ELECTRICAL SPECIFICATIONS - SECTION 26

GENERAL REQUIREMENTS

THE GENERAL PROVISIONS OF THE CONTRACT INCLUDING THE GENERAL AND SUPPLEMENTAL CONDITIONS AND GENERAL REQUIREMENTS APPLY TO THE WORK IN THIS SECTION. BEFORE SUBMITTING A BID, EXAMINE DOCUMENTS OF ALL OTHER TRADES, VISIT THE SITE AND GET ACQUAINTED WITH ALL CONDITIONS THAT MAY IN ANY WAY WHATSOEVER AFFECT THE EXECUTION OF THIS CONTRACT. TAKE MEASUREMENTS AND BE RESPONSIBLE FOR EXACT SIZE AND LOCATIONS OF ALL OPENINGS REQUIRED FOR THE INSTALLATION OF WORK. FIGURED DIMENSIONS ARE REASONABLY ACCURATE AND SHOULD GOVERN IN SETTING OUT WORK. WHERE DETAILED METHOD OF INSTALLATION IS NOT INDICATED OR WHERE VARIATIONS EXIST BETWEEN DESCRIBED WORK AND APPROVED PRACTICE, DIRECTION OF THE OWNERS REPRESENTATIVE ON JOB SITE SHALL BE FOLLOWED.

THE CONTRACT INCLUDES ALL ITEMS OF MATERIAL AND LABOR REQUIRED FOR THE COMPLETE INSTALLATION AND FULL OPERATION OF THE ELECTRICAL WORK AS SHOWN ON THE DRAWINGS AND HEREINAFTER SPECIFIED. ALL MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH APPLICABLE CODES, REGULATIONS AND/OR ORDINANCES AND MEET THE APPROVAL OF LOCAL INSPECTION AUTHORITY HAVING JURISDICTION. THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE SHALL BE THE MINIMUM REQUIREMENT FOR ALL WORK. EXAMINE THE DRAWINGS AND SPECIFICATIONS FOR COMPLIANCE WITH THE ABOVE CODES, REGULATIONS AND ORDINANCES AND BASE BID AND WORK ACCORDINGLY. OBTAIN AND PAY FOR ALL PERMITS AND INSPECTIONS RELATED TO THIS WORK. A CERTIFICATE OF APPROVAL FOR WORK FROM INSPECTION AUTHORITY SHALL BE GIVEN TO THE OWNER BEFORE FINAL ACCEPTANCE WILL BE GIVEN BY OWNERS REPRESENATIVE.

ALL WORK, MATERIALS, AND EQUIPMENT SHALL HAVE A WARRANTY FOR THE DURATION OF THE INSTALLATION OR A PERIOD OF 1 YEAR, WHICHEVER IS LESS, AFTER ACCEPTANCE OF THE WORK BY THE OWNER. ANY DEFECTIVE ITEMS SHALL BE REMOVED AND REPLACED AT THE ELECTRICAL SUB-CONTRACTORS EXPENSE AND TO THE SATISFACTION OF THE OWNER.

PERFORM WORK UNDER THIS CONTRACT IN CLOSE HARMONY WITH OTHER CONTRACTORS SO COMPLETED WORK SHALL PRESENT A NEAT AND WORKMANLIKE INSTALLATION. EXPOSED FINISHED MATERIALS AND EQUIPMENT SHALL BE CAREFULLY CLEANED AND WIPED TO REMOVE GREASE, SMUDGES, DUST AND OTHER SPOTS AND LEFT SMOOTH AND CLEAN. DURING THE PROGRESS OF THE WORK, THE ELECTRICAL SUB-CONTRACTOR SHALL CAREFULLY CLEAN UP AFTER HIS MEN AND SHALL LEAVE THE PREMISES AND ALL PORTIONS OF THE BUILDING IN WHICH HE IS WORKING FREE OF DEBRIS AND IN A CLEAN AND SAFE CONDITION.

