

SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

- THE PROVISIONS OF THE INSTRUCTIONS TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, ALTERNATES, ADDENDAS AND DIVISION 1 ARE A PART OF THIS SPECIFICATION. ELECTRICAL, ARCHITECTURAL, MECHANICAL AND ALL OTHER DRAWINGS AS WELL AS THE SPECIFICATIONS FOR ALL THE DIVISIONS ARE A PART OF THE CONTRACT DOCUMENTS.
- VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH THE CONDITIONS AFFECTING THE INSTALLATION. SUBMISSION OF A PROPOSAL SHALL PRESUPPOSE KNOWLEDGE OF SUCH CONDITIONS AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED WHERE EXTRA LABOR OR MATERIALS ARE REQUIRED BECAUSE OF IGNORANCE OF THESE CONDITIONS.
- DEFINITIONS:
 - THE TERM "FURNISH" SHALL MEAN TO SUPPLY AND DELIVERY TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS.
 - THE TERM "INSTALL" SHALL MEAN WORK WHICH INCLUDES THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS.
 - THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.
- INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, SERVICES AND PERMITS NECESSARY FOR THE PROPER COMPLETION OF ALL ELECTRICAL WORK SHOWN. ITEMS OMITTED, BUT NECESSARY, TO MAKE THE ELECTRICAL SYSTEM COMPLETE AND WORKABLE SHALL BE UNDERSTOOD TO FORM PART OF THE WORK.
- IT IS THE PURPOSE OF THE ELECTRICAL DRAWINGS TO INDICATE THE APPROXIMATE LOCATION OF ALL EQUIPMENT, OUTLETS, ETC. ASCERTAIN EXACT LOCATIONS AND ARRANGE WORK ACCORDINGLY. THE RIGHT IS RESERVED TO EFFECT REASONABLE CHANGES IN THE LOCATION OF OUTLETS UP TO THE TIME OF ROUGHING-IN, WITHOUT ADDITIONAL COST TO THE OWNER.
- TEMPERATURE AND INTERLOCK CONTROLS ARE PROVIDED AND WIRED BY A CONTROLS CONTRACTOR. LINE (120 VOLT) VOLTAGE CONTROL DEVICES, SUCH AS THERMOSTATS AND AQUASTATS, WHICH CONTROL FRACTIONAL HORSEPOWER, 120 VOLT MOTORS ARE FURNISHED BY MECHANICAL CONTRACTOR, AND ARE WIRED BY ELECTRICAL CONTRACTOR.
- SECURE AND PAY FOR PERMITS AND INSPECTIONS REQUIRED FOR THE ELECTRICAL WORK.
- WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF LOCAL AND STATE CODES, AS WELL AS THE LATEST ADOPTED VERSION OF THE NATIONAL ELECTRICAL CODE, AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
- CONSULT THE DRAWINGS, PRODUCT DATA AND SHOP DRAWINGS COVERING THE WORK FOR VARIOUS OTHER TRADES. THE FIELD LAYOUTS OF THE CONTRACTORS FOR THE TRADE AND MAKE ADJUSTMENTS ACCORDINGLY IN LAYING OUT THE ELECTRICAL WORK.
- WARRANT THAT EQUIPMENT AND ALL WORK IS INSTALLED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE AND THAT ALL EQUIPMENT WILL MEET THE REQUIREMENTS SPECIFIED. GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS; REPAIR OR REPLACE ANY DEFECTIVE WORK, MATERIAL OR EQUIPMENT WITHIN ONE YEAR FROM DATE OF ACCEPTANCE.
- THE EXISTING ELECTRICAL AND TELEPHONE SERVICE, AND ALL EXISTING COMMUNICATION SYSTEMS WITHIN THE BUILDING SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ANY SERVICE SHUTDOWNS THAT MAY BE REQUIRED SHALL BE SCHEDULED THROUGH THE OWNER AND SHALL BE DONE AT A TIME AS DIRECTED BY THE OWNER. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED FOR THESE SHUTDOWN PERIODS EVEN THOUGH PREMIUM-TIME WORK MAY BE REQUIRED. PROVIDE TEMPORARY SERVICE TO EQUIPMENT OR SYSTEMS THAT CANNOT BE SHUTDOWN, AS DETERMINED BY OWNER.
