



HAIGHT CONSULTING ELECTRICAL ENGINEERS



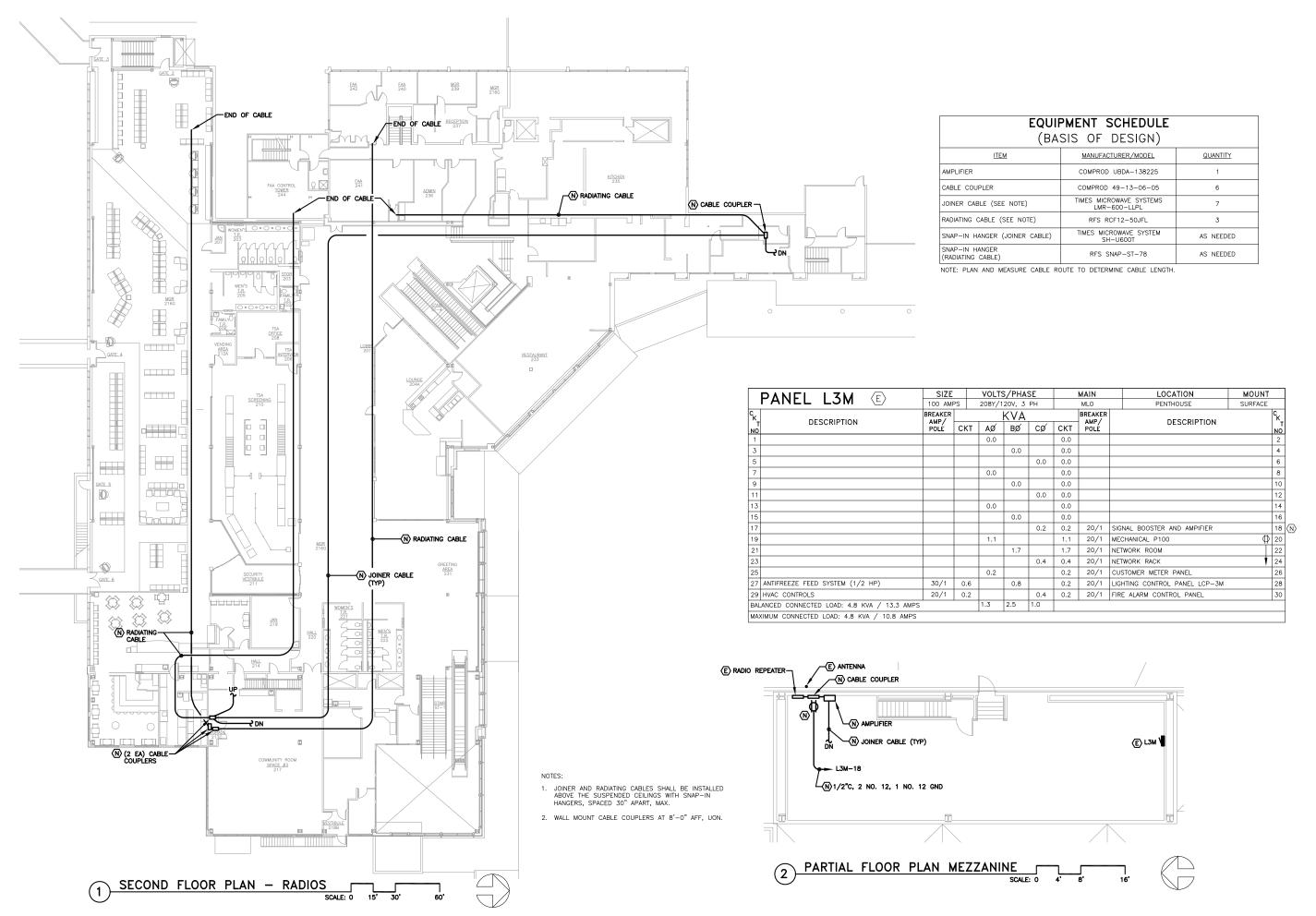
RADIO COVERAGE IMPROVEMENTS JUNEAU INTERNATIONAL AIRPORT CITY AND BOROUGH OF JUNEAU

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FIRST FLOOR PLAN SCHEMATIC DIAGRAM . .









