

ELECTRICAL SPECIFICATIONS

I. GENERAL REQUIREMENTS

- A. IN AS MUCH AS THE SPECIFICATIONS ARE BRIEF, THE CONTRACTOR SHALL PROVIDE WORKMANSHIP THAT IS OF THE BEST QUALITY WITH THE BEST POSSIBLE APPEARANCE AND UTILITY. FAULTY WORK SHALL BE REPAIRED OR REPLACED AT NO COST TO THE OWNER. INDUSTRY STANDARDS SHALL BE USED AS THE GUIDE FOR QUALITY OF MATERIALS AND WORKMANSHIP.
B. ENTIRE INSTALLATION SHALL BE PREPARED IN A FIRST-CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEMS SHALL BE FUNCTIONAL, OPERATIONAL, ACCEPTANCE BY OWNER SHALL BE A CONDITION OF THE CONTRACT. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES IN ORDER TO AVOID INTERFERENCES OR DISPUTES AMONG RESPECTIVE TRADES.
C. ELECTRICAL CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE PLANS (ARCHITECTURAL, MEP, EQUIPMENT SUPPLIER DRAWINGS, LANDLORD DRAWINGS, ETC.) AND SHALL VERIFY EXISTING CONDITIONS AT THE SITE.
D. THE ELECTRICAL CONTRACTOR'S CONTRACT SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: WIRING, CONDUIT, PANELBOARDS, TRANSFORMERS, SWITCHES, RECEPTACLES, TIME CLOCK, JUNCTION BOXES AND LABOR.
E. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE ANY AND ALL ITEMS NECESSARY TO COMPLETE THIS PROJECT AS DRAWN.
F. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ELECTRICAL EQUIPMENT AND WIRING IN ACCEPTANCE WITH THE LANDLORD'S DESIGN CRITERIA.

II. BASIC ELECTRICAL REQUIREMENTS

- A. ELECTRICAL CONTRACTOR SHALL VERIFY REQUIREMENTS FOR TEMPORARY LIGHTING AND POWER WITH GENERAL CONTRACTOR AND INCLUDE IN HIS SCOPE OF WORK WHEN DIRECTED BY G.C. INSTALL IN ACCORDANCE WITH ALL CODE AND OSHA REQUIREMENTS FOR CONSTRUCTION PROJECTS.
B. SHOP DRAWINGS:
1. INCLUDE OUTLINE AND GENERAL ARRANGEMENT DRAWINGS, DATA SHEETS AND WIRING DIAGRAMS.
2. MARK GENERAL CATALOG SHEETS AND DRAWINGS TO INDICATE SPECIFIC ITEMS SUBMITTED, AND THE TOP OF THE PAGE AS TO WHAT ITEM THE SHEET COVERS. INCLUDE PROPER IDENTIFICATION OF EQUIPMENT BY MANUFACTURER'S NAME AND MODEL NUMBER, AND NOTATION OF ALL OPTIONS.
3. SYSTEM WIRING RISER DIAGRAMS SHALL INDICATE ALL COMPONENTS SHOWN ON THE FLOOR PLANS, TYPE AND TERMINATION POINT OF CABLE TO EACH COMPONENT.
C. DETAILS AND SCHEDULES ARE SHOWN TO AID THE CONTRACTOR AND ARE NOT MEANT TO BE INCLUSIVE OF ALL DEVICES. PROVIDE REQUIRED EQUIPMENT AND ACCESSORIES FOR A COMPLETE INSTALLATION.
D. COMPLY WITH THE REQUIREMENTS OF NFPA; NATIONAL, STATE AND LOCAL ELECTRICAL CODES AND LOCAL UTILITY REGULATIONS.
E. MATERIAL SHALL BEAR U.L. AND/OR OTHER APPROVED AGENCY LISTING.
F. COORDINATE INSTALLATION OF ELECTRICAL WORK WITH THE OTHER CONTRACTORS TO AVOID CONFLICTS WITH OTHER WORK.
G. INSTALL MOTOR STARTERS/VFD'S FURNISHED BY HEATING AND PLUMBING CONTRACTORS, AND WIRE FROM THE POWER SOURCE TO THE STARTER/VFD AND FROM THE STARTER/VFD TO THE MOTOR. SEE HVAC AND PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.
H. VERIFY ELECTRICAL SIZE AND CONNECTION REQUIREMENTS FOR EQUIPMENT FURNISHED BY OTHERS.
I. PROVIDE ALL CUTTING AND PATCHING NECESSARY FOR ELECTRICAL WORK INSTALLATION UNLESS THIS WORK IS IDENTIFIED TO BE THE WORK OF OTHER CONTRACTORS. PATCHING SHALL MATCH ADJACENT SURFACES. CORE DRILL OR SAW-CUT OPENINGS THROUGH EXISTING CONCRETE.
J. PROJECT COMPLETION
1. CLEAN FIXTURES AND EQUIPMENT AND LEAVE IN PROPER WORKING CONDITION AT THE TIME OF FINAL CLEAN-UP.
2. MARK RECORD DRAWINGS ON A FINAL SET OF DRAWINGS WHICH INCLUDES ALL REVISIONS.
K. LOCATION
1. THE ARCHITECT SHALL RESERVE THE RIGHT TO MAKE OUTLET POSITION CHANGES UP TO 10' BEFORE INSTALLATION.
2. DO NOT LOCATE OUTLETS OR EQUIPMENT WHERE THE USEFULNESS AND/OR OPERATION WILL BE AFFECTED BY THE WORK OF OTHER TRADES, DOOR SWING, COUNTER, EQUIPMENT, ETC.
L. ACCESS
1. INSTALL EQUIPMENT, JUNCTION BOXES, PULL BOXES AND ACCESSORIES TO PERMIT ACCESS WITHOUT RELOCATING INSTALLED OR YET TO BE INSTALLED EQUIPMENT.
2. ACCESS PANELS
a) FURNISH ACCESS PANELS OF ADEQUATE SIZE TO PERMIT SERVICE OF CONCEALED DEVICES. PANELS SHALL BE SUITABLE FOR INSTALLATION IN THE MATERIAL FORMING THE FINISHED SURFACE, WITH FLUSH METAL FRAME, FLUSH HINGED STEEL DOOR, FLUSH SCREWDRIVER OPERATED LATCH.
b) PANELS UL LISTED TO CONFORM TO THE FIRE RATING OF THE SURFACE INSTALLED IN.
c) TURN ACCESS PANEL OVER TO CONTRACTOR SKILLED IN THE CONSTRUCTION OF THE SURFACES INVOLVED FOR INSTALLATION.
d) ARCHITECT TO APPROVE ACCESS PANEL LOCATION PRIOR TO INSTALLATION OF EQUIPMENT REQUIRING ACCESS.
e) COORDINATE WITH THE OTHER CONTRACTORS AND WHEREVER PRACTICAL, GROUP DEVICES IN SUCH A MANNER SO AS TO MINIMIZE PANELS.
M. ELECTRICAL CONTRACTOR TO PROVIDE PULL WIRE IN EMPTY CONDUIT FOR TELEPHONE OR AS REQUIRED BY LOCAL PHONE COMPANY.
N. ALL NEW MATERIALS, WORKMANSHIP AND EQUIPMENT SHALL BE GUARANTEED FOR ONE YEAR AFTER SYSTEM ACCEPTANCE.
O. ALL WIRING SHALL BE IN CONDUIT AS REQUIRED BY LOCAL CODE AND SHALL BE CONCEALED WHERE POSSIBLE. WHERE EXPOSED, RUN IN STRAIGHT LINES PARALLEL AND/OR PERPENDICULAR TO BUILDING LINES.
P. ELECTRICAL CONTRACTOR SHALL INCLUDE ALL MISCELLANEOUS ITEMS REQUIRED TO COMPLETE THE WORK.