- PROVIDE A MINIMUM OF ONE WEEK'S NOTICE TO THE OWNER BEFORE ANY SERVICE SHUTDOWN IS SCHEDULED.
- BIDS SHALL BE BASED UPON THE SPECIFIED PRODUCTS OR LISTED ALTERNATIVES. THE DRAWINGS AND SPECIFICATIONS ARE BASED ON THE PRODUCTS SPECIFIED BY TYPE, MODEL AND SIZE AND THIS ESTABLISHES MINIMUM QUALITIES WHICH SUBSTITUTES MUST MEET TO QUALIFY FOR REVIEW. WHERE ONLY ONE MAKE IS NAMED, IT SHALL BE PROVIDED. VERBAL REQUESTS OR APPROVALS SHALL NOT BE BINDING ON THE ARCHITECT, ENGINEER OR OWNER. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS AND EQUIPMENT OTHER THAN THOSE SPECIFIED, HE SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS TO THE ARCHITECT AT THE BID OPENING. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE ON THE BID FORM.
- EQUIPMENT AND MATERIALS USED ON THIS PROJECT SHALL BE NEW AND U.L. LABELED FOR THE APPLICATION.
- KEEP ONE COMPLETE SET OF THE CONTRACT WORKING DRAWINGS ON THE PROJECT SITE ON WHICH HE SHALL RECORD ANY DEVIATIONS OR CHANGES FROM SUCH CONTRACT DRAWINGS MADE DURING CONSTRUCTION. AFTER THE PROJECT IS COMPLETED, RECORD SETS OF DRAWINGS SHALL BE DELIVERED TO THE ARCHITECT IN GOOD CONDITION, AS A PERMANENT RECORD OF THE INSTALLATION AS CONSTRUCTED.
- PROVIDE NAMEPLATES ON PANELBOARDS, DISTRIBUTION EQUIPMENT, SAFETY SWITCHES, MOTOR STARTERS, JUNCTION BOXES, AND CONTROL DEVICES, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. LETTERING SHALL INCLUDE THE NAME OR DESIGNATION OF EQUIPMENT, HORSEPOWER, VOLTAGE RATING AND SERVICE DESIGNATION. NAMEPLATES SHALL BE LAMINATED PHENOLIC WITH A BLACK SURFACE AND WHITE CORE. IDENTIFICATION WITH A DTMO TYPE INSTRUMENT IS NOT PERMISSIBLE. THE INSIDE COVER OF ALL RECEPTACLE OUTLET PLATES SHALL BE PERMANENTLY MARKED TO INDICATE THE PANEL AND CIRCUIT NUMBER OF THE OUTLET. THE INSIDE COVER OF ALL BLANK PLATES FOR JUNCTION BOXES INSTALLED SHALL BE PERMANENTLY MARKED TO INDICATE THE SYSTEM.
- AFTER INSTALLATION, TEST FOR GROUNDS, SHORT CIRCUITS AND PROPER FUNCTION OF EACH SYSTEM AND RELATED WIRING. FAULTS IN THE INSTALLATION SHALL BE CORRECTED.
- INSULATION RESISTANCE TESTS SHALL BE MADE ON THE ELECTRICAL SYSTEM WITH AN APPROVED MEGOHMMETER.
- A GROUND CONTINUITY TEST SHALL BE MADE ON THE ENTIRE GROUNDING SYSTEM FROM THE SERVICE TO EVERY OUTLET.
- AFTER ALL TESTS AND ADJUSTMENTS HAVE BEEN COMPLETED, CLEAN ALL EQUIPMENT LEAVING EVERYTHING IN WORKING ORDER AT THE COMPLETION OF THIS WORK. CLEAN LIGHTING FIXTURES, OUTLET BOX PLATES, PANEL AND CABINET INTERIORS AND INTERIORS, ETC., OF DIRT, DUST, DEBRIS AND PAINT, AFTER ALL OTHER TRADES HAVE COMPLETED THEIR WORK.