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

THE EXACT MOUNTING HEIGHT OF OUTLETS SHALL BE DETERMINED IN THE FIELD WITH RELATION TO ARCHITECTURAL DETAILS AND EQUIPMENT BEING SERVED. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE OUTLET LOCATION WITH EQUIPMENT. THE OWNERS REPRESENTATIVE SHALL BE PERMITTED TO RELOCATE ANY OUTLET PRIOR TO INSTALLATION WITHIN A 15 FOOT LIMIT AT NO ADDITIONAL CHARGE IN CONTRACT PRICE. ALL FASTENERS, HANGERS AND METHODS OF HANGING EXPOSED WORK IN FINISHED AREAS SHALL BE SUBMITTED TO THE OWNERS REPRESENTATIVE FOR APPROVAL BEFORE INSTALLATION.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSTRUCTION OF EACH SYSTEM TO THE SATISFACTION OF THE OWNERS REPRESENTATIVE.

THE ELECTRICAL CONTRACTOR SHALL CONSULT THE PLUMBING, HEATING AND ARCHITECTURAL PLANS IN ALL INSTANCES BEFORE INSTALLING HIS WORK SO THAT HIS PIPING WILL NOT INTERFERE WITH THOSE BRANCHES. IN THE EVENT OF A CONFLICT, THIS CONTRACTOR SHALL REPORT TO THE OWNERS REPRESENTATIVE AT ONCE AND DO NO FURTHER WORK UNTIL A SATISFACTORY ARRANGEMENT IS DECIDED UPON. ANY WORK DONE, OR EQUIPMENT PLACED IN POSITION BY THIS CONTRACTOR, CREATING A CONFLICT IN VIOLATION HEREOF, SHALL BE READJUSTED TO THE SATISFACTION OF THE OWNERS REPRESENTATIVE AT THE EXPENSE OF THE CONTRACTOR. THE DECISION OF THE OWNERS REPRESENTATIVE SHALL BE FINAL IN REGARD TO CHANGES DUE TO CONFLICTING CONDITIONS. CONTRACTOR SHALL COMPLETE HIS WORK OR ANY PART THEREOF AT SUCH TIME AS MAY BE DESIGNATED BY THE OWNER, SO THAT IT CAN BE USED FOR TEMPORARY OR PERMANENT USE AND SUCH USE OF THE SYSTEM SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF SAME BY OWNER.

MATERIALS AND EQUIPMENT

ALL MATERIALS AND EQUIPMENT SHALL BE NEW. ALL MATERIALS, APPARATUS AND EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES INC., LABEL WHERE REGULARLY SUPPLIED. CERTAIN MANUFACTURERS OF MATERIAL AND EQUIPMENT ARE SPECIFIED AND PLANS ARE DETAILED ACCORDING TO THIS MATERIAL. THIS CONTRACTOR SHALL BASE HIS BID ON FURNISHING AND INSTALLING THIS MAKE OF MATERIAL AND EQUIPMENT.

WHERE MORE THAN ONE MAKE OF MATERIAL OR EQUIPMENT IS SPECIFIED, THE CONTRACTOR SHALL STATE IN HIS BID WHICH MAKE HE PROPOSES TO FURNISH. SHOP DRAWINGS SHALL BE SUBMITTED ON MATERIAL AND EQUIPMENT TO BE FURNISHED BY THE CONTRACTOR FOR ENGINEERS APPROVAL. THIS APPROVAL TO BE OBTAINED PRIOR TO SHIPMENT OF EQUIPMENT.

ELECTRICAL IDENTIFICATION

PROVIDE MANUFACTURERS STANDARD SELF-ADHESIVE VINYL TAPE NOT LESS THAN 3 MILS THICK BY 1-1/2" WIDE. WHERE APPLICABLE, INSTALL ON ALL CONCEALED RACEWAYS AT CONNECTION TO ALL JUNCTION BOXES, PULL BOXES, EQUIPMENT, WALL/FLOOR/ROOF PENETRATIONS, ETC. UNLESS OTHERWISE INDICATED OR REQUIRED BY GOVERNING REGULATIONS, PROVIDE ORANGE TAPE WITH BLACK LETTERS. PROVIDE CIRCUIT IDENTIFICATION BANDS FOR ALL CABLES AND CONDUCTORS. PROVIDE MANUFACTURERS STANDARD COLOR CODING FOR CABLE/CONDUCTOR JACKET AND/OR INSULATION FOR ALL CABLES AND CONDUCTORS OF ALL SYSTEMS. MATCH IDENTIFICATION WITH MARKING SYSTEM USED IN EXISTING SYSTEMS SHOP DRAWINGS, CONTRACT DOCUMENTS, AND SIMILAR PREVIOUSLY ESTABLISHED IDENTIFICATION FOR PROJECTS ELECTRICAL WORK. PROVIDE ON ALL CONDUCTORS OF ALL SYSTEMS.