- Q. ELECTRICAL CONTRACTOR SHALL NOT SCALE DRAWINGS FOR DIMENSIONS BUT SHALL CONTACT THE OWNER'S REPRESENTATIVE REGARDING ANY DIMENSIONAL DATA REQUIRED AND SHALL VERIFY EXACT LOCATION AND MOUNTING HEIGHTS OF ALL FIXTURES, NOT SPECIFIED ON DRAWINGS OR DETAILS WITH OWNERS REPRESENTATIVE PRIOR TO INSTALLATION.
R. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL FIXTURES, LAMPS, AND REPLACEMENT WORK THAT IS NOT INDICATED ON THE DRAWINGS UNLESS OTHERWISE NOTED. ALL SUCH INSTALLATION AND HOOK-UPS ARE BY ELECTRICAL CONTRACTOR.
S. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL OR REMOVE AND REPLACE AS NECESSARY ALL DAMAGED LIGHT FIXTURE LENSES, LOUVERS, Baffles, HOUSINGS, ETC. RECEIVED ON IN DAMAGED OR DEFECTIVE CONDITION WITH REPLACEMENT UNITS.
T. ELECTRICAL CONTRACTOR TO PROVIDE CIRCUIT 'LOCK-ON' CLIPS AND INSTALL SAME ON THE FOLLOWING CIRCUITS: WATER HEATER, NIGHT EMERGENCY LIGHTING, PHONE, AND COMPUTERS.
U. ELECTRICAL CONTRACTOR SHALL BALANCE THE LOADS ACROSS ALL PHASES AND SHALL PROVIDE A CIRCUIT DIRECTORY WITH TYPED CIRCUIT DESIGNATION CARD UNDER PLASTIC COVER ON THE INSIDE OF EACH PANEL DOOR. ELECTRICAL CONTRACTOR SHALL ALSO FURNISH AND INSTALL NAMEPLATES ON ALL DISCONNECT SWITCHES AND PANELS. ALL NEW ELECTRICAL MATERIALS, PRODUCTS AND EQUIPMENT (INCLUDING ALL COMPONENTS THEREOF) SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL AND MEET THE APPROPRIATE ASTM, NEC AND NEMA STANDARDS.
V. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE A TEMPORARY LIGHTING AND POWER SYSTEM FOR THE WORK OF ALL TRADES DURING CONSTRUCTION, AND SHALL REMOVE THE SAME PRIOR TO THE COMPLETION OF THE PROJECT.
W. TENANT'S ELECTRICAL CONTRACTOR SHALL BE REQUIRED TO PROVIDE TEMPORARY POWER WITH GROUND FAULT PROTECTION FOR ALL POWER EQUIPMENT USED IN THE PREMISES, AND SHALL REMOVE THE SAME PRIOR TO THE COMPLETION OF THE PROJECT.