- PROVIDE A TEMPORARY ELECTRICAL SERVICE ADEQUATE IN SIZE FOR HEATING, FOR THE USE OF ALL TRADES AND FOR THE LIGHTING OF EACH ROOM DURING CONSTRUCTION. TEMPORARY WIRING SHALL BE TO OSHA REQUIREMENTS. TEMPORARY SERVICE CAN BE EXTENDED FROM THE OWNER'S EXISTING POWER DISTRIBUTION SYSTEM. THE OWNER MUST APPROVE OF THE POINT OF SUPPLY, THE METHOD OF CONNECTION AND THE ROUTING OF NECESSARY TEMPORARY FEEDERS. PROVIDE A TEMPORARY TELEPHONE SERVICE FOR THE USE OF ALL TRADES DURING CONSTRUCTION.
- DO ALL CUTTING AND PATCHING IN EXISTING CONSTRUCTION AS NECESSARY FOR INSTALLATION OF THIS WORK. CUTTING DONE BY SKILLED MECHANICS AS CAREFULLY AS POSSIBLE AND WITH MINIMUM DAMAGE WHERE POSSIBLE.

- DETERMINE IF ANY STRUCTURAL ELEMENTS SUCH AS REBAR OR POST TENSION CABLES EXIST IN FLOORS, WALLS OR ROOFS BY INSPECTION COORDINATED WITH THE LANDLORDS TENANT COORDINATOR OR STRUCTURAL ENGINEER AND BY USE OF X-RAY WHEN REQUIRED PRIOR TO ANY CUTTING OR CORE DRILLING. IF SUCH ELEMENTS EXIST, REPORT THIS IMMEDIATELY TO THE ARCHITECT AND LANDLORD'S TENANT COORDINATOR FOR RESOLUTION PRIOR TO CUTTING OR DRILLING.
- OPERATION PRIOR TO COMPLETION:
WHEN ANY MECHANICAL OR ELECTRICAL EQUIPMENT IS OPERATED DURING CONSTRUCTION THE WARRANTY PERIOD SHALL NOT COMMENCE UNTIL THE EQUIPMENT IS OPERATED BY THE OWNER, PROPERLY CLEAN AND ADJUST THE EQUIPMENT AND COMPLETE ALL PUNCH LIST ITEMS BEFORE FINAL ACCEPTANCE BY THE OWNER. THE DATE OF EXTRA LABOR AND THE START OF THE WARRANTY MAY NOT BE THE SAME DATE. ALL INCANDESCENT LAMPS OPERATED FOR MORE THAN 50 HOURS DURING CONSTRUCTION SHALL BE REPLACED WITH NEW LAMPS PRIOR TO OWNER ACCEPTANCE.
- FIRE AND SMOKE INTEGRITY:
SEAL BUILDING OPENINGS THROUGHOUT, CAUSED BY INSTALLATION OF ALL TYPES OF ELECTRICAL EQUIPMENT (CONDUIT, CABLE/WIRE, PANELS ETC.) WHERE OPENINGS ARE IN FLOORS OR FIRE RATED WALLS CONFIGURE THE PENETRATION IN CONFORMANCE WITH UL LISTED CRITERIA. INSURE FIRE AND SMOKE BARRIER INTEGRITY THROUGHOUT. WHERE INTUMESCENT SEALER/CAULKING IS REQUIRED USE MATERIALS OF 3M OR DOW CORNING.
- BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

SECTION 16050 - BASIC MATERIALS AND METHODS

- ALL BOXES SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE INDEPENDENT OF THE CONDUIT SYSTEM. ALL BOXES SHALL BE 4" SQUARE BOXES MINIMUM WITH RAISED COVERS SUITABLE FOR THE WALL MATERIAL.
- CONDUITS SHALL BE:
 - RIGID OR INTERMEDIATE GRADE GALVANIZED STEEL CONDUIT IN WET LOCATIONS, CONCRETE, EXTERIOR MASONRY WALLS AND EXPOSED LOCATIONS SUBJECT TO DAMAGE.
 - GALVANIZED STEEL ELECTRICAL METALLIC TUBING IN DRY LOCATIONS, INTERIOR PARTITIONS AND CEILING SPACE.
 - FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO TRANSFORMERS, MOTORS AND EQUIPMENT. LIQUID-TIGHT FLEXIBLE METAL CONDUIT IN WET AND DAMP LOCATIONS.
 - FLEXIBLE METALLIC TUBING FROM OUTLET BOX TO RECESSED LIGHT FIXTURES IN SUSPENDED CEILING, SIX FOOT MAXIMUM LENGTH.
 - SCHEDULE 40 PVC RIGID NON-METALLIC CONDUIT BURIED BELOW GROUND FLOOR SLAB AND FOR EXTERIOR UNDERGROUND.