THE FOLLOWING INSULATION COLOR CODE SHALL BE USED FOR SYSTEM AND VOLTAGE IDENTIFICATION. THIS SHALL APPLY TO BOTH FEEDER AND BRANCH CIRCUIT WIRING. INTERCHANGE OF COLORS SHALL NOT BE PERMITTED.

208Y/120V SYSTEM:	BLACK, RED, BLUE & WHITE (NEUTRAL)
480Y/277V SYSTEM:	BROWN, ORANGE, YELLOW & GRAY (NEUTRAL)
EQUIPMENT GROUNDING:	GREEN

ALL EQUIPMENT & SYSTEM IDENTIFICATION NOMENCLATURE SHOWN ON DRAWINGS OR LISTED HEREIN IS SHOWN FOR GENERAL DESIGN AND INSTALLATION REFERENCE ONLY. THE ACTUAL NAMEPLATE, ETC. NOMENCLATURE FOR THIS PROJECT SHALL BE VERIFIED BY ELECTRICAL CONTRACTOR IN FIELD PRIOR TO FABRICATION AND WHERE APPLICABLE, SHALL BE AN EXTENSION OF EXISTING NOMENCLATURE USED ON THE SITE AS DETERMINED IN FIELD BY ELECTRICAL CONTRACTOR.

GROUNDING

ALL METALLIC CONDUIT, SURFACE WIREWAYS, SUPPORTS, CABINET AND EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH THE LATEST ISSUE OF THE NATIONAL ELECTRIC CODE.

CONDUIT AND FITTINGS

NORMAL SYSTEM BRANCH CIRCUITS SHALL BE INSTALLED IN SEPARATE RACEWAYS FROM EMERGENCY SYSTEM POWER.

ALL WIRING FOR DIFFERENT POWER VOLTAGES SHALL BE INSTALLED IN RACEWAY SYSTEMS SEPARATE FROM EACH OTHER.

ALL WIRING FOR THE VARIOUS ELECTRICAL SYSTEMS SHALL BE INSTALLED IN RACEWAY SYSTEMS SEPARATE FROM EACH OTHER.

ALL CONDUIT INSTALLED INDOORS SHALL BE GALVANIZED STEEL EMT (3/4" MINIMUM); ALL FITTINGS FOR SAME SHALL BE SET-SCREW OR COMPRESSION TYPE STEEL, WITH INSULATED THROATS. UNLESS INDICATED OTHERWISE ON DRAWINGS OR IN OTHER PARTS OF THE ELECTRICAL SPECIFICATIONS.

CONDUIT SHALL BE CLEANED INSIDE BEFORE ANY WIRES ARE PULLED. CONDUIT ENDS SHALL BE CAPPED AND PLUGGED WITH STANDARD ACCESSORIES AS SOON AS CONDUIT HAS BEEN PERMANENTLY INSTALLED. CONDUIT INSTALLED WITHOUT CONDUCTORS SHALL BE PROVIDED WITH SWEEP BENDS AND BALING WIRE FOR PULLING.

ALL JOINTS SHALL BE MADE TIGHT WITH WATERTIGHT COUPLINGS MATCHING CONDUIT AND ALL CORNERS SHALL BE MAKE WITH LONG RADIUS. THE ENDS OF ALL CONDUITS SHALL BE CUT SQUARE AND REAMED AND ALL JOINTS BROUGHT TO A SHOULDER. CONDUIT SHALL BE CONTINUOUS BETWEEN OUTLETS TO MAKE A COMPLETE INSTALLATION AND TO EFFECT A CONTINUOUS GROUND. SUITABLE SUPPORTS AND FASTENING SHALL BE PROVIDED FOR CONDUIT.

CONDUIT SHALL BE SUPPORTED BY APPROVED STRAPS, FASTENERS AND HANGERS. HANGERS SHALL BE SUSPENDED FROM RODS. 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. 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.

ALL RACEWAYS SHALL BE ENTIRELY FREE OF PLASTER, MORTAR, WATER AND OTHER FOREIGN MATTER.

