

DIVISION 26 ELECTRICAL SPECIFICATIONS

26 05 01 COMMON REQUIREMENTS FOR ELECTRICAL

ALL ELECTRICAL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LATEST EDITION OF NFPA 70 AND ALL REGULATIONS, LAWS, AND ORDINANCES WHICH MAY BE APPLICABLE AND BY TRAINED AND LICENSED ELECTRICIANS.

BEFORE SUBMITTING A BID, EXAMINE DOCUMENTS OF ALL OTHER TRADES, VISIT THE SITE AND GET ACQUAINTED WITH ALL CONDITIONS THAT MAY IN ANY WAY AFFECT THE EXECUTION OF THIS CONTRACT. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT SIZE AND LOCATIONS OF ALL OPENINGS REQUIRED. VERIFY INSTALLATION MAY BE MADE IN COMPLETE ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS. IN THE EVENT OF DISCREPANCY, IMMEDIATELY NOTIFY THE PROFESSIONAL ENGINEER OF RECORD. DO NOT PROCEED WITH THE INSTALLATION IN AREAS OF DISCREPANCY UNTIL ALL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

IT IS NOT THE INTENT OF THE DRAWINGS THAT EXISTING CONDITIONS BE ACCURATELY SHOWN. EXISTING ELECTRICAL WORK IS SHOWN TO LIMITED EXTENT ON DRAWINGS AND IS SHOWN FOR GENERAL REFERENCE ONLY. LOCATIONS AND INFORMATION WERE DERIVED FROM CURSORY SITE VISUAL OBSERVATIONS OR FROM DOCUMENTS THAT WERE PREPARED FOR PREVIOUSLY INSTALLED WORK WHEN AVAILABLE.

LIST OF EQUIPMENT, TABULATIONS OF DATA, SCHEDULES, ETC. APPEARING IN THE SPECIFICATIONS OR ON THE DRAWINGS ARE INCLUDED FOR REFERENCE BY THE CONTRACTOR IN ARRIVING AT A MORE COMPLETE UNDERSTANDING OF THE INTENDED INSTALLATION. THEY ARE NOT INTENDED OR TO BE CONSTRUED AS RELIEVING THE RESPONSIBILITY OF THE CONTRACTOR IN MAKING HIS/HER OWN TAKE-OFF AND PROVIDING ALL REQUIRED WORK.

THE WORK COVERED BY THESE SPECIFICATIONS SHALL CONSIST OF PROVIDING ALL NEW MATERIAL, LABOR, EQUIPMENT, AND SERVICES NECESSARY FOR A COMPLETE ELECTRICAL INSTALLATION AS SPECIFIED HEREIN. WORK IN THIS SECTION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING ITEMS:

- TELEPHONE CONDUIT SYSTEM
- DATA COMMUNICATIONS CONDUIT SYSTEM
- WIRING DEVICES
- BRANCH CIRCUITING
- GROUNDING
- CONNECTION OF HVAC EQUIPMENT
- TEMPORARY ELECTRICAL WIRING
- LIGHTING

WHENEVER THE WORDS "CONTRACTOR" APPEAR ON ELECTRICAL DRAWINGS OR IN THESE SPECIFICATIONS, IT SHALL REFER TO THE ELECTRICAL SUB-CONTRACTOR. WHENEVER THE WORD "PROVIDE" APPEARS IN THESE DOCUMENTS, IT SHALL BE INTERPRETED TO MEAN "FURNISH AND INSTALL".

COORDINATE ALL WORK WITH THE OWNER TO MINIMIZE INTERRUPTION OF BUILDING OPERATION. SCHEDULE OF ALL POWER OUTAGES MUST BE APPROVED BY THE OWNER PRIOR TO THE BEGINNING OF ANY WORK.

PRIOR TO ALL WORK, CAREFULLY INSPECT THE INSTALLED WORK OF ALL OTHER TRADES AND VERIFY THAT ALL SUCH WORK IS COMPLETE TO THE POINT WHERE THIS INSTALLATION MAY PROPERLY COMMENCE. COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE SCHEDULES FOR WORK OF ALL OTHER TRADES TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

COORDINATE EXACT ELECTRICAL REQUIREMENTS (VOLTAGE, PHASE, AMPS, WIRING, CONNECTIONS, AND ETC.) OF EQUIPMENT FURNISHED BY OTHERS PRIOR TO PERFORMING WORK. COORDINATE MANUFACTURER'S ELECTRICAL WIRING AND CONNECTION REQUIREMENTS WITH PRODUCT DATA AND/OR SUBMITTAL DRAWINGS PRIOR TO ROUGH-IN AND FURNISHING EQUIPMENT'S OVER-CURRENT PROTECTIVE DEVICES. ALL WIRING REQUIREMENTS SHOWN ARE SCHEMATIC IN NATURE. COORDINATE SPECIALTY RECEPTACLE AND/OR OUTLET TYPES WITH EQUIPMENT REQUIREMENTS. WHEN LOOSE DISCONNECT SWITCHES ARE FURNISHED UNDER MECHANICAL CONTRACT, RECEIVE AND INSTALL AND PROVIDE ALL FINAL TERMINATIONS NECESSARY.

VERIFY ALL EQUIPMENT LOCATIONS, SWITCHES, RECEPTACLES, LIGHTING FIXTURES, ETC., IN FIELD. THE OWNER RESERVES THE RIGHT TO CHANGE LOCATION OF ANY OUTLET OR FIXTURE FOR A DISTANCE OF 15 FT. IN ANY DIRECTION FROM DRAWING LOCATION, BEFORE THE WORK IS ACTUALLY ROUGHED IN, AT NO EXTRA CHARGE.