 - CONDUIT CONNECTIONS TO UNDERCABINET TYPE LIGHTING FIXTURES SHALL BE 3/8" FLEXIBLE METAL CONDUIT OR MC TYPE CABLE FROM THE WALL OUTLET BOX TO THE FIXTURE HOUSING.
 - RACEWAYS SHALL BE SIZED IN ACCORDANCE WITH N.E.C. WIRING TABLES OR AS NOTED ON DRAWINGS, WHICHEVER IS LARGER. MINIMUM CONDUIT SIZE SHALL BE ONE-HALF INCH.
 - CONDUIT FITTINGS FOR RIGID CONDUIT SHALL BE THREADED CAST FERROUS ALLOY WITH GASKETS AND COVERS WHERE REQUIRED. CONDUIT FITTINGS FOR EMT TO BE SET SCREW TYPE. LOCKNUTS SHALL BE OF THE BONDING TYPE WHICH BITE INTO THE METAL OF THE BOX. BUSHINGS SHALL BE OF THE INSULATING TYPE.
 - METAL CONDUITS SHALL BE COUPLED AND SECURED TO ALL BOXES IN A MANNER THAT PROVIDES AN ELECTRICALLY CONTINUOUS GROUND PATH FROM POINT OF SERVICE TO ALL OUTLETS.
 - RIGID CONDUITS SHALL BE TERMINATED IN SHEET STEEL WITH DOUBLE LOCKNUTS AND AN INSULATING BUSHING. EMPTY CONDUITS STUBBED SHALL BE THREADED AND CAPPED.
 - NYLON RING LINES SHALL BE INSTALLED IN ALL EMPTY CONDUITS.
 - CONDUIT ROUTING INDICATED ON THE DRAWINGS IS DIAGRAMMATIC ONLY AND IS NOT NECESSARILY THE INTENDED ACTUAL CONDUIT RUN. CONTRACTOR SHALL CHECK AND BE RESPONSIBLE FOR THE ACTUAL INSTALLATION WITH REGARD TO AVAILABLE SPACE AND SHALL COOPERATE WITH OTHER TRADES.
 - ALL CONDUITS SHALL BE SIZED AND INSTALLED SO THAT THE REQUIRED NUMBER OF CONDUCTORS MAY BE FULFILLED WITHOUT INJURY OR STRAIN.
 - CONDUIT RUNS SHALL BE LOCATED TO AVOID EQUIPMENT AND ACCESS TO EQUIPMENT OF OTHER TRADES.
 - CONDUITS SHALL BE CONTINUOUS AND SECURED TO ALL ENDS IN SUCH A MANNER THAT EACH CONDUIT SYSTEM SHALL BE ELECTRICALLY CONTINUOUS FROM THE POINT OF SERVICE TO ALL OUTLET BOXES. RUN CONDUITS CONCEALED UNDER OTHER TRADES INDICATED, WHERE IT IS NOT POSSIBLE TO INSTALL CONCEALED CONDUITS PERMISSION MUST BE OBTAINED FROM THE ARCHITECT TO RE-SURFACE, OR HOLD ON CONDUIT. THE ROUTING AND ELEVATION OF SUCH SURFACE MOUNTED RACEWAYS MUST BE COORDINATED WITH THE ARCHITECT BEFORE INSTALLATION. EXPOSED RACEWAYS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO STRUCTURAL MEMBERS AND SHALL BE PAINTED TO MATCH ADJACENT FINISHES.
 - CONDUIT SUPPORTS SHALL BE ATTACHED TO BUILDING STRUCTURAL MEMBERS ONLY, AND NOT TO ANY BUILDING SYSTEMS SUCH AS SUSPENDED CEILING, MECHANICAL DUCTS OR PIPES.
 - END OF EACH CONDUIT SHALL BE CAPPED WITH AN APPROVED CAP OR DISC TO PREVENT THE ENTRANCE OF FOREIGN MATERIALS DURING CONSTRUCTION.
 - CONDUITS SHALL PASS THROUGH FIRE OR SMOKE-RATED WALLS, CEILING, OR DECKS SHALL BE INSTALLED AS TO MAINTAIN THE FIRE OR SMOKE RATING.