CONSULTING ELECTRICAL ENGINEERS



IMPROVEMENTS JUNEAU INTERNATIONAL AIRPORT CITY AND BOROUGH OF JUNEAU

RADIO COVERAGE



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SPECIFICATION

GENERAL

1.1 SUMMARY OF WORK

- A. THE PUBLIC SAFETY AGENCIES, INCLUDING THE JUNEAU POLICE DEPARTMENT AND THE CAPITAL CITY FIRE & RESCUE HAVE VERY POOR RADIO COVERAGE INSIDE THE AIRPORT TERMINAL FACILITY. THE PURPOSE OF THIS PROJECT IS TO PROVIDE A RADIO REPEATER SYSTEM THAT WILL ENSURE GOOD COVERAGE IN EVERY PART OF THE FACILITY.
- B. THE CITY & BOROUGH OF JUNEAU PUBLIC AGENCIES RADIO TRANSMISSIONS ARE ROUTED THROUGH REPEATERS AT SADDLE MOUNTAIN AND PEDERSON HILL. BOTH ARE IN DIRECT SITE OF THE AIRPORT TERMINAL BUILDING.
- C. THE PLANS ILLUSTRATE A SYSTEM CONFIGURATION THAT IS ANTICIPATED TO PROVIDE THE DESIRED COVERAGE. THIS CONFIGURATION SHALL BE REVIEWED AND EVALUATED BASED ON THE EQUIPMENT AND SYSTEM CONFIGURATION PROPOSED. THE CONFIGURATION SHALL BE MODIFIED AS NEEDED TO ENSURE THE DESIRED COVERAGE. THE ANALYSIS OF THE PROPOSED SYSTEM SHALL BE PROVIDED FOR REVIEW AND ACCEPTANCE PRIOR TO INSTALLATION.

1.2 SEQUENCE OF WOR

- A. INSTALL NEW DEDICATED RECEPTACLE WITH CIRCUITING IN MEZZANINE. PLUG EXISTING RADIO REPEATER INTO NEW RECEPTACLE. CONFIRM CONTINUED FUNCTIONALTY OF REPEATER BEFORE CONTINUING WORK. COORDINATE WORK WITH JUNEAU POLICE, CAPITAL CITY FIRE RESCUE AND AIRPORT MAINTENANCE SLIBERUSCOP
- B. INSTALL NEW CABLE COUPLER IN MEZZANINE. RELOCATE RADIO ANTENNA CABLE CONNECTION FROM REPEATER TO NEW COUPLER. CONNECT REPEATER TO COUPLER WITH NEW JOINER CABLE. CONFIRM CONTINUED FUNCTIONALITY OF REPEATER BEFORE CONTINUING WORK. COORDINATE WITH JUNEAU POLICE, CAPITAL CITY FIRE RESCUE AND AIRPORT MAINTENANCE SUPERVISOR.
- C. INSTALL NEW AMPLIFIER IN MEZZANINE. PLUG AMPLIFIER INTO NEW RECEPTACLE. INSTALL AND CONNECT ALL OTHER CABLE COUPLERS AND JOINER CABLES.
- D. INSTALL RADIATING CABLES ONE AT A TIME. CONFIRM THE FUNCTIONALITY OF EACH RADIATING CABLE BEFORE INSTALLING THE NEXT RADIATING CABLE. COORDINATE WITH JUNEAU POLICE, CAPITAL CITY FIRE RESCUE AND AIRPORT MAINTENANCE SUPERVISOR.

1.3 DEFINITIONS

- A. EMT: ELECTRICAL METALLIC TUBING.
- B. IMC: INTERMEDIATE METAL CONDUIT.
- C. RSC: RIGID STEEL CONDUIT.

1.4 SUBMITTALS

A. PRODUCT DATA:

- 1. CONDUCTORS AND CABLES.
- 2. CONDUITS, RACEWAYS, AND BOXES.
- WIRING DEVICES
- 4. RADIO EQUIPMENT

B. SHOP DRAWINGS:

- 1. RADIO SYSTEM
- C. FIELD TEST REPORTS: SUBMIT WRITTEN TEST REPORTS TO INCLUDE THE FOLLOWING:
- 1 TEST PROCEDURES USE
- 2. TEST RESULTS THAT COMPLY WITH REQUIREMENTS.
- 3. RESULTS OF FAILED TESTS AND CORRECTIVE ACTION TAKEN TO ACHIEVE TEST RESULTS THAT COMPLY WITH REQUIREMENTS.

