE IN RACEWAY.

D. USE NO WIRE SMALLER THAN 12 AWG FOR POWER AND LIGHTING CIRCUITS, AND NO SMALLER THAN 14 AWG FOR CONTROL WIRING. USE 10 AWG CONDUCTOR FOR 20 AMPERE, 120 VOLT BRANCH CIRCUIT HOME RUNS LONGER THAN 75 FEET; AND FOR 20 AMPERE, 277 VOLT BRANCH CIRCUIT HOME RUNS LONGER THAN 200 FEET.

2.2 CONDUIT AND FITTINGS

A. CONDUIT:

1. METAL CONDUIT AND TUBING: GALVANIZED STEEL.
2. FLEXIBLE CONDUIT: STEEL
3. LIQUID TIGHT FLEXIBLE CONDUIT: FLEXIBLE CONDUIT WITH PVC JACKET.
4. PLASTIC CONDUIT AND TUBING: NEMA TC 2, PVC. USE SCHEDULE 40 CONDUIT.

B. CONDUIT FITTINGS:

1. METAL FITTINGS AND CONDUIT BODIES: NEMA FB 1.
2. PLASTIC FITTINGS AND CONDUIT BODIES: NEMA TC 3.
3. EMT FITTINGS: STEEL COMPRESSION TYPE

D. THE SURFACE METAL RACEWAY AND FITTINGS SHALL MEET ALL REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE ARTICLE 352A AND SHALL BE LISTED BY UNDERWRITERS' LABORATORIES, INC. IN FULL COMPLIANCE WITH THEIR STANDARD FOR SURFACE METAL RACEWAYS AND FITTINGS. (UL-5).

C. THE RACEWAY SHALL BE A TWO-PIECE WITH A BASE AND A COVER. THE BASE SHALL HAVE TWO WIRING CHANNELS SEPARATED BY INTEGRAL BARRIERS. BARRIERS MAY BE NAPPED OUT OF THE BASE TO CREATE ONE CHANNEL. TOTAL WIDTH SHALL BE 4 3/4" BY APPROXIMATELY 1 3/4" DEEP. BASE AND COVER SHALL BE 5 FT LENGTH. WALLS SHALL BE .05" THICK.

D. BOTH BASE AND COVER ARE TO BE MANUFACTURED OF GALVANIZED STEEL. THE BASE AND COVER SHALL HAVE A CLEAR, TEXTURED SCUFFCOAT FINAL FINISH, IVORY IN COLOR.

2 .4 ELECTRICAL BOXES

A. BOXES:

1. SHEET METAL: NEMA OS 1, GALVANIZED STEEL.
2. CAST METAL: CAST FERALLOY, DEEP TYPE, GASKETED COVER, THREADED HUBS.

B. HANDHOLE. PROVIDE HANDHOLE WHERE REQUIRED. HANDHOLE SHALL BE INSTALLED ON A BED OF CRUSHED ROCK. HANDHOLE SHALL HEAVY DUTY COVER TO BE MARKED ELECTRIC.

C. HINGED COVER ENCLOSURES: NEMA 250, TYPE 1, STEEL ENCLOSURE WITH MANUFACTURER'S STANDARD ENAMEL FINISH AND CONTINUOUS HINGE COVER, HELD CLOSED BY FLUSH LATCH OPERABLE BY SCREWDRIVER.

D. LARGE CAST METAL BOXES:

1. SURFACE-MOUNTED TYPE: NEMA 250, TYPE 4 AND

2.5 BUILDING WIRE AND CABLE

A. MANUFACTURERS:

1. GE
2. ROYAL
3. TRIANGLE

B. FEEDERS AND BRANCH CIRCUITS LARGER THAN 6 AWG: COPPER STRANDED CONDUCTOR, 600 VOLT INSULATION, THHN/THWN AND XHHW.

C. FEEDERS AND BRANCH CIRCUITS 6 AWG AND SMALLER: COPPER CONDUCTOR, 600 VOLT INSULATION, THHN/THWN,XHHW 6 AND 8 AWG, STRANDED CONDUCTOR; SMALLER THAN 8 AWG, SOLID CONDUCTOR.

D. CONTROL CIRCUITS: COPPER, STRANDED CONDUCTOR, 600 VOLT INSULATION, THW.

2.6 REMOTE CONTROL AND SIGNAL CABLE

A. CONTROL CABLE FOR CLASS 1 REMOTE CONTROL AND SIGNAL CIRCUITS: COPPER CONDUCTOR, 600 VOLT INSULATION, RATED 60 DEGREE C, INDIVIDUAL CONDUCTORS TWISTED TOGETHER, SHIELDED, AND COVERED WITH PVC JACKET.