 - CONDUIT ENTRIES INTO BUILDING SHALL BE MADE WATERTIGHT. ALL UNDERGROUND JOINTS SHALL BE SEALED.
 - EXTERIOR UNDERGROUND CONDUITS SHALL BE INSTALLED 36 INCHES MINIMUM BELOW FINISHED GRADE.
- BUSHINGS, LOCKNUTS AND CONNECTORS:
 - WHERE RIGID OR INTERMEDIATE METAL CONDUIT ENTERS A BOX, SECURE THE CONDUIT TO THE BOX WITH A LOCKNUT ON THE OUTSIDE AND INSIDE. PROVIDE BUSHINGS FOR CONDUIT TERMINALS AT BOXES. FOR CONDUCTORS THRU #8 AWG BUSHINGS SHALL BE GALVANIZED, NON-INSULATING TYPE, AND FOR CONDUCTORS LARGER THAN #8 AWG BUSHINGS ARE TO BE INSULATING TYPE. IF THE CONDUIT FITTING PROVIDES EQUIVALENT PROTECTION OF THE CONDUCTORS, THE BUSHING MAY BE ELIMINATED.

- FEEDER AND BRANCH CIRCUIT CONDUCTORS:
 - FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE U.L. LABELED, 90% CONDUCTIVITY COPPER-STAMPED AT 2 FT. INTERVALS WITH CONDUCTOR SIZE AND INSULATION TYPE.
 - FEEDER CIRCUIT CONDUCTORS SHALL BE TYPE "XHHW-2" OR "THHN," 600 VOLT, STRANDED COPPER, 90 DEGREE C RATED.
 - BRANCH CIRCUIT CONDUCTORS SHALL BE TYPE "THHN/THHN-2," 600 VOLT, 90° COPPER. WIRE SIZES #8 AWG AND LARGER SHALL BE STRANDED, OR BRANCH CIRCUIT CONDUCTORS SHALL BE TYPE "MC" THHN-2, 600 VOLT 90 DEGREE C COPPER WITH INSULATED GREEN GROUND WIRE ENCLOSED IN AN ALUMINUM OR GALVANIZED STEEL ARMOR "CONDUIT" THAT IS APPROVED FOR EXPOSED OR CONCEALED APPLICATIONS.
 - MINIMUM WIRE SIZE SHALL BE #12 AWG OR LARGER AS REQUIRED TO LIMIT VOLTAGE DROP AT FURTHEST OUTLET TO 3%.
- WIRE AND CABLE INSTALLATION:
 - PULL WIRE AND CABLES INTO CONDUIT USING IDEAL INDUSTRIES "YELLOW 190", OR EQUIVALENT.
 - COLOR CODE WIRE AND CABLE FOR CIRCUITS AS CALLED FOR IN THE NATIONAL ELECTRICAL CODE. COLOR CODING OF FEEDERS SHALL BE BY MEANS OF COLORED TAPE AT TERMINALS.
 - INDIVIDUAL BRANCH CIRCUITS ARE SHOWN ON THE DRAWINGS FOR CLARITY. LIGHTING AND RECEPTACLE CIRCUITS MAY BE GROUPED FOR HOMERUNS, SO LONG AS CONDUCTOR AMPACITIES ARE DERATED PER NEC REQUIREMENTS. NEUTRAL CONDUCTORS IN RECEPTACLE CIRCUITS SERVING DATA EQUIPMENT LOADS SHALL NOT BE SHARED.
 - WIRING FROM LEGALLY REQUIRED EMERGENCY AND STANDBY POWER GENERATION SOURCES SHALL BE KEPT INDEPENDENT OF EACH OTHER AND INDEPENDENT OF ALL OTHER BRANCH CIRCUIT WIRING, AND SHALL NOT ENTER THE SAME RACEWAY, CABLE, BOX, OR CABINET WITH OTHER WIRING, UNLESS SPECIFICALLY ALLOWED BY THE NATIONAL ELECTRICAL CODE.
- WIRING DEVICES:
 - LOCAL LIGHT SWITCHES SHALL BE 20 AMPERE, 120/277 VOLTS, AC SPECIFICATION GRADE, WITH GROUNDING TERMINAL, AS MANUFACTURED BY HUBBELL, OR EQUIVALENT, #CS-122 SERIES.