III. UTILITIES

- A. UTILITY COST BY OWNER.
B. ELECTRIC UTILITIES
1. EXISTING ELECTRICAL SERVICE
C. TELEPHONE UTILITIES
1. EXISTING TELEPHONE SERVICE
D. CABLE TELEVISION UTILITY
1. EXISTING CABLE TELEVISION SERVICE

IV. FINISH AND PAINTING

- A. E.C. SHALL PROVIDE A FACTORY OR FIELD APPLIED PRIME AND FINISH COAT OF COLOR SELECTED BY THE OWNER'S REPRESENTATIVE TO ALL ROOF MOUNTED EQUIPMENT AND OTHER EXTERIOR MATERIALS, INCLUDING SUPPORT HARDWARE.
B. COORDINATE WORK WITH THE PAINTERS SO THAT ALL EQUIPMENT IS INSTALLED PRIOR TO PAINTING. E.C. SHALL PAINT ITEMS IF NOT IN PLACE PRIOR TO NORMAL ROUTINE PAINTING.
C. IF FINISH IS SCORDED, SCRATCHED, OR FLAKED DURING STORAGE OR INSTALLATION, REFINISH THE EQUIPMENT TO THE SATISFACTION OF THE OWNER.
D. WHERE THE ELECTRICAL CONTRACTOR IS REQUIRED TO PAINT, THE PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINTING PORTION OF THE ARCHITECTURAL SPECIFICATION.
E. E.C. SHALL PROVIDE FINISH PAINT WHERE SPECIFIED OTHERWISE.

V. SUPPORTS

- A. CONDUIT HANGERS, ATTACHMENTS, AND SUPPORTS
1. PROVIDE PROPER FITTINGS AND SUPPORT SUITABLE FOR AMBIENT ENVIRONMENTAL CONDITIONS AND SERVICE DUTY.
2. ATTACH TO STRUCTURAL COMPONENTS TO NOT ENDANGER STRUCTURAL INTEGRITY.
3. PROVIDE ANGLES, CHANNELS, AND BEAMS AS REQUIRED.
B. BACKBOARDS
1. 3/4" PLYWOOD OR GIBSON BOARD AND EDGES WITH TWO COATS OF WHITE ENAMEL PAINT TO MOUNT EQUIPMENT WHERE SPECIFIED.
2. SUPPORTS WITH PAINTED GALVANIZED STEEL CHAINS.
C. CONCRETE PADS AND POLE BASES
1. PROVIDE FINAL INTERIOR EQUIPMENT CONCRETE PAD SIZE REQUIREMENTS TO CONCRETE CONTRACTOR. PADS SHALL EXTEND MINIMUM BEYOND EQUIPMENT FOOTPRINT.
2. PROVIDE CONCRETE FOR EXTERIOR POLE BASES AND EXTERIOR TRANSFORMER PADS PER DETAILS AND SPECIFICATIONS. CONCRETE PADS WHICH UTILITY DOES NOT HAVE REINFORCING REQUIREMENTS, REINFORCING SHALL BE 6X6 @ 12X2 @ 9".
D. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE ANY AND ALL BLOCKING, CHAINS, HANGERS, ETC. AS NECESSARY TO MAINTAIN UTILITY SYSTEMS.

VI. PENETRATIONS

- A. SLEEVES

- 1. FURNISH RIGID CONDUIT SLEEVES FOR CONDUITS AND CABLES PASSING THROUGH MASONRY, CONCRETE, OR OTHER SIMILAR CONSTRUCTION.
2. EXTEND SLEEVES COMPLETELY THROUGH THE CONSTRUCTION. EXTEND 1" ABOVE FLOORS, EXTEND 3" ABOVE THE FLOOR IN MECHANICAL ROOMS AND OTHER AREAS WHERE WATER MAY ACCUMULATE.
3. SLEEVES FOR CONDUITS 4" AND SMALLER: TWO SIZES LARGER THAN CONDUIT.
4. SLEEVES FOR CONDUITS LARGER THAN 4": ONE SIZE LARGER THAN CONDUIT.
5. FURNISH SLEEVE TO MASON FOR NEW MASONRY WALLS.
6. FURNISH, INSTALL, AND GROUT SLEEVE IN EXISTING MASONRY AND NEW CONCRETE WALLS.
7. SLEEVE NOT REQUIRED FOR DRYWALL WALLS OR CORE DRILLED HOLE IN CONCRETE WALL.
B. NON-FIRE RATED INTERIOR WALL AND FLOOR PENETRATIONS: FILL VOID BETWEEN CONDUIT AND SLEEVE, CONCRETE, OR DRYWALL WITH MINERAL WOOL. CAULK BETWEEN CONDUIT AND SLEEVE OR WALL WITH NON-HARDENING CAULK.
C. FIRE RATED INTERIOR WALL AND FLOOR PENETRATIONS: SEAL OPENING AROUND PIPE WITH A UL APPROVED FIRE-STOP SYSTEM HAVING AN F-RATING NOT LESS THAN THE HOURLY RATINGS OF THE ASSEMBLY BEING PENETRATED.
D. SMOKE WALL PENETRATIONS: CONDUITS OR CABLES PENETRATING PENETRATION SHALL NOT DESTROY THE BARRIER'S INTEGRITY.
E. ONLY U.L. APPROVED CUT-OUTS WILL BE PERMITTED IN DEMISING AND OTHER FIRE RATED PARTITIONS FOR ELECTRICAL CIRCUITS / SWITCHES AND FOR ALL UTILITY PENETRATIONS.