WIRE AND CABLE

FURNISH AND INSTALL ALL NECESSARY CABLE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS OR SPECIFIED HEREINAFTER. ALL WIRE SHALL BE COPPER. ALL WIRING SHALL BE NEW. NO WIRE SMALLER THAN #12 AWG SHALL BE INSTALLED UNLESS SPECIFICALLY DESIGNATED. USE OF #14 COLOR CODED WIRE WILL BE ALLOWED FOR CONTROL CIRCUITS ONLY. ALL CONDUCTORS SHALL BE COPPER. PROVIDE STRANDED CONDUCTORS FOR ALL SIZES UNLESS INDICATED OTHERWISE.

PROVIDE THHN/THWN INSULATION FOR ALL CONDUCTORS NO. 8 AWG AND SMALLER. FOR ALL OTHER SIZES PROVIDE THW OR THHN/THWN INSULATION AS APPROPRIATE FOR THE LOCATIONS WHERE INSTALLED. PROVIDE COLOR CODED INSULATION/JACKET FOR PHASE IDENTIFICATION. ALL WIRES SHALL BE RATED AT 600 VOLTS.

TYPE AC AND MC CABLE SHALL BE FORMED FROM CONTINUOUS LENGTH OF SPIRALLY WOUND, INTERLOCKED ZINC-COATED OR GALVANIZED (INSIDE & OUTSIDE) STRIP STEEL. ALL CONDUCTORS SHALL BE RATED FOR 90 DEG. C. MINIMUM. PROVIDE WITH FULL PARITY SIZED GREEN INSULATED EQUIPMENT GROUND CONDUCTOR. PROVIDE COMPATIBLE STEEL FITTINGS WITH INTEGRAL RED PLASTIC INSULATED THROAT BUSHINGS, COMPLIANT WITH NEC 350-5. CABLES SHALL BE 90 DEG. C. RATED WITH ALL COMPONENTS AND FITTINGS LISTED FOR GROUNDING AND COMPLIANT WITH THE FOLLOWING.

UL STD.4 AND UL STD. 83.
ANSI E119 AND E814.
NEC ARTICLES 250 AND 333.

METHOD OF WIRING - POWER

NEATLY DRESS ALL WORK. INSTALL ALL WORK PARALLEL AND PERPENDICULAR TO SURFACES OR EXPOSED STRUCTURAL MEMBERS, AND FOLLOW SURFACE CONTOURS, WHERE POSSIBLE. KEEP CONDUCTOR SPLICES TO MINIMUM. INSTALL SPLICE AND TAP CONNECTORS WHICH POSSESS EQUIVALENT OR BETTER MECHANICAL STRENGTH AND INSULATION RATING THAN CONDUCTORS BEING SPLICED. USE SPLICE AND TAP CONNECTORS WHICH ARE COMPATIBLE WITH CONDUCTOR MATERIAL. ALL WIRES SHALL BE RUN CONTINUOUS FROM OUTLET TO OUTLET/LUMINAIRE TO LUMINAIRE. INSULATION VALUE OF JOINTS TO BE 100% IN EXCESS OF WIRE. PROVIDE ADEQUATE LENGTH OF CONDUCTORS WITHIN ELECTRICAL ENCLOSURES AND TRAIN THE CONDUCTORS TO TERMINAL POINTS WITH NO EXCESS. BUNDLE MULTIPLE CONDUCTORS, WITH CONDUCTORS LARGER THAN NO 10 AWG CABLED IN INDIVIDUAL CIRCUITS. MAKE TERMINATIONS SO THERE IS NO BARE CONDUCTOR AT THE TERMINAL.

KEEP CONDUCTOR SPLICES TO MINIMUM. PULL CONDUCTORS SIMULTANEOUSLY WHERE MORE THAN ONE IS BEING INSTALLED IN SAME RACEWAY. USE UL LISTED PULLING COMPOUND OR LUBRICANT, WHERE NECESSARY. INSTALL SPLICE AND TAP CONNECTORS WHICH POSSESS EQUIVALENT OR BETTER MECHANICAL STRENGTH AND INSULATION RATING THAN CONDUCTORS BEING SPLICED. USE SPLICE AND TAP CONNECTORS WHICH ARE COMPATIBLE WITH CONDUCTOR MATERIAL. INCREASE WIRE SIZES PER NEC TO OFFSET VOLTAGE DROP AS/IF REQUIRED.

NO WIRE SIZE SMALLER THAN NO. 12 SHALL BE USED FOR ANY BRANCH CIRCUIT UNLESS OTHERWISE NOTED ON PLANS FOR CONTROL CIRCUITS. LARGER SIZES SHALL BE USED WHERE REQUIRED AND/OR INDICATED ON THE PLANS.