 - FLOURESCENT DIMMERS SHALL BE LUTRON "NOVA T-STAR" SERIES, #N1T-10 FOR 120 VOLT, #N1T-40-277 FOR 277 VOLT, 3-WAY, 2 LOCATION FLOURESCENT DIMMERS SHALL BE LUTRON "NOVA T-STAR" SERIES, #N1T-103P FOR 120 VOLT, #N1T-103P-277 FOR 277 VOLT.
 - INCANDESCENT DIMMERS SHALL BE LUTRON "NOVA T-STAR" LINEAR SLIDE SERIES - FOR UP TO 1500 WATT DIMMERS AND LUTRON "NOVA" LINEAR SLIDE SERIES FOR 2000 WATT DIMMERS.
 - DUPLEX RECEPTACLES SHALL BE 20A, 125V, 2 POLE, 3 WIRE GROUNDING. GENERAL PURPOSE "SPECIFICATION GRADE" DUPLEX RECEPTACLES: HUBBELL #CR532 ISOLATED GROUND DUPLEX RECEPTACLES: HUBBELL #CR532 IG - ORANGE. HOSPITAL GRADE DUPLEX RECEPTACLES: HUBBELL #8300H. TAMPER RESISTANT "SAFETY TYPE" DUPLEX RECEPTACLES: HUBBELL #H8300SG.
 - DUPLEX RECEPTACLES WHERE INDICATED ON THE DRAWINGS OR WHERE REQUIRED BY CODE, SHALL HAVE AN INTEGRAL GROUND FAULT PROTECTOR AND SHALL BE 20A, 125V, 2 POLE, 3 WIRE GROUNDING. HUBBELL #CR532 GROUND FAULT RECEPTACLES SHALL NOT BE THRU-WIRE. PROVIDE INDIVIDUAL DUPLEX RECEPTACLES AS SHOWN ON THE DRAWINGS. HOSPITAL GRADE GROUND FAULT DUPLEX RECEPTACLES: HUBBELL #HGF8300.
 - ALL SWITCHES, DIMMERS, AND RECEPTACLES SHALL BE INSTALLED UNLESS OTHERWISE INDICATED WITHIN THE SPECIFICATIONS. VERIFY COLOR AND LOCATION PRIOR TO PROCUREMENT OF THE DEVICES. ALL RECEPTACLES SHALL BE SMOOTH HIGH IMPACT THERMOPLASTIC FINISH WITH COLOR TO MATCH THE DEVICES. EMERGENCY RECEPTACLES AND SWITCHES SHALL BE RED, WITH COVERPLATES TO MATCH THE FINISH OF ALL OTHER COVERPLATES PROVIDED IN THE AREA. IN UNFINISHED AREAS, USE CADMIUM PLATED, ROUND CORNER, STEEL COVERPLATES FOR SURFACE MOUNTED OUTLET BOXES WITH THE WIRING DEVICES AND THE COVERPLATES SHALL BE BY THE SAME MANUFACTURER.
 - THE FOLLOWING ARE EQUIPMENT WIRING DEVICES:
 - RECEPTACLES: #55 SERIES MANUFACTURED BY PASS AND SEYMOUR OR LEVITON.
 - LIGHT SWITCHES: PASS AND SEYMOUR #20AC1 SERIES OR LEVITON #1221 SERIES.
 - DIMMERS: NO OTHER MANUFACTURERS ARE ACCEPTABLE.
- WIRING DEVICE INSTALLATION:
 - ADJACENT DEVICES SHALL BE MOUNTED IN GANGED BOXES WITH COMMON COVER PLATES.
 - VERIFY MOUNTING HEIGHTS AND LOCATIONS WITH THE ARCHITECT BEFORE ROUGH-IN. REFER TO DETAILS AND INTERIOR WALL ELEVATIONS SHOWN ON THE ARCHITECTURAL DRAWINGS.
 - OUTLETS SHALL NOT BE INSTALLED BACK TO BACK.
 - ALL RECEPTACLES SHALL BE MOUNTED WITH THE GROUND OPENING ABOVE THE PHASE AND NEUTRAL OPENINGS.
 - ALL DEVICES SHALL BE SECURED WITH MORE THAN A SINGLE SCREW.
- DISCONNECT SWITCHES
 - PROVIDE MOTOR DRIVEN EQUIPMENT WITH PROPERLY SIZED AND RATED DISCONNECT SWITCHES TO COMPLY WITH N.E.C. REQUIREMENTS, WHETHER OR NOT INDICATED ON THE DRAWINGS.