WHERE LIGHT FIXTURE AND OTHER ELECTRICAL ITEMS ARE SHOWN IN CONFLICT WITH LOCATIONS OF STRUCTURAL MEMBERS AND MECHANICAL OR OTHER EQUIPMENT, PROVIDE ALL REQUIRED SUPPORTS AND WIRING TO CLEAR THE ENCRoACHMENT.

PROVIDE ALL MISCELLANEOUS HARDWARE AND MATERIAL NOT SPECIFIED BUT NECESSARY TO PROVIDE A COMPLETE AND WORKING ELECTRICAL SYSTEM. THIS HARDWARE SHALL INCLUDE, BUT NOT BE LIMITED TO, ALL MISCELLANEOUS CONDUIT FITTINGS AND MOUNTING HARDWARE, LUMINAIRE MOUNTING HARDWARE, BRACKETS, CONNECTORS, CORDS AND PLUGS.

PROVIDE ACCESS DOORS TO PROVIDE ACCESS TO ALL J-BOXES, PULL BOXES, AND OTHER EQUIPMENT AS REQUIRED. ACCESS DOORS FOR INSTALLATION IN FIRE RATED CONSTRUCTION SHALL HAVE APPROPRIATE FIRE RATINGS.

DURING PROGRESS OF THE WORK, MAINTAIN ON DRAWINGS AT THE SITE, AN ACCURATE RECORD OF THE INSTALLATION OF THE ELECTRICAL SYSTEM, INDICATING ALL ITEMS WHICH HAVE BEEN CHANGED OR ADDED.

APPLY FOR AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY LOCAL AUTHORITY, FOR THE APPROVAL OF WORK.

A CERTIFICATE OF FINAL INSPECTION AND APPROVAL SHALL BE SUBMITTED WITH THE CONTRACTOR'S REQUEST FOR FINAL PAYMENT. NO FINAL PAYMENT WILL BE APPROVED WITHOUT THIS CERTIFICATE.

GUARANTEE ALL WORKMANSHIP, MATERIAL, AND EQUIPMENT AND REPLACE ANY FOUND DEFECTIVE WORK WITHOUT COST TO THE OWNER, FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.

ADDITIONAL WORK REQUIRED FOR COMMERCIAL KITCHENS, WHETHER OR NOT EXPLICITLY LISTED ON A CASE BY CASE BASIS ON PLANS:

ALL 15 AND 20 AMP, 125 VOLT RATED RECEPTACLES IN KITCHENS AND/OR WITHIN 6" OF A WATER SOURCE MUST HAVE GFCI PROTECTION. PROVIDE GFCI RECEPTACLES IN READILY ACCESSIBLE LOCATION. WHERE ELECTRICAL PANEL IS IN READILY ACCESSIBLE LOCATION, GFCI CIRCUIT BREAKERS MAY BE UTILIZED IN PLACE OF GFCI RECEPTACLES AT THE CONTRACTOR'S DISCRETION.

WALK IN COOLERS/FREEZERS: AVOID PENETRATIONS WHEREVER POSSIBLE. IF RECEPTACLES MUST BE MOUNTED TO THE EXTERIOR OF COOLER/FREEZER, SURFACE MOUNT CONDUIT/RECEPTACLE DOWN FROM CEILING ABOVE TO AVOID PENETRATIONS. SEAL ALL PENETRATIONS THROUGH THE WALK-IN COOLER/FREEZER. AVOID SEAMS IN WALK-IN COOLER/FREEZER PANELS WHEN MAKING PENETRATIONS. MAKE ALL NECESSARY CONNECTIONS TO THE LIGHTS, DEFROST TIMER, EVAPORATOR, CONDENSER, ETC. WHERE CONDUITS ARE INSTALLED IN WALK-IN COOLERS/FREEZERS, PROVIDE RUNS VERTICALLY TO AVOID TRAPPING CONDENSATION.

HARD WIRED EQUIPMENT ON PLAN IS SHOWN DIRECTLY CONNECTED WITH DISCONNECTING MEANS PER THE PROVISIONS OF NFPA 70, SECTION 422.34. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE WITH FINAL EQUIPMENT SELECTIONS. IF NO UNIT SWITCH WITH A MARKED-OFF POSITION IS INTEGRAL TO THE APPLIANCE BEING SERVED, PROVIDE GENERAL PURPOSE LOCAL DISCONNECT SWITCH SUITABLE FOR THE VOLTAGE, AMPERAGE AND PHASE OF THE APPLIANCE.

NATIONAL ACCOUNT: REFER TO THE NATIONAL ACCOUNT DIRECTORY. THE FOLLOWING EQUIPMENT MAY BE AVAILABLE: MAIN SERVICE PANELBOARD WITH BREAKERS INSTALLED, LIGHTING AND DISTRIBUTION PANELBOARD(S) WITH BREAKERS INSTALLED, ROOF-TOP DISCONNECTS FOR HVAC UNITS AND KITCHEN EXHAUST FANS, LIGHTING CONTACTOR PANEL, AND SHUNT TRIP SYSTEMS.

26 05 03 SUBMITTALS FOR ELECTRICAL SYSTEMS ALL MATERIALS, APPARATUS AND EQUIPMENT SHALL BEAR THE SEAL OF UNDERWRITERS LABORATORIES INC. (UL) OR A SIMILAR REPUTABLE TESTING AGENCY. DESIGN BASIS MANUFACTURERS OF MATERIAL AND EQUIPMENT ARE SPECIFIED AND PLANS ARE DETAILED ACCORDING TO THIS MATERIAL. CONTRACTOR SHALL BASE HIS BID ON FURNISHING AND INSTALLING THIS MAKE OF MATERIAL AND EQUIPMENT.