1.5 QUALITY ASSURAN

- A ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
- B. COMPLY WITH NFPA 70.
- 1.6 FIELD QUALITY CONTRO
- 1. SUPPORTING DEVICES FOR ELECTRICAL COMPONENTS.
- 2. ELECTRICAL IDENTIFICATION
- 3. TOUCHUP PAINTING
- B. WIRING DEVICES:
- 1. AFTER INSTALLING WIRING DEVICES AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR PROPER POLARITY, GROUND CONTINUITY, AND COMPLIANCE WITH REQUIREMENTS.
- 1.7 REFININSHING AND TOUCHUP PAINTING
- A. REFINISH AND TOUCHUP PAINT
- 1. CLEAN DAMAGED AND DISTURBED AREAS AND APPLY PRIMER, INTERMEDIATE, AND FINISH COATS TO SUIT THE DEGREE OF DAMAGE AT EACH LOCATION.
- 2. FOLLOW PAINT MANUFACTURER'S WRITTEN INSTRUCTIONS FOR SURFACE PREPARATION AND FOR TIMING AND APPLICATION OF SUCCESSIVE COATS.
- 3. REPAIR DAMAGE TO GALVANIZED FINISHES WITH ZINC-RICH PAINT RECOMMENDED BY MANUFACTURER.
- 4. REPAIR DAMAGE TO PAINT FINISHES WITH MATCHING TOUCHUP COATING RECOMMENDED BY MANUFACTURER.
- 1.8 CLEANING AND PROTECTION
- A. ON COMPLETION OF INSTALLATION, INCLUDING OUTLETS, FITTINGS, AND DEVICES, INSPECT EXPOSED FINISH. REMOVE BURRS, DIRT, PAINT SPOTS, AND CONSTRUCTION DEBRIS.
- B. PROTECT EQUIPMENT AND INSTALLATIONS AND MAINTAIN CONDITIONS TO ENSURE THAT COATINGS, FINISHES, AND CABINETS ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.

BASIC MATERIALS AND METHODS

1.1 SUPPORTING DEVICES

- A. RACEWAY AND CABLE SUPPORTS: MANUFACTURED CLEVIS HANGERS, RISER CLAMPS, STRAPS, THREADED C-CLAMPS WITH RETAINERS, CEILING TRAPEZE HANGERS, WALL BRACKETS, AND SPRING-STEEL OR CLICK-TYPE HANGERS.
- B. EXPANSION ANCHORS: CARBON-STEEL WEDGE OR SLEEVE TYPE.
- C. POWDER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL.
- D. ELECTRICAL EQUIPMENT INSTALLATION:
- 1. HEADROOM MAINTENANCE: IF MOUNTING HEIGHTS OR OTHER LOCATION CRITERIA ARE NOT INDICATED, ARRANGE AND INSTALL COMPONENTS AND EQUIPMENT TO PROVIDE THE MAXIMUM POSSIBLE HEADROOM.
- 2. MATERIALS AND COMPONENTS: INSTALL LEVEL, PLUMB, AND PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS, UNLESS OTHERWISE INDICATED.
- 3. EQUIPMENT: INSTALL TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF COMPONENTS. CONNECT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE WITH OTHER INSTALLATIONS.

E. ELECTRICAL SUPPORTING DEVICE APPLICATION:

- 1. DAMP LOCATIONS AND OUTDOORS: HOT-DIP GALVANIZED MATERIALS, STAINLESS STEEL MATERIALS, OR NONMETALLIC, U-CHANNEL SYSTEM COMPONENTS.
- 2. DRY LOCATIONS: STEEL MATERIALS.
- 3. SELECTION OF SUPPORTS: COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
- 4. STRENGTH OF SUPPORTS: ADEQUATE TO CARRY PRESENT AND FUTURE LOADS, TIME A SAFETY FACTOR OF AT LEAST FOUR; MINIMUM OF 200-LB DESIGN LOAD.