- HANGERS AND SUPPORTS:
 - SUPPORT CONDUIT RUNS DIRECTLY ADJACENT TO BUILDING CONSTRUCTION WITH SUITABLE ONE AND TWO-HOLE STRAPS AND/OR CLAMP-TYPE HANGERS. SUPPORT CONDUIT RUNS NOT ADJACENT TO BUILDING CONSTRUCTION WITH SUITABLE, ADJUSTABLE HANGERS. DO NOT USE PERFORATED STRAP-TYPE HANGER, WIRE TIES OR PLUMBERS STRAP.
 - PROVIDE ANGLE IRON FRAMES AND SUPPORTS FOR JUNCTION BOXES AND CABINETS TO PREVENT STRAIN ON ENCLING CONDUITS. GROUP EXPOSED CONDUITS TOGETHER. CONDUIT PENETRATIONS INCLUDING SHALL BE TIGHT TO THE CONDUIT AND SEALED.
 - SUPPORT RIGID STEEL, INCL. AND EMT RACEWAYS AT MAX. TEN FEET INTERVALS AND WITHIN THREE FEET OF OUTLET AND JUNCTION BOXES, CABINETS OR FITTINGS. SUPPORT WITHIN 12" OF EACH CHANGE IN DIRECTION. USE ONE-HOLE MALLEABLE IRON CLAMPS. SUPPORT MULTIPLE RUNS ON GALVANIZED UNISTRUP.
 - DO NOT SUPPORT ELECTRICAL RACEWAYS, BOXES, FIXTURES AND EQUIPMENT FROM CEILING SUPPORT SYSTEMS, MECHANICAL SYSTEM SUPPORTS, OR MECHANICAL SYSTEMS.
- ALL EQUIPMENT MOUNTED ON EQUIPMENT ROOM WALLS SHALL BE ATTACHED TO 3/4" PLYWOOD BOARDS, PAINTED WITH FIRE RESISTANT PAINT.

SECTION 16400 - SERVICE AND DISTRIBUTION

- GROUNDING:
 - GROUND ALL ELECTRICAL SYSTEM CONDUITS, MOTORS, PANELS AND OTHER EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ALL PROVISIONS OF THE NATIONAL ELECTRICAL CODE, STATE BUILDING CODE AND LOCAL OR REGIONAL CODES.
 - GROUNDING OF THE ELECTRICAL SYSTEM SHALL BE BY MEANS OF AN INSULATED GROUNDING CONDUCTOR INSTALLED WITH FEEDER AND BRANCH CIRCUIT CONDUCTORS IN ALL CONDUITS. GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH N.E.C. ARTICLE 250.
 - SYSTEM NEUTRAL CONDUCTORS SHALL BE GROUND AT THE SOURCE. NEUTRAL CONDUCTORS SHALL NOT BE USED FOR EQUIPMENT GROUNDING.
 - THE GROUNDING CONDUCTOR FOR BRANCH CIRCUITS FEEDING ISOLATED GROUND RECEPTACLES SHALL BE CONNECTED ONLY AT THE ISOLATED GROUND RECEPTACLE GROUND TERMINALS, AND AT THE GROUND BUS OF THE SERVING PANEL.
- BRANCH CIRCUIT PANEL BOARDS
 - BRANCH CIRCUIT PANEL BOARDS SHALL BE DEAD-FRONT CIRCUIT BREAKER TYPE. WITH VOLTAGE, AMPERAGE, MAIN CIRCUIT BREAKER OR MAIN LUGS ONLY, AS NOTED ON DRAWINGS. ALL PANEL BOARD SHALL BE PROVIDED WITH SOLID NEUTRALS AND GROUNDING BUS WITH LUGS.
 - CIRCUIT BREAKERS SHALL BE THERMAL MAGNETIC, MOLDED CASE, BOLT-ON TYPE, WITH QUANTITY, AMPERAGE, AND POLES AS NOTED ON THE PANEL SCHEDULES. SHORT CIRCUIT INTERRUPTING CAPACITY SHALL BE AS NOTED ON THE DRAWINGS. TWO AND THREE POLE BREAKERS SHALL BE COMMON TRIP. AUTOMATIC TRIPPING SHALL BE INDICATED BY THE OPERATING HANDLE ASSUMING A MID-POSITION BETWEEN ON AND OFF. PROVIDE HACR BREAKERS AS REQUIRED BY ALL HVAC EQUIPMENT MANUFACTURERS.