B. CONTROL CABLE FOR CLASS 2 OR CLASS 3 REMOTE CONTROL AND SIGNAL CIRCUITS: COPPER CONDUCTOR, 300 VOLT INSULATION, RATED 60 DEGREE C, INDIVIDUAL CONDUCTORS TWISTED TOGETHER, SHIELDED, AND COVERED WITH PVC JACKET; UL LISTED.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. VERIFY THAT SUPPORTING SURFACES ARE READY TO RECEIVE WORK.

B. VERIFY THAT INTERIOR OF BUILDING IS PHYSICALLY PROTECTED FROM WEATHER.

C. VERIFY THAT MECHANICAL WORK THAT IS LIKELY TO DAMAGE CONDUCTORS HAS BEEN COMPLETED.

D. COMPLETELY AND THOROUGHLY SWAB RACEWAY SYSTEM BEFORE INSTALLING CONDUCTORS.

E. ELECTRICAL BOXES ARE SHOWN ON DRAWINGS IN APPROXIMATE LOCATIONS UNLESS DIMENSIONED.

1. OBTAIN VERIFICATION FROM ENGINEER OF FLOOR BOX LOCATIONS, AND LOCATIONS OF OUTLETS IN OFFICES AND WORK AREAS, PRIOR TO ROUGH-IN.

2. IT SHALL BE UNDERSTOOD THAT ANY OUTLET MAY BE RELOCATED A DISTANCE NOT EXCEEDING 15FT FROM THE LOCATION SHOWN ON THE DRAWINGS PRIOR TO OR DURING ROUGH-IN, IF SO DIRECTED BY THE ARCHITECT-ENGINEER WITHOUT ADDITIONAL COST TO THE OWNER.

3. LOCAL SWITCHES WHICH ARE SHOWN NEAR DOORS SHALL BE LOCATED AT THE STRIKE SIDE OF THE DOOR AS FINALLY HUNG, REGARDLESS OF SWING ON THE DRAWINGS.

3.2 INSTALLATION

A. PERFORM WORK ACCORDING TO NECA STANDARD OF INSTALLATION.

B. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND TO PRESENT NEAT APPEARANCE.

1. ROUTE EXPOSED RACEWAY PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING.
2. MAINTAIN MINIMUM 6-INCH CLEARANCE TO PIPING AND 12-INCH CLEARANCE TO HEAT SURFACES SUCH AS FLUES, STEAM PIPES, AND HEATING APPLIANCES.
3. MAINTAIN REQUIRED FIRE, ACOUSTIC, AND VAPOR BARRIER RATING WHEN PENETRATING WALLS, FLOORS, AND CEILINGS.
4. ROUTE CONDUIT THROUGH ROOF OPENINGS FOR PIPING AND DUCTWORK WHERE POSSIBLE; OTHERWISE, ROUTE THROUGH ROOF JACK WITH PITCH POCKET.
5. GROUP IN PARALLEL RUNS WHERE PRACTICAL. USE RACK CONSTRUCTED OF STEEL CHANNEL. MAINTAIN SPACING BETWEEN RACEWAYS OR DERATE CIRCUIT AMPACITIES TO NFPA 70 REQUIREMENTS.
6. USE CONDUIT HANGERS AND CLAMPS; DO NOT FASTEN WITH WIRE OR PERFORATED PIPE STRAPS.
7. USE CONDUIT BODIES TO MAKE SHARP CHANGES IN DIRECTION.
8. TERMINATE CONDUIT STUBS WITH INSULATED BUSHINGS.
9. USE SUITABLE CAPS TO PROTECT INSTALLED RACEWAY AGAINST ENTRANCE OF DIRT AND MOISTURE.
10. PROVIDE NO. 12 AWG INSULATED CONDUCTOR OR SUITABLE PULL STRING IN EMPTY RACEWAYS, EXCEPT SLEEVES AND NIPPLES.
11. INSTALL EXPANSION JOINTS WHERE RACEWAY CROSSES BUILDING EXPANSION OR SEISMIC JOINTS.
12. INSTALL PLASTIC CONDUIT AND TUBING ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
13. USE STEEL COMPRESSION TYPE FITTINGS WITH EMT CONDUITS.

C. INSTALL SURFACE METAL RACEWAY AND MULTI OUTLET ASSEMBLIES ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

1. USE FLAT-HEAD SCREWS OR CLIPS AND STRAPS SUITABLE FOR THE PURPOSE, TO FASTEN CHANNEL TO SURFACES. MOUNT PLUMB AND LEVEL.