F. SUPPORT INSTALLATION:

- 1. INSTALL SUPPORT DEVICES TO SECURELY AND PERMANENTLY FASTEN AND SUPPORT ELECTRICAL COMPONENTS.
- 2. INSTALL INDIVIDUAL AND MULTIPLE RACEWAY HANGERS AND RISER CLAMPS TO SUPPORT RACEWAYS. PROVIDE U-BOLTS, CLAMPS, ATTACHMENTS, AND OTHER HARDWARE NECESSARY FOR HANGER ASSEMBLIES AND FOR SECURING HANGER RODS AND CONDUITS.
- 3. SUPPORT PARALLEL RUNS OF HORIZONTAL RACEWAYS TOGETHER ON TRAPEZE- OR BRACKET-TYPE HANGERS.
- 4. SIZE SUPPORTS FOR MULTIPLE RACEWAY INSTALLATIONS SO CAPACITY CAN BE INCREASED BY A 25 PERCENT MINIMUM IN THE FUTURE.
- 5. SUPPORT INDIVIDUAL HORIZONTAL RACEWAYS SEPARATE, MALLEABLE-IRON PIPE HANGERS OR CLAMPS.
- 6. INSTALL 14-INCH DIAMETER OR LARGER THREADED STEEL HANGER RODS, UNLESS OTHERWISE INDICATED.
- 7. SPRING-STEEL FASTENERS SPECIFICALLY DESIGNED FOR SUPPORTING SINGLE CONDUITS OR TUBING MAY BE USED INSTEAD OF MALLEABLE-IRON HANGERS FOR 1-INCH AND SMALLER RACEWAYS SERVING LIGHTING AND RECEPTACLE BRANCH CIRCUITS ABOVE SUSPENDED CEILINGS FOR FASTENING RACEWAYS TO SLOTTED CHANNEL AND ANGLE SUPPORTS.
- 8. ARRANGE SUPPORTS IN VERTICAL RUNS SO THE WEIGHT OF RACEWAYS AND ENCLOSED CONDUCTORS IS CARRIED ENTIRELY BY RACEWAY SUPPORTS, WITH NO WEIGHT LOAD ON RACEWAY TERMINALS.
- 9. SIMULTANEOUSLY INSTALL VERTICAL CONDUCTOR SUPPORTS WITH CONDUCTORS.
- 10. SEPARATELY SUPPORT CAST BOXES THAT ARE THREADED TO RACEWAYS AND USED FOR FIXTURE SUPPORT. SUPPORT SHEET-METAL BOXES DIRECTLY FROM THE BUILDING STRUCTURE OR BY BAR HANGERS. IF BAR HANGERS ARE USED, ATTACH BAR TO RACEWAYS ON OPPOSITE SIDES OF THE BOX AND SUPPORT THE RACEWAY WITH AN APPROVED FASTENER NOT MORE THAN 24 INCHES FROM THE BOX.
- 11. INSTALL METAL CHANNEL RACKS FOR MOUNTING CABINETS, PANELBOARDS, DISCONNECT SWITCHES, CONTROL ENCLOSURES, PULL AND JUNCTION BOXES, TRANSFORMERS, AND OTHER DEVICES, UNLESS COMPONENTS ARE MOUNTED DIRECTLY TO STRUCTURAL ELEMENTS OF ADEQUATE STRENGTH.
- 12. SECURELY FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTS TO THE BUILDING STRUCTURE, UNLESS OTHERWISE INDICATED. PERFORM FASTENING ACCORDING TO THE FOLLOWING UNLESS OTHER FASTENING METHODS ARE INDICATED:
- a. WOOD: FASTEN WITH WOOD SCREWS OR SCREW-TYPE NAILS.
- b. EXISTING CONCRETE: EXPANSION BOLTS.
- C. INSTEAD OF EXPANSION BOLTS, THREADED STUDS DRIVEN BY A POWDER CHARGE AND PROVIDED WITH LOCK WASHERS MAY BE USED IN EXISTING CONCRETE.

DENTIFICATION

- A. IDENTIFICATION DEVICES: A SINGLE TYPE OF IDENTIFICATION PRODUCT FOR EACH APPLICATION CATEGORY. USE COLORS PRESCRIBED BY ANSI A13.1, NFPA 70, AND THESE SPECIFICATIONS.
- B. TAPE MARKERS FOR WIRE: VINYL OR VINYL-CLOTH, SELF-ADHESIVE, WRAPAROUND TYPE WITH PREPRINTED NUMBERS AND LETTERS.

. INSTALLATION:

- 1. INSTALL AT LOCATIONS FOR MOST CONVENIENT VIEWING WITHOUT INTERFERENCE WITH OPERATION AND MAINTENANCE OF EQUIPMENT.
- 2. COORDINATE NAMES, ABBREVIATIONS, COLORS, AND OTHER DESIGNATIONS USED FOR ELECTRICAL IDENTIFICATION WITH CORRESPONDING DESIGNATIONS INDICATED IN THE CONTRACT DOCUMENTS OR REQUIRED BY CODES AND STANDARDS. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.
- 3. SELF-ADHESIVE IDENTIFICATION PRODUCTS: CLEAN SURFACES BEFORE APPLYING.
- 4. COLOR-CODE 208/120-V SYSTEM SECONDARY SERVICE, FEEDER, AND BRANCH-CIRCUIT CONDUCTORS THROUGHOUT THE SECONDARY ELECTRICAL SYSTEM AS FOLLOWS:
- a. PHASE A: BLACK
- b. PHASE B: RED
- c. PHASE C: BLUE