 - PANEL BOARD ENCLOSURES SHALL BE GENERAL PURPOSE, SURFACE, FLUSH-MOUNTED AS NOTED ON PLANS, WITH GALVANIZED LATCH BOX AND MOUNTED FRONT WITH LOCKABLE DOOR. A GLAZED DIRECTORY FRAME SHALL BE PROVIDED INSIDE THE DOOR, AND SHALL BE OF SUFFICIENT SIZE TO BE DESCRIBED IN THE EACH CIRCUIT. ALL SECTIONS OF MULTI-SECTION PANELS SHALL BE SAME SIZE.
 - TWO KEYS SHALL BE PROVIDED WITH ALL PANELS AND ALL KEYS SHALL BE KEYS ALIKE.
 - SCREW FASTENED HANDLE LOCKING DEVICES SHALL BE PROVIDED FOR BRANCH CIRCUIT BREAKERS FOR EMERGENCY EXIT, SECURITY AND NIGHT LIGHT.
 - BRANCH CIRCUIT PANELBOARDS SHALL BE SQUARE D, "NOOD," 120/208 VOLT, 3-PHASE, 4-WIRE OR TYPE NF, 277/480V, 3-PHASE, 4-WIRE. DISTRIBUTION PANELBOARDS SHALL BE SQUARE D, "MOUNT-ONE." EQUIVALENT ALTERNATE MANUFACTURERS: CUTLER HAMMER, GENERAL ELECTRIC OR SIEMENS.
 - ALL LIGHTING AND APPLIANCE PANELBOARDS SHALL HAVE A TYPEWRITTEN CIRCUIT DIRECTORY THAT SHALL SHOW LOGGING KEYS CONNECTED DURING CONSTRUCTION.
 - THE BRANCH CIRCUIT NUMBERS USED ON THE DRAWINGS SHALL BE APPLIED FOR THE CONSTRUCTION OF THE WORK, AT THE COMPLETION OF THE WORK, CIRCUIT NUMBER ADJUSTMENTS SHALL BE MADE AS REQUIRED TO PROVIDE BALANCED PHASE LOADING ON EACH PANELBOARD.
 - FLUSH MOUNTED PANELBOARDS SHALL BE INSTALLED WITH A MINIMUM OF THREE EMPTY 3/4" CONDUITS STUBBED UP TO THE NEAREST ACCESSIBLE CEILING SPACE FOR CONVENIENT FUTURE EXPANSION.
- PROVIDE 75 DEGREE C RATED CONNECTIONS THROUGHOUT.

SECTION 16700 - COMMUNICATIONS

- COMBINATION TELEPHONE/DATA OUTLET BOXES SHALL BE 4 INCHES SQUARE WITH SINGLE GANG PLASTER RINGS, UNLESS OTHERWISE NOTED.
- TELEPHONE-ONLY, DATA-ONLY, FAX AND PAY TELEPHONE OUTLETS SHALL BE SIMILAR.
- ALL CONDUITS REQUIRED FOR COMBINATION TELEPHONE/DATA OUTLETS AS SHOWN ON DRAWINGS SHALL BE INSTALLED COMPLETE WITH BUSHINGS AND NYLON PULL WIRES.
- PROVIDE CONDUIT FROM EACH OUTLET UP TO THE NEAREST ACCESSIBLE CORRIDOR CEILING SPACE AND PROVIDE A PLASTIC GROMMET AT EACH STUB.
- PROVIDE MISCELLANEOUS COMMUNICATION SYSTEM DEVICES AS SHOWN AND SPECIFIED ON THE DRAWINGS.
- INCLUDE SUFFICIENT WIRING, CONDUIT TERMINATIONS, ELECTRICAL BOXES AND ALL OTHER NECESSARY MATERIAL AS RECOMMENDED BY THE SYSTEM SUPPLIERS.
- PLENUM RATED CABLE SHALL BE USED IN PLENUMS IF CABLES NOT CALLED IN CONDUIT.

1/21/16 10:00 AM - 1/21/16 10:00 AM

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SPECIFICATIONS