PROVIDE THE FOLLOWING MINIMUM WIRE SIZES BASED ON DISTANCES FROM PANEL TO FIRST DEVICE OF A 15 OR 20 AMPERE GENERAL LIGHTING OR RECEPTACLE BRANCH CIRCUIT. IN ADDITION TO UPSIZING CONDUCTORS AS REQUIRED FOR VOLTAGE DROP, PROVIDE MINIMUM #10 AWG CONDUCTORS TO THE LAST DEVICE FOR BRANCH CIRCUITS MORE THAN 150 FEET IN LENGTH.

DISTANCE	AWG WIRE SIZES
UP TO 60 FEET	#12
61 TO 90 FEET	#10
91 TO 150 FEET	# 8
151 TO 240 FEET	# 6

PROVIDE THE FOLLOWING MINIMUM AWG CONDUCTOR SIZES FOR GENERAL BRANCH CIRCUITING THAT ARE NOT INDICATED ON DRAWINGS, BASED ON USING COPPER CONDUCTORS. WHERE APPLICABLE INCREASE AS REQUIRED TO ACCOMMODATE VOLTAGE DROP AND TO ACCOMMODATE SPECIAL CONDITIONS. DO NOT DERATE ANY GROUNDED (NEUTRAL) CONDUCTORS. TEMPERATURE RATINGS LISTED BELOW PERTAIN TO BOTH WIRE AND TERMINATIONS.

	60 DEG. C RATING	75 DEG. C RATING	EQUIPT. GROUNDING
SOURCE BREAKER/FUSE	AWG WIRE SIZE	AWG WIRE SIZE	AWG WIRE SIZE
15 AMPERE	#12	#12	#12
20 AMPERE	#12	#12	#12
25 AMPERE	#10	#10	#10
30 AMPERE	#10	#10	#10
35 AMPERE	# 8	# 8	#10
40 AMPERE	# 8	# 8	#10

OUTLETS SHALL BE LOCATED APPROXIMATELY AS SHOWN ON THE PLANS AND SHALL BE WIRED TO PROVIDE CONTROL OF OUTLETS INDICATED. ALL WIRES OF ANY ONE CIRCUIT SHALL BE RUN IN THE SAME CONDUIT.

TYPE AC/MC CABLE MAY BE UTILIZED ONLY IF NEC APPROVED AND IF APPROVED BY LOCAL AUTHORITY HAVING JURISDICTION AND IF INCLUDED IN THE APPLICATIONS DEFINED BELOW.

15 THROUGH 30 AMPERE BRANCH CIRCUIT WORK. THIS SHALL APPLY ONLY UNDER ALL OF THE FOLLOWING CIRCUMSTANCES AND CONDITIONS.

ONLY WHERE CONCEALED (ALL EXPOSED WIRING SHALL BE INSTALLED IN CONDUIT).

ROUTE ALL CABLES PERPENDICULAR AND PARALLEL TO THE BUILDING ARCHITECTURAL LINES/SURFACES/STRUCTURAL MEMBERS, KEEPING OFFSETS TO A MINIMUM AND FOLLOWING SURFACE CONTOURS WHERE POSSIBLE. MAINTAIN A UNIFORM ELEVATION FOR ALL CABLE RUNS WHEREVER POSSIBLE. ALL CABLES SHALL BE SUPPORTED/ANCHORED AT MAXIMUM 4 FOOT INTERVALS AND WITHIN 12" OF BOX OR OUTLET AND SHALL NOT SAG. INSTALL CABLES IN A MANNER THAT PREVENTS OVERHEATING. CABLES SHALL BE FASTENED DIRECTLY TO THE STRUCTURE USING FACTORY CLAMPS/CLIPS SPECIFICALLY DESIGNED FOR THE RESPECTIVE CABLE (CADDY OR EQUAL).

OUTLET, JUNCTION AND SWITCHBOXES

IN GENERAL, GANG TYPE OUTLET BOXES SHALL NOT BE USED. THE OUTLET BOX LOCATIONS INDICATED ON DRAWINGS SHALL BE CONSIDERED APPROXIMATE, AND THEREFORE, IT SHALL BE INCUMBENT UPON THIS CONTRACTOR TO STUDY THE GENERAL CONSTRUCTION WITH RELATION TO SPACES AND EQUIPMENT SURROUNDING EACH OUTLET. ALL OUTLET, SWITCH AND JUNCTION 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.