1.3 FIRESTOPPING

- A. APPLY FIRESTOPPING TO CABLE AND RACEWAY PENETRATIONS OF FIRE-RATED FLOOR AND WALL ASSEMBLIES TO ACHIEVE FIRE-RESISTANCE RATING OF THE ASSEMBLY.
- CUTTING AND PATCHING
- A. CUT, CHANNEL, CHASE, AND DRILL FLOORS, WALLS, PARTITIONS, CEILINGS, AND OTHER SURFACES REQUIRED TO PERMIT ELECTRICAL INSTALLATIONS. PERFORM CUTTING BY SKILLED MECHANICS OF TRADES INVOLVED.
- B. REPAIR AND REFINISH DISTURBED FINISH MATERIALS AND OTHER SURFACES TO MATCH ADJACENT UNDISTURBED SURFACES. INSTALL NEW FIREPROOFING WHERE EXISTING FIRESTOPPING HAS BEEN DISTURBED. REPAIR AND REFINISH MATERIALS AND OTHER SURFACES BY SKILLED MECHANICS OF TRADES INVOLVED.

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- A. COPPER COMPLYING WITH NEMA WC 5 OR 7; STRANDED FOR NO. 8 AWG AND LARGER.
- B. INSULATION TYPES: TYPE THW, THHN-THWN, XHHW, USE, AND SO COMPLYING WITH NEMA WC 5 OR 7.
- C. CABLE: METAL-CLAD CABLE, TYPE MC AND TYPE SO: WITH GROUND WIRE.
- MC METAL—CLAD CABLE: PROVIDE INTERLOCKED STEEL OR ALUMINUM METAL CLAD CABLE WITH THHN, COLOR CODED, COPPER CONDUCTORS. THE
 METAL SHEATH MAY SERVE AS A SAFETY GROUND. PROVIDE THE CABLE WITH A GROUND CONDUCTOR FOR ISOLATED OR SEPARATE SAFETY GROUND.
 PROVIDE AN OVERALL WRAP OF MOISTURE RESISTANT COVERING MADE WITH THE INTERLOCKING METAL SHEATH. PROVIDE CONNECTORS AND SUPPORT
 CLAMP'S SPECIFICALLY MADE FOR THIS CABLE.
- 1.2 CONDUCTOR AND INSULATION APPLICATIONS
- A. EXPOSED BRANCH CIRCUITS: TYPE THW, THHN-THWN, OR XHHW, SINGLE CONDUCTORS IN RACEWAY AND METAL-CLAD CABLE, TYPE MC.
- B. TIGHTEN ELECTRICAL CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE—TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A AND UL 486B.
- C. MAKE SPLICES AND TAPS THAT ARE COMPATIBLE WITH CONDUCTOR MATERIAL AND THAT POSSESS EQUIVALENT OR BETTER MECHANICAL STRENGTH AND INSULATION RATINGS THAN UNSPLICED CONDUCTORS.
- 1. USE OXIDE INHIBITOR IN EACH SPLICE AND TAP CONDUCTOR FOR ALL CONDUCTORS LOCATED IN MOIST OR CORROSIVE ENVIRONMENTS.
- D. WIRING AT OUTLETS: INSTALL CONDUCTOR AT EACH OUTLET, WITH AT LEAST 6 INCHES OF SLACK.