AN ACCEPTABLE MANUFACTURER'S NAME AND MODEL NUMBER OF A PRODUCT MAY BE PROVIDED IN THESE DOCUMENTS. THIS IS THE EQUIPMENT INCLUDED DURING THE DESIGN PROCESS AND FORMS THE BASIS OF A STANDARD QUALITY. IF THERE MORE THAN ONE MAKE OF MATERIAL OR EQUIPMENT IS SPECIFIED, THE CONTRACTOR SHALL STATE IN HIS BID WHICH MAKE OF EQUIPMENT TO FURNISH. ALL SHOP DRAWING APPROVAL SHALL BE OBTAINED PRIOR TO SHIPMENT OF EQUIPMENT.

VERIFY THE MODEL NUMBER OR PRODUCT IS STILL ACCURATE AND MEETS ALL REQUIREMENTS SHOWN ON THE DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN THE REQUIREMENTS AND THE PRODUCT OR MODEL NUMBER, THE STRICTER OF THE TWO SHALL GOVERN.

26 05 08 - ELECTRICAL SITE REQUIREMENTS

EXISTING UTILITIES: THE INFORMATION SHOWN CONCERNING EXISTING UTILITIES IS APPROXIMATE. THE LOCATION, SIZES AND OTHER INFORMATION INDICATED IS ONLY AS ACCURATE AS THAT PROVIDED BY THE OWNERS OF THE UTILITIES. THIS INFORMATION IS NOT WARRANTED OR GUARANTEED TO BE COMPLETE OR ACCURATE. THE ENGINEER DOES NOT INDEPENDENTLY VERIFY NOR FIELD LOCATE UTILITIES. THE CONTRACTOR IS RESPONSIBLE TO PHYSICALLY LOCATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES, WHETHER SHOWN ON PLANS OR NOT, PRIOR TO BEGINNING CONNECTIONS.

THE CONTRACTOR SHALL SUPPORT, PROTECT AND RESTORE ALL EXISTING UTILITIES AND THEIR ASSOCIATED ITEMS. PROTECT EXCAVATED OPENINGS WITH SUBSTANTIAL RAILINGS, SIGNAGE, SHORING, AND STEEL ROADWAY PLATES IN STRICT COMPLIANCE WITH OSHA/RUSH. WITH LOCAL DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS, WITH AUTHORITY HAVING JURISDICTION, AND AS DIRECTED BY OWNER'S REPRESENTATION IN FIELD. PROVIDE TRAFFIC DETOURS PER DOT STANDARDS DURING ACTIVE CONSTRUCTION WORK SHIFT TIME PERIODS. PROTECT STEEL ROADWAY PLATES, PROPERLY INSTALLED AND ANCHORED PER DOT STANDARDS, OVER ROADWAY CUTS DURING INACTIVE PERIODS. FINISH WORK AFFECTING THE ROADWAYS, AND RESTORE/PAVE ROADWAY CUTS AS QUICKLY AS POSSIBLE AFTER STARTING THOSE SEGMENT OF WORK.

THE CONTRACTOR SHALL NOTIFY THE REGISTERED UTILITY PROTECTION SERVICE AND ALL UTILITY OWNERS HAVING FACILITIES IN THE CONSTRUCTION AREA WHO ARE NOT MEMBERS OF A REGISTERED UNDERGROUND PROTECTION SERVICE.

THE CONTRACTOR SHALL GIVE NOTIFICATION AS REQUIRED BY CODE, AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS, EXCLUDING SATURDAYS, SUNDAYS AND HOLIDAYS. THE CONTRACTOR SHALL COORDINATE THE WORK WITH THE UTILITY OWNERS UNTIL THE WORK IS COMPLETED. THE CONTRACTOR SHALL PROVIDE THE PROJECT OWNER WITH EVIDENCE OF HAVING NOTIFIED THE UTILITIES AND PROVIDED THEM WITH THE WORK SCHEDULE PRIOR TO CONSTRUCTION COMMENCEMENT.

DO NOT USE EXPLOSIVES.

PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENT, AND OTHER FACILITIES FROM DAMAGE CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT, AND OTHER HAZARDS CREATED BY EXCAVATION OPERATIONS.

EXCAVATE BY HAND AREAS WITHIN DRIP-LINE OF LARGE TREES. PROTECT THE ROOT SYSTEM FROM DAMAGE AND DRY-OUT. MAINTAIN MOIST CONDITIONS FOR ROOT SYSTEM AND COVER EXPOSED ROOTS WITH BURLAP. PAINT ROOT CUTS OF 1 INCH DIAMETER AND LARGER WITH EMULSIFIED ASPHALT TREE PAINT.

BACKFILL AND FILL MATERIALS: IN GENERAL, USE EXCAVATED MATERIAL FOR BACKFILL. PRIOR TO BACKFILLING, REMOVE ROCK AND GRAVEL LARGER THAN 2 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETABLE MATTER, AND OTHER DELETERIOUS MATTER. PROVIDE PRE-MIXED, FACTORY PACKAGED, NON-STAINING, NON-CORROSIVE, NONGASEOUS GROUT, RECOMMENDED FOR INTERIOR AND EXTERIOR APPLICATIONS. PROVIDE SUB-BASE CONSISTING OF GRADED MIXTURE OF CRUSHED GRAVEL, CRUSHED STONE, CRUSHED SLAG, OR SAND.

TRENCHING: EXCAVATE TRENCHES TO THE UNIFORM WIDTH, SUFFICIENTLY WIDE TO PROVIDE AMPLE WORKING ROOM. EXCAVATE TRENCHES TO DEPTH AND WIDTH INDICATED OR OTHERWISE NECESSARY TO FULFILL PROJECT REQUIREMENTS.