VII. IDENTIFICATION

- A. ENGRAVED LABELS: ENGRAVED 3-LAYER PHENOLIC LABEL WITH BLACK LETTERS ON WHITE MATERIAL, UNLESS OTHER COLORS ARE CALLED OUT ON THE DRAWINGS OR DETAILS. LABELS MINIMUM 3/4" HIGH AND 2" LONG. LABELS MAY BE ATTACHED WITH DOUBLE BACKED ADHESIVE TAPE UNLESS INDICATED OTHERWISE. LABELS REQUIRED AT:
1. PANELBOARDS:
a) MOUNT IDENTIFICATION LABEL AT THE TOP OF THE FRONT COVER. MOUNT ON THE INSIDE OF DOOR FOR RECESSED PANELBOARDS.
b) 'FED FROM' LABEL.
2. DISCONNECT: LABEL EQUIPMENT THAT IT SERVES.
B. PROVIDE TYPEWRITTEN DIRECTORY ACCURATELY INDICATING ROOMS AND/OR EQUIPMENT BEING SERVED AT THE FOLLOWING LOCATIONS:
1. PANELBOARDS
C. EQUIPMENT IDENTIFICATION: IDENTIFY ALL EQUIPMENT AND APPARATUS WITH ENGRAVED BAKELITE NAMEPLATE OR IMPRESSED, PLASTIC STRIP.

VIII. CONDUIT

- A. CONDUIT: ALL CONDUIT SHALL BE CONCEALED IN FINISHED AREAS. ALL CONDUIT UNDERGROUND OR IN CONCRETE SLAB SHALL BE RIGID CONDUIT. ALL OTHER CONDUIT MAY BE ELECTRICAL METALLIC TUBING (EMT). ALL CONDUITS SHALL BE RUN PARALLEL WITH AND AT RIGHT ANGLES TO THE BUILDING CONSTRUCTION AND SHALL BE LEVEL.
B. RMC
1. ALLOWED FOR ALL SIZES INSIDE ABOVE GRADE.
2. REQUIRED WHERE CALLED OUT ON PLANS.
3. REQUIRED FOR ALL SIZES OF CONDUIT ABOVE GRADE CONDUIT.
4. GALVANIZED RIGID STEEL WITH GALVANIZED RIGID STEEL FITTINGS, THREADED WATERTIGHT.
C. EMT
1. ALLOWED FOR INSIDE ABOVE GRADE CONDUIT 2" AND SMALLER, MINIMUM SIZE 1/2".
2. STEEL SET SCREW OR COMPRESSION TYPE FITTINGS WITH INSULATED THROAT.
3. CAST METAL SET SCREW FITTINGS NOT ALLOWED.
D. FLEXIBLE
1. MINIMUM SIZE 1/2".
2. MAXIMUM LENGTH 36" FOR CONNECTION TO HVAC EQUIPMENT
3. MAXIMUM LENGTH 72" FOR CONNECTION TO FIXTURES IN TILE CEILINGS.
4. STEEL FITTINGS WITH INSULATED THROAT, UL LISTED.
E. INSTALLATION
1. DRAWINGS AND DIAGRAMS SHOW SIZE AND APPROXIMATE LOCATION OF CONDUIT. THE DRAWINGS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED TO DETERMINE EXACT LOCATION. PROVIDE ADDITIONAL OFFSETS AS REQUIRED FOR FIELD CONDITIONS. ROUTE CONDUIT IN ORDERLY MANNER, PARALLEL TO BUILDING STRUCTURE, CONICAL CONDUIT IN FINISHED AREAS.
2. INSTALL UL APPROVED EXPANSION FITTINGS COMPLETE WITH GROUNDING JUMPERS WHERE CONDUITS CROSS BUILDINGS EXPANSION JOINTS AND IN LONG CONDUIT RUNS WHERE DIFFERENTIAL EXPANSION OR CONTRACTION WOULD CAUSE BENDING OR SEPARATION.
3. INSTALL CONDUIT WITH ADEQUATE DRAINAGE.
4. WHEN REQUIRED BY STATE AND LOCAL CODES AND ORDINANCES, PROVIDE SEPARATE CONDUIT/RACEWAY FOR FIRE ALARM, EMERGENCY STAND-BY, REQUIRED STAND-BY, TELECOMMUNICATION SYSTEMS.
5. ROUTE CONDUIT ABOVE LAY-IN SUSPENDED CEILINGS SO AS NOT TO INTERFERE WITH TILE REMOVAL.
6. INSTALL FLEXIBLE STEEL CONDUIT DROPS FROM INDEPENDENT JUNCTION BOX MOUNTED ABOVE CEILING TO RECESSED LIGHT FIXTURES.
7. SECURE CONDUITS WITH AT LEAST ONE CORROSION PROOF MALLEABLE ALLOY STRAP OR HANGER EVERY 8 FT. DO NOT USE PERFORATED STRAPPING.
8. PROVIDE UL LISTED FIRE-WALL PENETRATIONS WHEN CONDUIT PASS THROUGH A FIRE RATED WALL.