WHERE OUTLET BOXES OCCUR IN FACING TILE OR OTHER MATERIAL WHERE SUCH MATERIALS FORM THE FINISHED WALL SURFACE, THE OPENING FOR THE BOX SHALL BE CUT NEATLY AND OF THE SIZE THAT THE COVER PLATE WILL COVER ALL PARTS OF THE OPENING. CONDULETS SHALL BE USED ON EXPOSED RACEWAYS. IN GENERAL, JUNCTION BOXES SHALL BE FURNISHED AND REQUIRED BY THE NATIONAL ELECTRIC CODE, OF THE PROPER SIZES, AND SHALL BE CONSTRUCTED OF #12 GAUGE STEEL WITH REMOVABLE FRONT FASTENED ON WITH COUNTER SUNK HEAD SCREWS OR OTHER APPROVED MEANS. FOR SPECIAL APPLICATION, JUNCTION BOXES SHALL BE NOTED, DETAILED AND/OR SIZED ON THE DRAWINGS OR IN THE FIELD AS REQUIRED.

HEIGHT OF BOXES

PRIOR TO ROUGH-IN, VERIFY ALL BOX/DEVICE MOUNTING HEIGHTS AND LOCATIONS IN FIELD WITH OWNERS REPRESENTATIVE. IN GENERAL, WHERE NOT LOCATED AT COUNTER AREAS, THE HEIGHT OF BOXES FROM FINISHED FLOOR TO CENTER OF BOXES SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED ON PLANS:

SWITCHES: 48"
DEVICES AT SPECIAL HEIGHTS: AS DIRECTED IN FIELD.
RECEPTACLES: 18" (UNLESS COUNTER HEIGHT)
TELEPHONE OUTLETS (DESK PHONE): 18"
TELEPHONE OUTLETS (WALL PHONE): 48"
DATA CABLE OUTLETS: 18"
CONTROL STATIONS: 48"

WIRING DEVICES

UNLESS SPECIFICALLY INDICATED OTHERWISE, OR DIRECTED OTHERWISE IN FIELD, PROVIDE WHITE COLOR FOR NORMAL UTILITY WIRING DEVICES.

PROVIDE WALL SWITCHES, THAT ARE FLUSH SELF-GROUNDING WITH GREEN GROUND SCREW AND COLOR CODED COVER, SNAP TOGGLE TYPE, BACK AND SIDE WIRED, SPECIFICATION GRADE. PROVIDE WALL SWITCHES RATED 20A, 120/277 VOLTS, 1 HP AT 120V, A.C. QUIET TYPE. SINGLE POLE SWITCHES SHALL BE EQUAL TO LEVITON #1221-2 SERIES. DOUBLE-POLE SWITCHES SHALL BE EQUAL TO LEVITON #1222-2 SERIES.

PROVIDE DUPLEX AND SINGLE SPECIFICATION GRADE RECEPTACLES, 2-POLE, 3-WIRE GROUNDING, SELF-GROUNDING, GREEN GROUNDING SCREW, GROUND TERMINALS AND POLES INTERNALLY CONNECTED TO MOUDINGS YOKE, COLOR CODED BASE, 20-AMPERES, 125-VOLTS, WITH METAL PLASTER EARS, BACK & SIDE WIRING, NEMA CONFIGURATION 5-20R. PROVIDE DUPLEX RECEPTACLES EQUAL TO LEVITON #5362 SERIES. FOR RECEPTACLE CIRCUITS PROTECTED WITH 15A BREAKERS, PROVIDE NEMA 5-15R EQUIVALENTS.

PROVIDE SELF-GROUNDING COMMERCIAL SPECIFICATION GRADE, DUPLEX RECEPTACLES, GROUND-FAULT CIRCUIT INTERRUPTERS; FEED-THRU TYPE, CAPABLE OF PROTECTING CONNECTED DOWNSTREAM RECEPTACLES ON SINGLE CIRCUIT, GROUNDING TYPE UL-RATED 943, CLASS A, GROUP 1, SPECIFICATION GRADE, 20-AMPERES RATING (DEVICE & FEED-THRU), 125-VOLTS, 60 HZ; WITH SOLID-STATE GROUND-FAULT SENSING AND SIGNALING (MAXIMUM THRESHOLD OF 5MA AT 0.025 SECONDS MAXIMUM); EQUIP WITH 20-AMPERE PLUG CONFIGURATION, NEMA 5-20R. PROVIDE GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLES EQUAL TO LEVITON #8898 SERIES.