COMPACT EACH LAYER OF BACKFILL OR FILL MATERIAL TO 95% STANDARD COMPACTION.

TOPSOIL AND SEEDING: SEPARATELY STOCKPILE EXCAVATED TOPSOIL ADJACENT TO TRENCH AND UTILIZE IN THE FINAL STAGE OF BACKFILLING. GRADE EXPOSED EARTH AND OTHER ERODIBLE AREAS TO A REASONABLY UNIFORM, AND SATISFACTORY, CROSS SECTION AND SLOPE, AS SOON AS PRACTICABLE.

CONCRETE ENCASEMENT: PROVIDE AS INDICATED OR OTHERWISE NECESSARY TO FULFILL PROJECT REQUIREMENTS.

IN GENERAL, UNLESS DIRECTED OTHERWISE IN FIELD, USE THE SIDES OF EXCAVATED TRENCHES AS FORMS FOR CONCRETE ENCASMENT. DO NOT REMOVE FORMS FOR 24 HOURS AFTER CONCRETE HAS BEEN PLACED. PROVIDE SUFFICIENT QUANTITY OF FORMS TO ALLOW CONTINUOUS PROGRESS OF WORK. IF REQUIRED FOR SPECIAL APPLICATIONS IN FIELD, PROVIDE FORMS MADE OF STEEL, WOOD, OR OTHER SUITABLE MATERIAL OF SIZE AND STRENGTH TO RESIST MOVEMENT DURING CONCRETE PLACEMENT, AND TO RETAIN HORIZONTAL AND VERTICAL ALIGNMENT UNTIL REMOVAL. CLEAN ALL FORMS AFTER EACH USE AND COAT WITH FORM RELEASE AGENT TO ENSURE SEPARATION FROM CONCRETE WITHOUT DAMAGE. FORM AREAS THAT INVOLVE TERMINATION OF SPARE CONDUITS BELOW GRADE, OR THAT INVOLVE CONTINUATION OF CONDUITS BY OTHERS, ACCORDINGLY TO ACCOMMODATE EASY FUTURE ACCESS TO THE ENDS OF CONDUITS FOR FUTURE EXTENSIONS.

PROVIDE REINFORCEMENT TO INCLUDE WELDED WIRE MESH, REINFORCING BARS, AND JOINT DOWEL BARS IF DEEMED NECESSARY.

DESIGN MIX TO PRODUCE NORMAL-WEIGHT CONCRETE CONSISTING OF PORTLAND CEMENT, AGGREGATE, AIR-ENTRAINING ADMIXTURE, AND WATER TO PRODUCE THE FOLLOWING PROPERTIES:

- AGGREGATE: 3/8"
- COMPRESSIVE STRENGTH: 3000 PSI, MINIMUM AT 28 DAYS
- SLUMP RANGE: 7" - 8" (PROVIDE ENOUGH SLUMP TO FLOW TO BOTTOM OF THE FORMATION AND YET NOT BE SO WET AS TO CAUSE THE DUCTS TO FLOAT.
- AIR CONTENT: 5% - 8%
- PORTLAND CEMENT: ANSII/ASTM C 150, TYPE 1
- DYE: PROVIDE BRIGHT RED DYE, CENTRALLY MIXED.

EXPANSION JOINTS: PROVIDE PRE-MOLDED JOINT FILLER FOR EXPANSION JOINTS ABUTTING MANHOLES, CABLE PITS, AND SIMILAR STRUCTURES.

CONCRETE FINISHING: PROVIDE SMOOTH BROOM FINISHED CONCRETE SURFACE BY SCREEDING AFTER STRIKING-OFF AND CONSOLIDATING CONCRETE. PROTECT CONCRETE FROM DAMAGE UNTIL ACCEPTANCE OF WORK.

SERVICE VOLTAGE: THESE DRAWINGS ARE FOR A METERED, UNDERGROUND BUILDING SERVICE OF 120/208 VOLT, THREE PHASE, FOUR WIRE, 60 HERTZ. ALL KITCHEN AND AIR CONDITIONING EQUIPMENT HAS BEEN DESIGNED AND PURCHASED FOR USE ON THIS ELECTRICAL SYSTEM. THE CONTRACTOR SHALL CONTACT THE ELECTRICAL UTILITY AND VERIFY ALL OF THE ABOVE SERVICE CHARACTERISTICS, AND THE AVAILABLE FAULT CURRENT.

SERVICE EQUIPMENT: THE SERVICE SHALL BE LOCATED AS SHOWN ON THE SITE PLAN, OR AS INDICATED IN THE INSTRUCTIONS TO BIDDERS. UTILITY POLES, PADS FOR UTILITY TRANSFORMERS, CURRENT TRANSFORMER ENCLOSURES, METERING EQUIPMENT, SERVICE MASTS, AND OTHER RELATED MATERIALS AND EQUIPMENT SHALL BE PROVIDED, FURNISHED, AND INSTALLED AS REQUIRED. INCLUDE THE COST OF ALL THE ABOVE ITEMS. SERVICE CONNECTIONS, AND METER CHARGES IN THE BASE BID. MAIN SERVICE SWITCHES AND CURRENT TRANSFORMER CABINETS SHALL BE INCLUDED IN THE BASE BID. UNLESS NOTED OTHERWISE, A MAIN SERVICE SWITCH WITH CURRENT LIMITING FUSES MAY BE USED WHEN THE AVAILABLE FAULT CURRENT (AFC) IS EXCESSIVE, IN ORDER TO USE STOCK PANELBOARDS, WITH 10K OR 22K AIC RATINGS.

26 05 19 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES FURNISH AND INSTALL ALL NECESSARY CABLE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS. ALL WIRE SHALL BE COPPER UNLESS OTHERWISE SPECIFIED.