IX. WIRE

- A. TYPE AND SIZE
1. NO. 10 & 12: SOLID OR STRANDED COPPER, 600V, THHN/THWN.
2. NO. 8 TO 250 KCMIL: STRANDED COPPER, 600V, THHN/THWN.
3. MINIMUM BRANCH CIRCUIT WIRE SIZE, NO. 12.
4. CONTROL WIRING: STRANDED COPPER, MINIMUM NO. 12.
5. GREEN INSULATION, COPPER STRANDED EQUIPMENT GROUND.
6. TYPE MC AND AC CABLE SHALL NOT BE USED. ALL WIRING SHALL BE INSTALLED IN CONDUIT.
B. NEUTRALS AND GROUNDS SHALL BE COLOR CODED PER NEC.
C. WIRING COLORS
1. 120/208-VOLT AND 120/240-VOLT SYSTEM: PHASE-A (BLACK), PHASE-B (RED), PHASE-C (BLUE).
D. TWO PERCENT VOLTAGE DROP AT PANELBOARDS AND THREE PERCENT FOR BRANCH CIRCUITS FOR FIVE PERCENT VOLTAGE DROP PER NEC.
E. CIRCUITS: WATER HEATER, NIGHT EMERGENCY LIGHTING, PHONE, AND COMPUTERS.
F. PROVIDE A SEPARATE GROUNDING CONDUCTOR AND SEPARATE NEUTRAL CONDUCTOR FOR EVERY BRANCH CIRCUIT. RECEPTACLE BRANCH CIRCUIT.
G. PROVIDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH LIGHTING BRANCH CIRCUIT THAT SERVES LED FIXTURES OR PROVIDE A NEUTRAL CONDUCTOR ONE SIZE LARGER THAN THE LARGEST SOURCE CONDUCTOR WHEN THE NEUTRAL IS SHARED.
H. ALL WIRING IN PATIENT CARE SPACES SHALL MEET ALL THE REQUIREMENTS OF SECTION 517. ALL TREATMENT ROOMS SHALL BE CONSIDERED PATIENT CARE SPACES.

X. BOXES

- A. FLUSH INTERIOR 4" SQUARE STEEL BOXES WITH FLUSH DOORS AND SQUARE CUT CORNERS. PROVIDE BOXES RATED FOR THROUGH FEED.
B. JUNCTION AND SPLICE BOXES SHALL BE GALVANIZED STEEL WITH FLUSH DOORS AND SQUARE CUT CORNERS. DIMENSIONS: THROUGH FEED AND BACK-TO-BACK NOT ALLOWED.
C. OUTLET AND JUNCTION BOXES USED AS RACEWAY SHALL BE MANUFACTURED BY THE SURFACE MOUNTING MANUFACTURER TO BE COMPATIBLE WITH THE RACEWAY USED. VERIFY LOCATION PRIOR TO INSTALLATION. MATCH THE HEIGHT OF EXISTING DEVICES FOR INSTALLATIONS IN ADDITION TO EXISTING FACILITIES.