2. USE SUITABLE INSULATED BUSHINGS AND INSERTS AT CONNECTIONS TO OUTLETS AND CORNER FITTINGS IN METAL RACEWAY.

3. USE FITTINGS AND ACCESSORIES DESIGNED FOR USE WITH RACEWAY SYSTEM.

D. INSTALL AUXILIARY GUTTER AND WIREWAY ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

E. INSTALL ELECTRICAL BOXES AS SHOWN ON THE DRAWINGS, AND AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND REGULATORY EQUIREMENTS.

1. USE CAST OUTLET BOX IN EXTERIOR LOCATIONS EXPOSED TO WEATHER AND WET LOCATIONS.
2. USE HINGED COVER ENCLOSURE FOR INTERIOR PULL AND JUNCTION BOX LARGER THAN 12 INCHES IN ANY DIMENSION.
3. LOCATE AND INSTALL ELECTRICAL BOXES TO ALLOW ACCESS. PROVIDE ACCESS PANELS IF REQUIRED.
4. LOCATE AND INSTALL ELECTRICAL BOXES TO MAINTAIN HEADROOM AND TO PRESENT NEAT MECHANICAL APPEARANCE.
5. INSTALL PULL BOXES AND JUNCTION BOXES ABOVE ACCESSIBLE CEILINGS OR IN UNFINISHED AREAS.
6. PROVIDE KNOCKOUT CLOSURES FOR UNUSED OPENINGS.
7. ALIGN WALL-MOUNTED OUTLET BOXES FOR SWITCHES, THERMOSTATS, AND SIMILAR DEVICES.
8. COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF OUTLETS ABOVE COUNTERS AND BACKSPLASHES.
10. SECURE BOXES TO INTERIOR WALL AND PARTITION STUDS, ACCURATELY POSITIONING TO ALLOW FOR SURFACE FINISH THICKNESS.
11. USE STAMPED STEEL STUD BRIDGES FOR FLUSH OUTLETS IN HOLLOW STUD WALL, AND ADJUSTABLE STEEL CHANNEL FASTENERS FOR FLUSH CEILING OUTLET BOXES.
12. LOCATE BOXES IN MASONRY WALLS TO REQUIRE CUTTING CORNER ONLY. COORDINATE MASONRY CUTTING TO ACHIEVE NEAT OPENINGS FOR BOXES.
13. DO NOT INSTALL BOXES BACK-TO-BACK IN WALLS; PROVIDE 6 INCHES SEPARATION, MINIMUM; EXCEPT PROVIDE 24 INCHES SEPARATION, MINIMUM IN ACOUSTIC-RATED WALLS.
14. DO NOT DAMAGE INSULATION.

F. INSTALL CABLE AND WIRE ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

1. NEATLY TRAIN AND SECURE WIRING INSIDE BOXES, EQUIPMENT, AND PANELBOARDS.
2. USE WIRE PULLING LUBRICANT FOR PULLING 4 AWG AND LARGER WIRES.
3. SUPPORT CABLES ABOVE ACCESSIBLE CEILINGS TON KEEP THEM FROM RESTING ON CEILING TILES.
4. MAKE SPLICES, TAPS, AND TERMINATIONS TO CARRY FULL AMPACITY OF CONDUCTORS WITHOUT PERCEPTIBLE TEMPERATURE RISE.
5. TERMINATE SPARE CONDUCTORS WITH ELECTRICAL TAPE.

G. INSTALL WIRING DEVICES ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

H. INSTALL WALL PLATES FLUSH AND LEVEL.

1. INSTALL PLATES ON SWITCH, RECEPTACLE, AND BLANK OUTLETS IN FINISHED AREAS, USING JUMBO SIZE PLATES FOR OUTLETS INSTALLED IN MASONRY WALLS.
2. INSTALL GALVANIZED STEEL PLATES ON OUTLET BOXES AND JUNCTION BOXES IN UNFINISHED AREAS, ABOVE ACCESSIBLE CEILINGS, AND ON SURFACE-MOUNTED OUTLETS.

I. INSTALL SERVICE FITTINGS ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

J. BEFORE INSTALLING RACEWAYS AND PULLING WIRE TO ANY MECHANICAL EQUIPMENT OR KITCHEN EQUIPMENT, VERIFY ELECTRICAL CHARACTERISTICS WITH FINAL SUBMITTAL ON EQUIPMENT TO ASSURE PROPER NUMBER AND AWG OF CONDUCTORS.