NO CONDUCTOR SMALLER THAN NO. 12 AWG SHALL BE USED UNLESS OTHERWISE INDICATED. IN GENERAL, CONDUCTORS SMALLER THAN NO. 12 WILL BE PERMITTED ONLY FOR COMMUNICATION, SIGNAL, OR CONTROL CIRCUITS.

PROVIDE THE FOLLOWING MINIMUM AWG CONDUCTOR SIZES FOR GENERAL BRANCH CIRCUITING AND GROUNDS THAT ARE NOT INDICATED ON DRAWINGS. ALL WIRING IS BASED ON USING COPPER CONDUCTORS UNLESS OTHERWISE INDICATED. WHERE APPLICABLE, INCREASES ARE REQUIRED TO ACCOMMODATE VOLTAGE DROP AND TO ACCOMMODATE SPECIAL CONDITIONS. DO NOT DERATE ANY GROUNDED OR UNGROUNDED CONDUCTORS. TEMPERATURE RATINGS LISTED BELOW PERTAIN TO BOTH WIRE AND TERMINATIONS.

SOURCE BREAKER/FUSE	50 DEG. C RATING AWG WIRE SIZE	EQUIPMENT GROUNDING AWG WIRE SIZE
15 AMPERE	#12	#12
20 AMPERE	#12	#12
25 AMPERE	#10	#10
30 AMPERE	#8	#10
35 AMPERE	#8	#10
40 AMPERE	#8	#10
45 AMPERE	#8	#10
50 AMPERE	#8	#10
60 AMPERE	#6	#8
70 AMPERE	#6	#8
80 AMPERE	#4	#8
90 AMPERE	#4	#8
100 AMPERE	#2	#8
120 AMPERE	#1	#8

CONDUCTORS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET, NO SPLICES SHALL BE PERMITTED EXCEPT AT OUTLETS. ALL ELECTRICAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC.

COLOR CODING IS REQUIRED FOR ALL SERVICE, FEEDER, BRANCH, CONTROL, AND SIGNALING CIRCUIT CONDUCTORS. INSULATION COLOR FOR NEUTRALS SHALL BE WHITE FOR 120 VOLT CIRCUITS. EQUIPMENT GROUNDING CONDUCTORS SHALL BE GREEN. THE COLOR OF THE INSULATION OF THE UNGROUNDED CONDUCTORS SHALL BE AS FOLLOWS:

208Y/120V SYSTEM: BLACK, RED, BLUE AND WHITE (NEUTRAL)
480Y/277V SYSTEM: BROWN, BRANGE, YELLOW AND GRAY (NEUTRAL)
EQUIPMENT GROUNDING: GREEN
ALL UNGROUNDED CONDUCTORS OF THE SAME COLOR SHALL BE CONNECTED TO THE SAME UNGROUNDED FEEDER CONDUCTOR.

USE NO WIRE SMALLER THAN NO. 12 AWG, RATED AT 600 VOLTS, FOR POWER AND LIGHTING CIRCUITS AND NO SMALLER THAN NO. 14 FOR CONTROL WIRING. BRANCH CIRCUIT CONDUCTORS FOR 20 AMPERE, 120 VOLT CIRCUITS SHALL BE NO. 12 AWG, WITH CONDUCTOR FROM PANEL BOARD TO THE FIRST OUTLET AS FOLLOWS:

0 - 75 FEET-----#12 AWG
75 -150 FEET-----#10 AWG
150-250 FEET-----# 8 AWG
250-350 FEET-----# 6 AWG

ALL JOINTS AND SPLICES SHALL BE MADE MECHANICALLY AND ELECTRICALLY SECURE. ALL SPLICES AND JOINTS SHALL BE MADE WITH APPROVED SOLDERLESS CONNECTORS, PROPERLY INSTALLED.

26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

ALL WIRE FOR GROUNDING PURPOSE SHALL BE STRANDED COPPER, OR COPPER CLAD STEEL AS REQUIRED FOR TYPE AND SIZES INDICATED ON DRAWINGS.

BUILDING ELECTRODE GROUND RODS SHALL BE 10'-0" LONG X 3/4" DIAMETER (MINIMUM DIMENSIONS). GROUND RODS SHALL BE STEEL WITH A MOLECULARLY BONDED OUTER LAYER OF ELECTROLYTICALLY APPLIED COPPER JACKET OF GALVANIZED STEEL AS REQUIRED. ALL GROUND RODS SHALL BE TESTED WITH PROPER TEST EQUIPMENT FOR ROD TO EARTH RESISTANCE BEFORE CONNECTING GROUND WIRE.

METAL RACEWAYS MAY NOT BE USED FOR EQUIPMENT GROUNDING CONDUCTOR.

PROVIDE A SEPARATE DRIVEN GROUND FOR THE NEUTRAL BUSS ON THE ELECTRICAL DISTRIBUTION SYSTEM.

PROVIDE A SEPARATE DRIVEN GROUND FOR USE AS EQUIPMENT GROUND. THE DRIVEN GROUND TO INCOMING CITY WATER LINE THROUGH A #4/O BAR STRANDED COPPER CONDUCTOR. USE APPROVED GROUND CLAMPS.

PROPERLY GROUND ALL MOTORS, TRANSFORMERS, EQUIPMENT, CONDUITS, SWITCH GEAR, ETC.

GROUND ALL LUMINAIRES BY INSTALLING A SEPARATE GREEN GROUND WIRE IN ANY FLEXIBLE CONDUIT BETWEEN OUTLET BOX AND FIXTURE.