SPECIAL PURPOSE RECEPTACLES SHALL BE OF THE SIZE, TYPE AND MANUFACTURER AS INDICATED ON THE PLANS OR AS DETERMINED IN FIELD. REFER TO GROUNDING SECTION FOR SPECIAL RECEPTACLE GROUNDING REQUIREMENTS.

ALL DEVICE WALLPLATES SHALL BE STANDARD SIZE; "MIDWAY", "OVERSIZED" ("JUMBO") OR "EXTRA DEEP" WALLPLATES SHALL NOT BE ACCEPTABLE. CONSTRUCT WITH METAL SCREWS FOR SECURING PLATES TO DEVICES; SCREW HEADS COLORED TO MATCH FINISH OF PLATES. WALLPLATES IN FINISHED AREAS SHALL BE COMMERCIAL SPECIFICATION GRADE, THERMOPLASTIC TO MATCH DEVICE COLOR.

SUPPORTS, INSERTS, CUTTING AND PATCHING

THIS CONTRACTOR SHALL DO ALL CUTTING AND PATCHING REQUIRED FOR THE ADMISSION OF HIS WORK. ANY DAMAGE DONE BY THIS CONTRACTOR TO THE BUILDING DURING THE PROGRESS OF HIS WORK SHALL BE MADE GOOD AT HIS OWN EXPENSE. ALL PATCHING SHALL BE DONE BY A SKILLED CRAFTSMAN IN THAT RESPECTIVE TRADE. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO SUPERVISE THE INSTALLATION OF, AND PAY FOR ALL ADDITIONAL MEMBERS, WOOD OR METAL AND LABOR WHICH MAY BE REQUIRED TO SUPPORT ANY TYPE OF PERMANENT OR TEMPORARY ELECTRICAL APPARATUS EMPLOYED IN THE EXECUTION OF THIS CONTRACTORS WORK.

SEAL ALL NEW FLOOR, CEILING, WALL, SLAB, ETC. PENETRATIONS TO MATCH OR EXCEED EXISTING ASSEMBLY FIRE RATINGS. PROVIDE SLEEVE SEALS FOR ALL SLEEVES. PROVIDE SLEEVES FOR ALL PENETRATIONS. ALL PENETRATIONS OF FIRE-RATED OR SMOKE-RATED WALL, FLOORS CEILINGS, ETC. SHALL BE SEALED IMMEDIATELY AFTER RACEWAYS ARE INSTALLED. ALL NEW ELECTRICALLY RELATED WORK SHALL BE SUPPORTED DIRECTLY FROM BUILDING STRUCTURAL MEMBERS. NEW ELECTRICALLY RELATED WORK SHALL NOT BE SUPPORTED FROM DUCTWORK, DUCTWORK HANGER, CEILING SUPPORTS, EXISTING CONDUIT SUPPORT, ETC.. ALL CONDUITS (AND CABLE ASSEMBLIES, WHERE APPLICABLE) SHALL BE ROUTED PARALLEL TO BUILDING STRUCTURAL MEMBERS. ANY AND ALL NONCOMPLYING WORK INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE REMOVED AND REINSTALLED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AND THE ENGINEER, AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.

LUMINAIRES

ALL RECESSED LUMINAIRES SHALL BE EQUIPPED WITH NECESSARY PLASTER FRAMES AND SURFACE TRIM. ALL RECESSED FLUORESCENT LUMINAIRES SHALL BE EQUIPPED AND SUITABLY CONSTRUCTED TO OPERATE WITH "P" RATED BALLASTS. ALL JUNCTION BOXES AND SERVICEABLE COMPONENTS (BALLASTS, THERMAL PROTECTION DEVICES, FUSES, ETC.) FOR RECESSED LUMINAIRES SHALL BE READILY ACCESSIBLE FOR SERVICE OR REPLACEMENT FROM BELOW THE CEILING, WITHOUT REMOVING ANY CEILING COMPONENTS (OTHER THAN TILES).