RACEWAYS

- 1.1 CONDUIT AND TUBING
- A. RIGID STEEL CONDUIT: ANSI C80.1
- B. IMC: ANSI C80.6
- C. EMT AND FITTINGS: ANSI C80.3
- 1. FITTINGS: SET-SCREW OR COMPRESSION TYPE.
- D. FITTINGS: NEMA FB 1; COMPATIBLE WITH CONDUIT AND TUBING MATERIALS.
- 1.2 INSTALLATION
- EXPOSED: EMT
- 2. CONCEALED: EMT.
- 3. DAMP OR WET LOCATIONS: RIGID STEEL CONDUIT
- 4. BOXES AND ENCLOSURES: NEMA 250, TYPE 1.
- B. MINIMUM RACEWAY SIZE: 1/2-INCH TRADE SIZE.
- C. RACEWAY FITTINGS: COMPATIBLE WITH RACEWAYS AND SUITABLE FOR USE AND LOCATION.
- 1. RIGID AND INTERMEDIATE STEEL CONDUIT: USE THREADED RIGID STEEL CONDUIT FITTINGS, UNLESS OTHERWISE INDICATED.
- D. INSTALL EXPOSED RACEWAYS, AND RACEWAYS WITHIN ACCESSIBLE SPACES, PARALLEL OR AT RIGHT ANGLES TO NEARBY SURFACES OR STRUCTURAL MEMBERS AND FOLLOW SURFACE CONTOURS AS MUCH AS POSSIBLE.
- 1. RUN PARALLEL OR BANKED RACEWAYS TOGETHER ON COMMON SUPPORTS.
- 2. MAKE PARALLEL BENDS IN PARALLEL OR BANKED RUNS. USE FACTORY ELBOWS ONLY WHERE ELBOWS CAN BE INSTALLED PARALLEL; OTHERWISE, PROVIDE FIELD BENDS FOR PARALLEL RACEWAYS.
- E. JOIN RACEWAYS WITH FITTINGS DESIGNED AND APPROVED FOR THAT PURPOSE AND MAKE JOINTS TIGHT.
- USE INSULATING BUSHINGS TO PROTECT CONDUCTORS.
- F. TIGHTEN SET SCREWS OF THREADLESS FITTINGS WITH SUITABLE TOOLS.
- G. TERMINATIONS:
- 1. WHERE RACEWAYS ARE TERMINATED WITH LOCKNUTS AND BUSHINGS, ALIGN RACEWAYS TO ENTER SQUARELY AND INSTALL LOCKNUTS WITH DISHED PART AGAINST BOX. USE TWO LOCKNUTS, ONE INSIDE AND ONE OUTSIDE BOX.
- 2. WHERE RACEWAYS ARE TERMINATED WITH THREADED HUBS, SCREW RACEWAYS OR FITTINGS TIGHTLY INTO HUB SO END BEARS AGAINST WIRE PROTECTION SHOULDER. WHERE CHASE NIPPLES ARE USED, ALIGN RACEWAYS SO COUPLING IS SQUARE TO BOX; TIGHTEN CHASE NIPPLE SO NO THREADS ARE EXPOSED.

BOXES, ENCLOSURES, AND CABINETS

- 1.1 SHEET METAL OUTLET AND DEVICE BOXES: NEMA OS 1.
- 1.2 SMALL SHEET METAL PULL AND JUNCTION BOXES: NEMA OS 1.

WIRING DEVICES

- 1.1 RECEPTACLES
- A. STRAIGHT-BLADE-TYPE RECEPTACLES: COMPLY WITH NEMA WD1, NEMA WD 6, DSCC W-C-596G, AND UL 498, 20 AMPERE MINIMUM.
- 1.2 WALL PLATES
- A. SINGLE AND COMBINATION TYPES TO MATCH CORRESPONDING WIRING DEVICES.
- 1. PLATE-SECURING SCREWS: METAL WITH HEAD COLOR TO MATCH PLATE FINISH
- 2. MATERIAL FOR FINISHED SPACES: SMOOTH, HIGH-IMPACT, NYLON.
- 1.3 INSTALLATION
- A. INSTALL DEVICES AND ASSEMBLIES LEVEL, PLUMB, AND SQUARE WITH BUILDING LINES.
- B. ARRANGEMENT OF DEVICES: UNLESS OTHERWISE INDICATED, MOUNT FLUSH, WITH LONG DIMENSION VERTICAL, AND WITH GROUNDING TERMINAL OF RECEPTACLES ON BOTTOM. GROUP ADJACENT SWITCHES UNDER SINGLE, MULTIGANG WALL PLATES.

RADIO SYSTEM

- 1.1 EQUIPMENT
- A. EXISTING REPEATER/BASE STATION: THE EXISTING REPEATER/BASE STATION SHALL BE RETAINED WITH ADDITIONAL COMPONENTS AS NEEDED FOR A COMPLETE SYSTEM.
- B. BASIS-OF DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS IN THE DRAWING PRODUCT SCHEDULE.
- A. INSTALL THE SYSTEM IN ACCORDANCE TO THE MANUFACTURER'S INSTRUCTIONS.
- B. TEST SYSTEM OPERATIONS TO CONFIRM PERFORMANCE IN ACCORDANCE TO THE ANALYSIS PROVIDED PRIOR TO INSTALLATION.







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