XI. RECEPTACLES

- A. RECEPTACLES SHALL BE OF THE FOLLOWING:
B. RECEPTACLES SHALL BE OF THE FOLLOWING:
1. ALL OUTLETS SHALL BE FLUSH MOUNTED.
2. GROUND FAULT INTERRUPTER RECEPTACLES SHALL BE AS FOLLOWS:
a) FOR INTERIOR APPLICATIONS: INSTALL GFI RECEPTACLE DESIGN TO TRIP AT 5MA IN 1/30TH OF A SECOND RATED AT 115VAC / 20A BY PASS AND SEYMOUR OR EQUAL.
b) FOR EXTERIOR APPLICATION: INSTALL GFI RECEPTACLES AS DESIGNED FOR TRIP AND RATING ABOVE. RECEPTACLES SHALL BE METAL RATED NEMA 3R WITH COVER PLATE AS MANUFACTURED NYLON UNLESS NOTED OTHERWISE. MOUNTED AT 48" A.F.F.
3. NO CONVENIENCE DUPLEX RECEPTACLES SHALL BE LOCATED ON CERAMIC TILE OR A MIRRORRED SURFACE UNLESS SPECIFICALLY REQUIRED BY CITY CODE.
C. OUTLET BOXES: BOXES SHALL BE PRESSED STEEL KNOCKOUT TYPE, CAST IRON WITH DRILLED, TAPPED AND PLUGGED HOLES, OR PVC. CAST IRON BOXES SHALL BE HOT DIPPED GALVANIZED OR SHEARIZED. ALL BOXES SHALL BE OF PROPER CODE SIZE FOR THE NUMBER OF WIRES OR CONDUITS PASSING THROUGH OR TERMINATING THEREIN.
D. LIGHT SWITCH BOXES: ENCLOSURE BOXES TO SERVE FOR VARIOUS LIGHT CONTROL SWITCHES (PER PLANS) AND MEET SAME CRITERIA AS FOR OUTLET BOXES. ALL BOXES SHALL AS A MINIMUM STANDARD BE RATED FOR THE VOLTAGE AND AMPERAGE OF THE CIRCUIT BEING SWITCHED AND /OR TO MEET LOCAL CODES AND ORDINANCES.
E. LIGHT SWITCHES
1. GENERAL USE SNAP SWITCHES AS INDICATED ON PLANS ARE AS MANUFACTURED BY LEVITON, PASS AND SEYMOUR OR EQUAL, AND SHALL BE RATED AT 20A/125 VAC. THE SWITCH FACE SHALL BE OF ALMOND HIGH-IMPACT NYLON WITH A BRUSHED STAINLESS COVERPLATE UNLESS NOTED OTHERWISE. MOUNT AT 48" A.F.F.
2. SNAP SWITCHES USED TO CONTROL OUTLETS / RECEPTACLES SHALL BE OF THE HEAVY-DUTY TYPE RATED AT THE VOLTAGE / AMPERAGE INDICATED IN PLANS AND DIAGRAMS AND SHALL BE FURTHER QUALIFIED TO CONTROL MOTOR LOADS UP TO 2.0 HORSEPOWER, UNLESS OTHERWISE NOTED. SWITCHES AND COVER PLATES SHALL BE PASS AND SEYMOUR OR EQUAL.
F. ALL SWITCH AND OUTLET COVER PLATES TO BE BRUSHED STAINLESS STEEL.
G. BLANK, TELEVISION AND TELEPHONE OUTLETS: 4" SQUARE EXTRA DEEP BOX, SINGLE GANG RING AND BLANK COVER PLATE. PROVIDE CONDUIT FROM EACH BOX INTO AN ACCESSIBLE SPACE. TERMINATE CONDUIT WITH INSULATED CONNECTORS ON BOTH ENDS.