K. UNDERGROUND CABLE AND CONDUIT INSTALLATION SHALL CONFORM TO ANSI C2 AND NEC EXCEPT AS OTHERWISE INDICATED. THE CONTRACTOR SHALL PROMPTLY REPAIR ANY UTILITY LINES OR SYSTEM DAMAGED BY HIS OPERATION. THE TOP OF UNDERGROUND CONDUIT SHALL NOT BE LESS THAN 24 INCHES BELOW GRADE. THE BOTTOM OF CONDUITS TRENCH SHALL BE GRADED SMOOTH, WHERE ROCK AND SHARP EDGED MATERIAL ARE ENCOUNTERED, THE BOTTOM SHALL BE EXCAVATED FOR ADDITIONAL 3 INCHES, FILLED AND TAMPED LEVEL TO THE ORIGINAL BOTTOM WITH SAND OR EARTH FREE FROM ROCKS AND SHARP MATERIALS. PROVIDE MAGNETIC YELLOW WARNING TAPE ABOVE THE ENTIRE LENGTH OF UNDERGROUND CONDUITS TAPE SHALL BE BURIED 12" BELOW GRADE.

L. SURFACES DISTURBED DURING THE INSTALLATION OF UNDERGROUND CONDUITS SHALL BE RESTORED TO THEIR ORIGINAL CONDITIONS. PROVIDE SOD OF QUALITY EQUAL TO THAT REMOVED, PATCH PAVEMENT, SIDEWALK CURB, ETC. EXCAVATED MATERIAL NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED FROM PROJECT SITE. REMOVE WATER FROM EXCAVATION BY PUMPING OR OTHER APPROVED METHOD. BACKFILL SHALL BE FREE FROM LARGE CLODS OF EARTH OR STONES OVER 1 INCH IN SIZE.

SECTION 16400

SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 SUBMITTALS

A. SHOP DRAWINGS: FOR REVIEW; INDICATE CONSTRUCTION DETAILS FOR THE FOLLOWING:
1. PANELBOARDS.

B. PRODUCT DATA: FOR REVIEW; PROVIDE RATINGS AND COMPONENT DETAILS FOR THE FOLLOWING:
1. ENCLOSED SWITCHES.
2. FUSES.
3. CIRCUIT BREAKERS.

C. TEST REPORTS: FOR INFORMATION.

D. OPERATING AND MAINTENANCE INSTRUCTIONS: FOR PROJECT CLOSEOUT; INCLUDE THE FOLLOWING:
1. SWITCHBOARD: SUBMIT NEMA PB 1.1.
2. PANELBOARD: SUBMIT NEMA PB 2.1.

1.2 REGULATORY REQUIREMENTS

A. CONFORM TO REQUIREMENTS OF NFPA 70.

B. FURNISH PRODUCTS LISTED BY UL OR OTHER TESTING FIRM ACCEPTABLE TO AUTHORITY HAVING JURISDICTION.

C. CONFORM TO REQUIREMENTS OF UTILITY COMPANY.

PART 2 PRODUCTS

2.1 ENCLOSED SWITCHES

A. MANUFACTURERS:

1. SQUARE D

B. ENCLOSED SWITCH ASSEMBLIES: NEMA KS 1; TYPE HD.

1. FUSE CLIPS: DESIGNED TO ACCOMMODATE CLASS R OR J FUSES.

C. ENCLOSURES: TYPE 1 FOR INTERIOR LOCATIONS, TYPE 3R FOR EXTERIOR LOCATIONS

2.2 FUSES

A. MANUFACTURERS:

1. FERRAZ-SHAWMUT
2. BUSSMAN

B. FUSES 600 AMPERES AND LESS: CURRENT LIMITING, ONE-TIME FUSE,250 VOLT, UL CLASS RK 1, RK 5

OR J.

2.3 PANELBOARDS

A. MANUFACTURERS:

1. SQUARE D

B. DISTRIBUTION PANELBOARDS: NEMA PB 1; CIRCUIT BREAKER TYPE.

1. ENCLOSURE: TYPE 1
2. PROVIDE SURFACE CABINET FRONT WITH SCREW COVER AND HINGED DOOR.
3. BUS: COPPER.
4. GROUND BUS: COPPER.
5. VOLTAGE: 120/208 VOLTS OR 277/480 VOLTS, THREE PHASE.
6. MINIMUM INTEGRATED EQUIPMENT RATING: AS INDICATED ON DRAWINGS.

C. LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS: NEMA PB 1; CIRCUIT BREAKER TYPE.

1. ENCLOSURE: NEMA PB 1; TYPE 1
2. PROVIDE FLUSH OR SURFACE CABINET FRONT WITH LOCKABLE DOOR, KEYED ALIKE.
3. BUS: COPPER BUS.
4. GROUND BUS: COPPER.
5. VOLTAGE: 277/480 VOLTS OR 120/208 VOLTS, THREE PHASE.
6. MINIMUM INTEGRATED EQUIPMENT RATING: AS INDICATED ON DRAWINGS.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. MAKE ARRANGEMENTS WITH UTILITY COMPANY TO OBTAIN PERMANENT ELECTRIC SERVICE TO THE PROJECT.

B. PROVIDE CONCRETE PAD FOR UTILITY TRANSFORMER. PROVIDE PAD DIMENSIONS AND DETAILS TO UTILITY REQUIREMENTS.

3.2 INSTALLATION

A. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. INSTALL PROPER FUSES IN EACH FUSED SWITCH.

C. INSTALL PANELBOARDS AND LOAD CENTERS TO NEMA PB 1.1.

3.3 CLEANING

A. CLEAN EQUIPMENT FINISHES TO REMOVE PAINT AND CONCRETE SPLATTERS.

SECTION 16510

INTERIOR LUMINAIRES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. CONFORM TO REQUIREMENTS OF ANSI/NFPA 70.

B. CONFORM TO REQUIREMENTS OF NFPA 101.

C. FURNISH PRODUCTS LISTED AND CLASSIFIED BY UNDERWRITERS LABORATORIES, INC. AS SUITABLE FOR PURPOSE SPECIFIED AND SHOWN.

PART 2 PRODUCTS

2.1 LUMINARIES

A. FURNISH PRODUCTS AS SPECIFIED IN SCHEDULE ON DRAWINGS.

B. INSTALL BALLASTS, LAMPS, AND SPECIFIED ACCESSORIES AT FACTORY.

PART 3 EXECUTION

3.1 INSTALLATION

A. INSTALL IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.

B. INSTALL SUSPENDED LUMINARIES USING PENDANTS SUPPORTED FROM SWIVEL HANGERS. PROVIDE PENDANT LENGTH REQUIRED TO SUSPEND LUMINAIRE AT INDICATED HEIGHT.

C. LOCATE RECESSED CEILING LUMINARIES AS INDICATED ON REFLECTED CEILING PLAN.

D. INSTALL SURFACE MOUNTED LUMINARIES AND EXIT SIGNS PLUMB AND ADJUST TO ALIGN WITH BUILDING LINES AND WITH EACH OTHER. SECURE TO PROHIBIT MOVEMENT.

E. EXPOSED GRID CEILINGS: SUPPORT SURFACE MOUNTED LUMINARIES ON GRID CEILING DIRECTLY FROM BUILDING STRUCTURE OR PROVIDE AUXILIARY MEMBERS SPANNING CEILING T(S) TO SUPPORT SURFACE MOUNTED LUMINARIES.

F. INSTALL RECESSED LUMINARIES TO PERMIT REMOVAL FROM BELOW.

G. INSTALL CLIPS TO SECURE RECESSED GRID-SUPPORTED LUMINARIES IN PLACE. PROVIDE A MINIMUM OF 2 GALVANIZED STEEL WIRES TO SUPPORT LIGHTING FIXTURE FROM BUILDING STRUCTURE. PLACE WIRES DIAGONALLY AT LONG SIDES OF FIXTURE.

H. INSTALL SPECIFIED LAMPS IN EACH LUMINAIRE, EMERGENCY LIGHTING UNIT AND EXIT SIGN.

I. ADJUST EXIT SIGN DIRECTIONAL ARROWS AS INDICATED.

J. RELAMP LUMINARIES THAT HAVE FAILED LAMPS AT SUBSTANTIAL COMPLETION.

K. CLEAN ELECTRICAL PARTS TO REMOVE CONDUCTIVE AND DELETERIOUS MATERIALS. REMOTE DIRT AND DERBIS FROM ENCLOSURE. CLEAN FINISHES AND TOUCHUP DAMAGE.

SHAFFER ENGINEERING GROUP, LLC
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REVISION	BY

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ELECTRICAL SPECIFICATIONS

RENOVATIONS TO THE HEALTH BUILDING(2010)
ST. JOHNS COMMUNITY COLLEGE
PALATKA, FL

Seal/Signature:

Date:	06/18/10
Scale:	AS NOTED
Drawn:	JBS
Job:	015G02
Sheet:	E-5

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