26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS CONDUIT SHALL BE SUPPORTED BY APPROVED STRAPS, FASTENERS AND HANGERS. HANGERS SHALL BE SUSPENDED FROM ROOFS. PERFORATED STRAPS WILL NOT BE ACCEPTABLE. FASTENERS SHALL BE LEAD EXPANSION SHIELDS IN BLOCK OR CONCRETE, TOGGLE BOLTS IN HOLLOW WALLS, MACHINE SCREWS ON METAL SURFACES AND WOOD SCREWS ON WOOD CONSTRUCTION.

ALL CONDUIT SHALL BE SUPPORTED INDEPENDENTLY FROM ALL OTHER BUILDING SYSTEMS AND SHALL BE SUPPORTED DIRECTLY FROM STRUCTURAL COMPONENTS. AT BUILDING EXPANSION JOINTS AND WHERE DEFLECTION IS EXPECTED, CONDUITS SHALL BE PROVIDED WITH EXPANSION FITTINGS WITH BONDING JUMPERS. CONDUITS PASSING THROUGH STRUCTURAL MEMBERS SHALL BE PROVIDED WITH STUB AND COUPLING OR SLEEVE IN THE MEMBER. WHERE MOISTURE CONDITIONS ARE ENCOUNTERED, A HOLE SHALL BE DRILLED AT THE LOWEST POINT IN THE CONDUIT RUN.

26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

CONCEAL CONDUIT AND EMT WITHIN FURNISHED WALLS, CEILINGS, AND FLOORS UNLESS OTHERWISE INDICATED. INSTALL CONDUITS PARALLEL OR PERPENDICULAR TO BUILDING LINES.

INTERIOR CONDUIT SHALL BE OF SUFFICIENT SIZE AND INSTALLED SO THE REQUIRED NUMBER OR CONDUCTORS CAN BE INSERTED OR REMOVED WITHOUT INJURY TO, OR EXCESSIVE STRAIN UPON, THE INSULATION. THE MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED.

CONDUITS SHALL BE RUN CONTINUOUS FROM OUTLET TO OUTLET AND SHALL BE FASTENED TO ALL BOXES AND CABINETS WITH DOUBLE LOCKOUTS, TO PROVIDE CONTINUITY OF GROUND, AND A BUSHING. THE FULL NUMBER OF THREADS MUST PROJECT BEYOND LOCKOUT IN BOXES AND CABINETS TO ALLOW THE BUSHING TO BUIT UP TIGHT AGAINST THE END OF THE CONDUIT.

CONDUIT RUN EXPOSED SHALL RUN PARALLEL, OR PERPENDICULAR TO WALLS, CEILINGS, OR PRINCIPAL FRAMING MEMBERS. IT IS REQUIRED THAT ALL CONDUIT BE INSTALLED TO REFLECT NEAT, CAREFUL WORKMANSHIP THROUGHOUT THE JOB. CONDUIT WHICH HAS BEEN CRUSHED, DAMAGED, OR DEFORMED IN ANY WAY SHALL NOT BE INSTALLED IN THE JOB. CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST TROUBLE FROM COLLECTION OF TRAPPED CONDENSATE, AND ALL RUNS OF CONDUIT SHALL BE FREE OF SUCH TRAPS WHEREVER POSSIBLE.

ALL CONDUIT HANGERS AND SUPPORTS SHALL BE RIGIDLY FASTENED TO THE BUILDING STRUCTURE. NO CONDUIT SHALL BE SUPPORTED FROM DUCTWORK, PIPING, OR CEILING GRID SYSTEMS.

PROVIDE FIRE SEALS WHEREVER CONDUIT PENETRATES FIRE WALLS, CEILING OR RATED FLOOR SLABS.

RIGID STEEL CONDUIT SHALL BE USED FOR ALL CONDUIT RUNS INSTALLED IN CONCRETE SLABS, IN ALL PARTS OF CONCRETE CONSTRUCTION. ALL APPLICATIONS INSIDE BUILDING INCLUDING 2" OR LARGER IN SIZE. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR CONDUIT, 8 FEET INTERVALS FOR CONDUIT ON 1" TO AND INCLUDING 2", AND 10 FEET FOR CONDUITS 2-1/2" OR LARGER.

RIGID CONDUIT (ALUMINUM) SHALL NOT BE INSTALLED IN POURED CONCRETE. ALUMINUM CONDUIT MAY BE USED FOR SWITCH LEGS AND BRANCH CIRCUITS IN PARTITIONS, ABOVE CEILING, AND WHERE CONDUIT RUN IS EXPOSED. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR 3/4" CONDUIT, 8 FEET INTERVALS FOR CONDUIT 1" TO AND INCLUDING 2".

ELECTRICAL METALLIC TUBING (THIN WALL) MAY BE USED FOR SWITCH LEGS (EXCEPT IN POURED CONCRETE WALLS) AND BRANCH CIRCUITS IN PARTITIONS, ABOVE CEILINGS, AND WHERE CONDUIT RUN IS EXPOSED. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR 3/4" CONDUIT, 8 FEET INTERVALS FOR CONDUIT 1" TO AND INCLUDING 2". EMT LARGER THAN 1-1/2" WILL NOT BE PERMITTED.

PLASTIC CONDUIT (PVC): PLASTIC CONDUIT MAY BE USED FOR INTERIOR AND CONDUIT RUNS OUTSIDE BUILDING AND BELOW FLOOR SLAB. UNDERGROUND CONDUIT RUNS OUTSIDE BUILDING SHALL BE A MINIMUM OF 2'-6" BELOW GRADE. CONDUIT RUN BELOW FLOOR SLAB SHALL BE A MINIMUM OF 12" BELOW FLOOR SLAB.

FLEXIBLE CONDUIT (MC CABLE) SHALL BE USED BETWEEN OUTLET BOXES IN HUNG OR FURRED CEILINGS AND RECESSED LIGHTING FIXTURES. FLEXIBLE CONDUIT SHALL NOT BE USED LONGER THAN 6 FEET IN LENGTH.

LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR FINAL CONNECTIONS TO ALL MOTORS. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR FINAL CONNECTIONS TO TRANSFORMERS OR DEVICES WHICH DO OR MAY VIBRATE. LIQUID TIGHT FLEXIBLE CONDUIT SHALL NOT EXCEED 3 FEET IN LENGTH.

USE SEALING BUSHINGS IN ALL UNDERGROUND CONDUITS AS REQUIRED TO PREVENT THE ENTRY OF MOISTURE INTO ELECTRICAL EQUIPMENT.

PROVIDE EQUIPMENT EXPANSION FITTINGS WHERE CONDUIT CROSSES A BUILDING EXPANSION JOINT, AND IN ALL STRAIGHT CONDUIT RUNS 200 FEET OR LONGER.

ALL OUTLET, SWITCH, JUNCTION AND PULL BOXES SHALL BE MADE OF CODE GALVANIZED STEEL COMPLETE WITH RINGS AND SCREW COVER PLATES AND LOCATED WHERE SHOWN AND NOTED ON DRAWINGS. WHERE CONDUIT IS CONCEALED, BOXES SHALL NOT BE LESS THAN 4" SQUARE X 1-1/2" DEEP. ALL BOXES SHALL BE EQUIPPED WITH PROPER COVERS TO BRING FLUSH WITH FINISHED WALL SURFACE.

USE GANG BOXES WHERE MORE THAN ONE DEVICE IS TO BE INSTALLED AT THE SAME LOCATION.

ALL BOXES FOR CONCRETE WORK SHALL BE OF TYPE ESPECIALLY DESIGNED FOR INSTALLATION IN CONCRETE.

PROVIDE OUTLET BOX ACCESSORIES AS REQUIRED FOR EACH INSTALLATION, INCLUDING MOUNTING BRACKETS, WALLBOARD HANGERS, EXTENSION RINGS, FIXTURE STUDS, CABLE CLAMPS, AND METAL STRAPS FOR SUPPORTING OUTLET BOXES, COMPATIBLE WITH OUTLET BOXES BEING USED AND MEETING REQUIREMENTS OF INDIVIDUAL WIRING SITUATIONS.

PULL BOXES (NOT SHOWN ON THE CONTRACT DRAWINGS) SHALL BE INSTALLED AS REQUIRED TO FACILITATE PULLING OF CONDUCTORS ON LONG RUNS. PULL BOXES LOCATED IN FLOORS SHALL BE FLUSH WITH FINISHED FLOOR, AND OF CAST WROUGHT IRON, ALUMINUM, OR BRONZE WITH SEALED WATERPROOF COVER. CONDUIT ENTRANCES SHALL BE THREADED.

PROVIDE CORROSION RESISTANT CAST METAL WEATHERPROOF OUTLET WIRING BOXES, OF THE TYPE, SHAPE, AND SIZE REQUIRED FOR EACH APPLICATION, WITH THREADED CONDUIT ENDS, CAST METAL FACE PLATE WITH SPRING-HINGE WATERPROOF CAP, SUITABLE CONFIGURED FOR EACH APPLICATION, INCLUDING FACE PLATE GASKET AND CORROSION PROOF FASTENERS.

PROVIDE WATERPROOF OUTLETS FOR INTERIOR AND EXTERIOR LOCATIONS EXPOSED TO WEATHER OR SUBJECT TO FREQUENT WASHING.

SECURE BOXES RIGIDLY TO THE SUBSTRATE UPON WHICH THEY ARE BEING MOUNTED, OR SOLIDLY EMBED BOXES IN CONCRETE OR MASONRY.

26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PROVIDE MANUFACTURERS STANDARD SELF-ADHESIVE VINYL TAPE NOT LESS THAN 3 MILS THICK BY 1-1/2" WIDE. INSTALL ON ALL CONCEALED RACEWAYS AT CONNECTION TO ALL JUNCTION BOXES, PULL BOXES, EQUIPMENT, WALL/FLOOR/ROOF PENETRATIONS, ETC.

PROVIDE CIRCUIT IDENTIFICATION BANDS FOR ALL CABLES AND CONDUCTORS. PROVIDE ON ALL CONDUCTORS OF ALL SYSTEMS.

INSTALL ENGRAVED PLASTIC-LAMINATE SIGN ON ELECTRICAL EQUIPMENT, INCLUDING PANELBOARDS, DISCONNECTS, STARTERS, CONTROL PANELS, ETC. PROVIDE SINGLE LINE OF TEXT, 1/2" HIGH LETTERING, ON 1-1/2" HIGH SIGN (2" HIGH WHERE 2 LINES ARE REQUIRED), WHITE LETTERING IN BLACK FIELD.

26 05 84 MECHANICAL EQUIPMENT

PROVIDE ALL NECESSARY ELECTRICALLY RELATED WORK AS REQUIRED TO RENDER ALL MECHANICAL EQUIPMENT (INCLUDING PLUMBING, HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT) FULLY OPERATIONAL AND FULLY COMPLIANT WITH ALL LOCAL AND NATIONAL CODES. THIS INCLUDES, PRIOR TO ORDERING MATERIALS OR COMMENCING WORK WITH ROUGH-IN, REVIEWING EQUIPMENT SUBMITTAL DATA AND COORDINATING WITH INSTALLING CONTRACTORS TO ENSURE THE CORRECT SIZE, RATING AND QUANTITY OF CONDUCTORS ARE PROVIDED.