XII. OCCUPANCY SENSORS

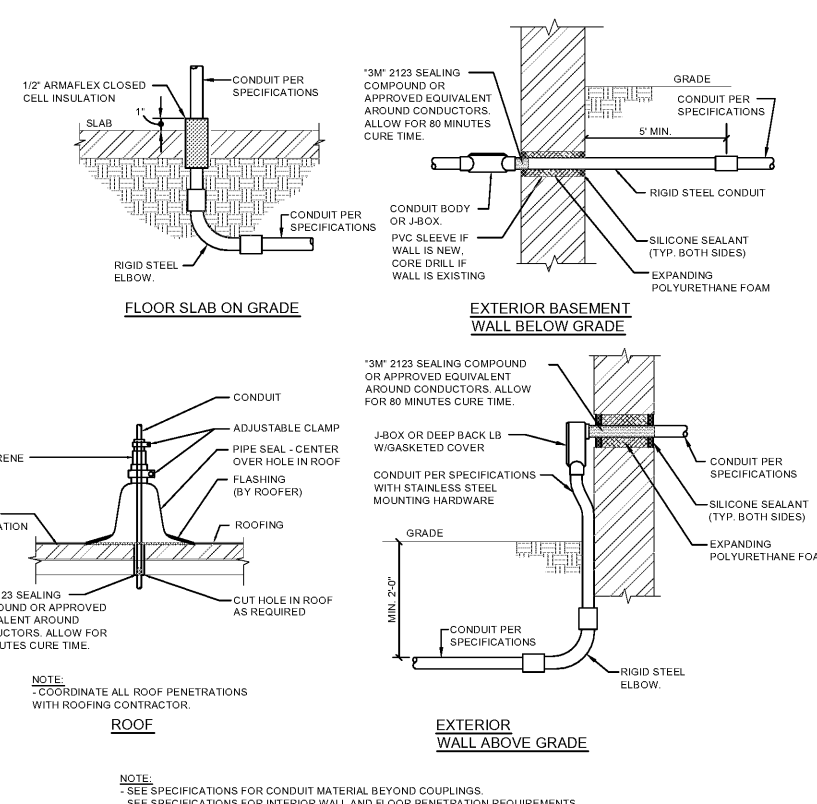
- H. MANUFACTURERS: HUBBELL, MYTECH, NOVITAS AND UNENCO, THE WATT STOPPER.
1. CEILING SENSOR:
a) HUBBELL OMNI-DT.
b) LONG THROW FOR CORRIDORS OR OTHER LONG THROW SPACES: HUBBELL OMNI-US 200.
2. WALL SENSOR:
c) SINGLE LEVEL WALL SWITCH: HUBBELL LH-MT SERIES
d) DUAL LEVEL/CIRCUIT WALL SWITCH: HUBBELL LHMTD.
e) SINGLE STALL BATHROOM WALL SENSOR: HUBBELL LH-MT RATED FOR 1/6HP.
3. POWER PACK: HUBBELL CPS-24 (SLAVE SL-20A).
I. DUAL TECHNOLOGY CONTROL
4. DOPPLER SHIFTS IN TRANSMITTED ULTRASOUND.
5. PASSIVE INFRARED HEAT CHANGES.
J. CONTROL STRATEGIES
6. MOTION FROM BOTH TECHNOLOGIES MUST BE SENSED BEFORE TURNING LIGHTING ON.
7. DETECTION BY EITHER TECHNOLOGY WILL HOLD LIGHTING ON FOR THE SET TIME PERIOD.
8. RETRIGGER TIME DELAY: ONLY ONE MOTION IS NECESSARY TO TURN ON THE LIGHTS WITHIN 5 SECONDS AFTER TURNING OFF.
K. SENSORS
9. SENSORS SHALL BE SIZED FOR THE ROOM THEY SERVE BY MANUFACTURER'S VENDOR OR COVER 1,500 SQUARE FEET WITH STANDARD LENS AND UP TO 90 LINEAR FEET WITH LONG RANGE LENS FOR WALKING MOTION WHEN MOUNTED AT A CEILING HEIGHT OF 12 FEET.
10. INDEPENDENT SENSITIVITY ADJUSTMENTS AND LED DISPLAY FOR EACH SENSING TECHNOLOGY.
11. SINGLE POLE, DOUBLE THROW ISOLATED RELAY WITH NORMALLY OPEN, NORMALLY CLOSED, AND COMMON OUTPUTS RATED AT 1 AMP FOR 24 VDC AND 1/2 AMP AT 120 VDC. THE ISOLATED RELAY IS FOR USE WITH HVAC CONTROL, DATA LOGGING, AND OTHER CONTROL OPTIONS.
12. TWO OUTPUTS: ONE OUTPUT IS BASED ON OCCUPANCY ONLY AND THE OTHER IS BASED ON OCCUPANCY WITH A HOLD OFF AND AN INTERNAL PHOTOCELL SETTING WHEN A MINIMUM LIGHT LEVEL IS PRESENT - ADJUSTABLE FROM 2.5 TO 430 FOOT-CANDELES.
13. POWER SUPPLY: UL LISTED POWER PACK THAT CONSISTS OF A TRANSFORMER AND CONTACT CLOSURE RELAY IN ONE PACKAGE.
14. SENSOR SHALL HAVE STANDARD 5 YEAR WARRANTY AND BE UL LISTED.
L. ULTRASONIC SENSING
15. VOLUMETRIC IN COVERAGE
16. CIRCUIT SHALL BE SOLID STATE CONTROLLED WITH ADVANCED SIGNAL PROCESSING AND CRYSTAL ACCURACY.
17. ULTRASONIC FREQUENCY: 40 KHZ + .006%.
18. ULTRASONIC RECEIVERS: TEMPERATURE AND HUMIDITY RESISTANT WITH LESS THAN A 6 DB SHIFT IN THE HUMIDITY RANGE OF 10% TO 90% AND LESS THAN A 6 DB SHIFT IN THE TEMPERATURE RANGE OF -20 TO 60 DEGREES C.
M. INFRARED SENSING
19. UTILIZE A TEMPERATURE COMPENSATED DUAL ELEMENT SENSOR AND A MULTI-ELEMENT FRESNEL LENS. UP TO 10 DIFFERENT PASSIVE INFRARED PATTERNS SHALL BE AVAILABLE BY LENS SELECTION.
20. DETECTION SHALL BE MAINTAINED WHEN A PERSON OF AVERAGE SIZE AND WEIGHT MOVES WITHIN A MAXIMUM DISTANCE OF 12' EITHER IN A HORIZONTAL OR VERTICAL MANNER AT THE APPROXIMATE SPEED OF 12" PER SECOND.
21. DAYLIGHT FILTER WHICH ENSURES THAT THE SENSOR IS INSENSITIVE TO SHORT WAVELENGTH INFRARED WAVES SUCH AS THOSE EMITTED BY THE SUN.
22. FRESNEL LENS SHALL BE A POLY IR 4 BASED MATERIAL.
23. LENS SHALL HAVE GROOVES FACING IN TO AVOID DUST AND RESIDUE BUILD UP.
24. PROVIDE MFR STANDARD LENS SUITABLE FOR APPLICATION.
N.E.C. SHALL INCLUDE TIME IN HIS BID TO WORK WITH THE OWNER AND MANUFACTURER TO DETERMINE THE PROPER TIME AND SENSOR SETTING FOR EACH OF THE MOTION SWITCHES FOR THE TYPE OF SPACE IN WHICH THEY WILL BE INSTALLED. INCLUDE TIME IN BID TO HAVE THE MANUFACTURER'S REPRESENTATIVE ON SITE AND REVIEW THE JOB TO DETERMINE WHAT THE EXPECTED EQUIPMENT SETTINGS SHOULD BE.

XIII. ENCLOSED DISCONNECT SWITCHES

- A. ELECTRICAL COMPONENTS, DEVICES AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A LISTED AGENCY ACCEPTABLE TO AUTHORITY HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
B. NONFUSIBLE SWITCH: TYPE WITH LOCKABLE HANDLE.
C. FUSE: TYPE AND RATING AS SPECIFIED ON DRAWINGS. HANDLE LOCKABLE IN OPEN AND CLOSED POSITION. THE INTERLOCK SHALL BE FOR IN CLOSED POSITION WITH INTERLOCK BYPASS.
D. ENCLOSURES: NEMA 3R AND NEMA 3B TO MEET ENVIRONMENTAL CONDITIONS OF INSTALLED LOCATION.
1. OUTDOOR LOCATIONS: NEMA 3B AND 250 TYPE 3R.
2. KITCHEN AREAS: NEMA 3B AND 4X, STAINLESS STEEL.
3. OTHER WET OR DAMP INDICATED LOCATIONS: NEMA 250 TYPE 4.
4. HAZARDOUS AREAS INDICATED ON DRAWINGS: NEMA 250 TYPE 7C.
5. MANUFACTURER'S STANDARD PRIME-COAT FINISH READY FOR FIELD PAINTING.
6. CONDUIT ENCLOSURE WITH ENGRAVED METAL OR LAMINATED-PLASTIC NAMEPLATE MOUNTED WITH CONDUIT-RESISTANT SCREWS.
7. INSTALL EQUIPMENT GROUNDING CONNECTIONS FOR SWITCHES AND CIRCUIT BREAKERS WITH GROUND CONTINUITY TO MAIN ELECTRICAL GROUND BUS.
8. DEMONSTRATE PRODUCT CAPABILITY AND COMPLIANCE WITH REQUIREMENTS AFTER INSTALLATION AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED.
9. PERFORM VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST. CERTIFY COMPLIANCE WITH TEST PARAMETERS.
10. CORRECT MALFUNCTIONING UNITS, ON-SITE WHERE POSSIBLE, AND RETEST TO DEMONSTRATE COMPLIANCE.

XIV. PANELBOARDS

- A. MANUFACTURER: CUTLER HAMMER, GENERAL ELECTRIC, ITE - SIEMENS, SQUARE D
B. CABINET
1. NEMA 1 CABINET, CODE GAUGE STEEL CONSISTING OF A BOX WITH A REMOVABLE FRONT WITH HINGED DOOR AND LATCH.
2. FABRICATE WITH STRAIGHT EDGES AND SQUARE CORNERS.
3. BOXES SHALL BE MINIMUM 20" WIDE.
4. MANUFACTURER'S STANDARD FINISH, PRIME COAT AND BAKED ENAMEL FINISH.
C. PROVIDE A NAMEPLATE LISTING OF THE PANEL TYPE AND NUMBER OF PROTECTIVE AND SWITCHING DEVICES AND RATINGS.
D. BUS BARS FOR THE MAINS SHALL BE COPPER SIZED IN ACCORDANCE WITH UL STANDARDS. INCLUDE FULL SIZE NEUTRAL BARS UNLESS OTHERWISE NOTED. PROVIDE GROUND BUS.
E. NEUTRAL BUSING SHALL HAVE ONE LUG FOR EVERY BRANCH CIRCUIT THAT THE PANELBOARD IS CAPABLE OF SUPPORTING.
F. BUS SPACES FOR FUTURE SWITCHING AND PROTECTIVE DEVICES FOR THE MAXIMUM DEVICES AND SWITCHES THAT THE PANELBOARD CAN ACCOMMODATE.
G. CIRCUIT BREAKERS:
1. UNLESS INDICATED OTHERWISE, CIRCUIT BREAKERS SHALL BE BOLT-ON, INDIVIDUALLY REPLACEABLE, THERMAL-MAGNETIC, AUTOMATIC FREE TRIPPING, SEPARATELY INDICATING 'ON', 'TRIPPED', AND 'OFF', AMBIENT COMPENSATED AT 40 DEGREES C., SINGLE, DOUBLE, OR TRIPLE POLE, AS REQUIRED BY THE PANEL SCHEDULES.
2. CIRCUIT BREAKERS INDICATED AS MULTIPLE POLE SHALL BE COMMON TRIP.
3. SHUNT TRIP BREAKERS SHALL HAVE INTEGRAL RELAYS.



CONDUIT PENETRATION DETAILS

NO SCALE

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PROJECT INFORMATION

PROJECT NUMBER 1823380

TENANT BUILD-OUT FOR:
ASPEN DENTAL
4011 WARDS ROAD • LYNCHBURG, VA 24502

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE MAY 31, 2018

Table with columns for REVISIONS and a list of revision entries.

SHEET INFORMATION

SPECIFICATIONS

SHEET NUMBER

E0.2