26 24 16 PANELBOARDS PROVIDE PANEL BOARDS AS SHOWN ON THE DRAWINGS. PANEL BOARDS SHALL BE DEAD FRONT EQUIPPED WITH THERMAL MAGNETIC MOLDED CASE CIRCUIT BREAKERS, OF FRAME AND TRIP RATINGS AS SHOWN ON THE PANEL BOARDS SCHEDULE. PANEL BOARDS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE LATEST NEMA STANDARDS AND SHALL BE LISTED BY UL AND BEAR UL LABEL. ALL PANEL BOARDS SHALL BE OF ONE MANUFACTURER.

PANELBOARDS, MAIN BUSS, MAIN LUGS, AND/OR MAIN BREAKER SHALL BE RATED AS NOTED ON PANEL BOARD SCHEDULES. CURRENT DENSITY SHALL BE IN ACCORDANCE WITH UL REQUIREMENTS. BUSS MOUNTING FOR CIRCUIT BREAKERS SHALL BE BOLTED CONNECTIONS AND ACCOMMODATE ANY COMBINATION OF CIRCUIT BREAKER UNITS WITHOUT FURTHER MODIFICATIONS. THE COMPLETE PANEL BOARD, INCLUDING MAIN CIRCUIT BREAKER, BUSS AND LUGS, BRANCH CIRCUIT BREAKERS, AND CONNECTION SHALL BE PROPERLY DESIGNED AND UL LISTED TO WITHSTAND THE EFFECT OF THE AVAILABLE REQUIRED SHORT CIRCUIT CURRENT.

MATERIALS: ALL PANEL BOARDS SHALL BE MOUNTED IN CODE GAUGE GALVANIZED STEEL CABINETS, HAVING HINGED DOOR. EACH DOOR SHALL BE EQUIPPED WITH A LATCH AND LOCK. ALL LOCKS ON ALL PANEL BOARD CABINET DOORS ON THIS PROJECT SHALL ACCEPT A COMMON KEY. FURNISH TWO KEYS WITH EACH LOCK.

FOR DETAILS CONCERNING THE NUMBER AND SIZE OF CIRCUIT BREAKERS, SIZE OF MAINS, SIZE AND LOCATION OF LUGS, AND WHETHER SURFACE OR FLUSH MOUNTED, REFER TO PROJECT PANEL BOARD SCHEDULES ON THE CONTRACT DRAWINGS.

CABINET SHALL BE SIZED TO PROVIDE WIRING GUTTERS AT SIDES, TOP AND BOTTOM TO ACCOMMODATE THE NECESSARY CONDUCTORS WITHOUT CROWDING.

PROVIDE ON THE INSIDE OF THE DOOR FACE OF EACH PANEL BOARD CABINET, AN ACCURATE TYPEWRITTEN CIRCUIT DIRECTORY PROTECTED BY GLASS OR CLEAR PLASTIC. HANDWRITTEN OR HAND PRINTED DIRECTORIES WILL NOT BE ACCEPTED. THE CONTRACTOR IS INSTRUCTED THAT THE FINAL TYPED DIRECTORY SHALL BE MADE AFTER THE PERMANENT ROOM NUMBERS ARE INSTALLED ON THE DOORS, AND THE DIRECTORIES SHALL LIST THESE NUMBERS RATHER THAN THE ROOM NUMBERS USED ON THE CONSTRUCTION DRAWINGS.

ALL PANEL BOARDS SHALL HAVE ENGRAVED NAME TAGS ATTACHED TO CONDUIT INDICATING PANEL NUMBER AND VOLTAGE.

ANCHOR ENCLOSURES FIRMLY TO WALLS AND STRUCTURAL SURFACES, ENSURING THAT THEY ARE PERMANENTLY AND MECHANICALLY SECURED.

INSTALL ALL PANEL BOARDS WITH THE TOP 6'-6" ABOVE FINISHED FLOOR.

ACCEPTABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: SCHNEIDER ELECTRIC, EATON, GENERAL ELECTRIC, OR SIEMENS.

DISTRIBUTION PANEL BRANCH BREAKERS SHALL BE SELECTED TO PROVIDE SERIES RATING AS NECESSARY FOR AVAILABLE FAULT CURRENT.

26 27 26 WIRING DEVICES ALL WIRING DEVICES SHALL BE UL LISTED, COMMERCIAL SPECIFICATION GRADE. SWITCHES IN THE SAME LOCATION SHALL BE GANGED BEHIND A SINGLE PLATE.

DEVICE PLATES IN THE KITCHEN AREA SHALL BE METAL, ALUMINUM, OR STAINLESS STEEL. THE DINING AREA SHALL BE TAMPER RESISTANT, AND THERMOPLASTIC (NYLON) OR METAL, COLOR AS APPROVED BY POPEYES DESIGN. APPROVED MANUFACTURER OF SWITCHES AND RECEPTACLES ARE HUBBELL, ARROW HART, BRYANT, LEVITON, HESS & SEYMOUR, GENERAL ELECTRIC, SLATER OR EQUAL.

DUPLEX RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 3 WIRE GROUNDING TYPE. PROVIDE SMOOTH THERMOPLASTIC COVER PLATE AND MATCHING SCREWS. DEVICES AND COVER PLATES SHALL MATCH ADJACENT ARCHITECTURAL FINISHES UNLESS SPECIFICALLY NOTED OTHERWISE.

WEATHERPROOF RECEPTACLES SHALL BE 15 AMP, 125 VOLT, 3 WIRE GROUNDING TYPE WITH WEATHERPROOF COVER. WEATHERPROOF RECEPTACLES SHALL BE 15 AMP, 125 VOLT, 3 WIRE GROUNDING TYPE WITH TWO VERTICAL USB PORTS WITH A MINIMUM OF 1" CHARGE CAPACITY AND TWO 20A RATED OUTLETS.

WALL SWITCHES SHALL BE 20 AMP, 120-2