PROVIDE LOW ENERGY SOLID STATE RAPID START OR PROGRAMMED RAPID START (SEE PLANS) ELECTRONIC FLUORESCENT LAMP BALLASTS SPECIFICALLY DESIGNED FOR OPERATING LAMP TYPES INDICATED. FLUORESCENT BALLASTS SHALL BE MOTOROLA OR ADVANCE EQUAL (LESS THAN OR EQUAL TO 20% THD). ALL LUMINAIRES MAY CONTAIN EITHER SINGLE BALLASTS OR MULTIPLE BALLASTS AS REQUIRED TO FULFILL REQUIRED FUNCTION AND AS REQUIRED TO COMPLY WITH CONSTRUCTION SCHEDULE.

FLUORESCENT LAMP COLOR TEMPERATURE SHALL BE AS INDICATED ON DRAWINGS OR AS DIRECTED IN FIELD.

PROVIDE LUMINAIRES AND/OR LUMINAIRE OUTLET BOXES WITH HANGERS TO PROPERLY SUPPORT LUMINAIRE WEIGHT. ALL LUMINAIRES INSTALLED IN OR ON SUSPENDED CEILING SYSTEMS SHALL BE ANCHORED DIRECTLY TO THE BUILDING STRUCTURAL SYSTEM ABOVE (ANCHORED PER NEC). SUCH ANCHORING SHALL BE INDEPENDENT OF THE CEILING SUPPORT SYSTEM. ALL LUMINAIRES SHALL BE INSTALLED PLUMB AND LEVEL. SUPPORT SURFACE MOUNTED LUMINAIRES GREATER THAN 2 FEET IN LENGTH AT A POINT IN ADDITION TO THE OUTLET BOX LUMINAIRE STUD.

MECHANICAL EQUIPMENT

PROVIDE ALL CONDUIT AND OUTLET BOXES AS REQUIRED FOR ALL CONTROL WIRING AND THERMOSTATS. FURNISH AND INSTALL POWER WIRING AND MAKE LINE CONNECTIONS TO ALL HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY DISCONNECTS TO OPERATE THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEM AS DESCRIBED ON DRAWINGS OF ALL OTHER TRADES. THE ELECTRICAL CONTRACTOR SHALL PROVIDE CONTROL AND INTERLOCK WIRING AS SPECIFICALLY INDICATED ON THE DRAWINGS. ALL OTHER CONTROL WIRING REQUIRED FOR OPERATION OF THE SYSTEMS SHALL BE PROVIDED BY THE HEATING CONTRACTOR.

ELECTRICAL CONTRACTOR SHALL EXAMINE THE APPROVED DRAWINGS OF ALL BRANCHES AND SHALL WIRE AND CONNECT ALL MOTORS, DISCONNECTS, CONTROL DEVICES AND OTHER ITEMS REQUIRING ELECTRICITY FOR OPERATION. THIS CONTRACTOR SHALL MAKE THE NECESSARY ELECTRICAL CONNECTIONS BETWEEN THE SPECIFIED EQUIPMENT AND THE JUNCTION BOX NEAR EQUIPMENT WITH FLEXIBLE METALLIC CONDUIT AND MATCHED CONNECTORS. NO FLEXIBLE CONDUIT SHALL BE EXPOSED IN FINISHED ROOMS.

PANELBOARDS

SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PANELBOARD PRODUCTS OF ONE OF THE FOLLOWING (FOR EACH TYPE AND RATING OF PANELBOARD AND ENCLOSURE):

1. SQUARE D COMPANY.
2. GENERAL ELECTRIC COMPANY.
3. SIEMENS/ITE.
4. EATON.

EXCEPT AS OTHERWISE INDICATED, PROVIDE PANELBOARDS, ENCLOSURES AND ANCILLARY COMPONENTS, OF TYPES, SIZES, AND RATINGS INDICATED, WHICH COMPLY WITH MANUFACTURER'S STANDARD MATERIALS; WITH THE DESIGN AND CONSTRUCTION IN ACCORDANCE WITH PUBLISHED PRODUCT INFORMATION.

PROVIDE PANELBOARDS WITH PROPER NUMBER OF UNIT PANELBOARD DEVICES AS REQUIRED FOR COMPLETE INSTALLATION. WHERE TYPES, SIZES, OR RATINGS ARE NOT INDICATED, COMPLY WITH NEC, UL AND ESTABLISHED INDUSTRY STANDARDS FOR THOSE APPLICATIONS INDICATED.

PROVIDE PANELBOARDS THAT ARE NEW AND MANUFACTURER'S LATEST STANDARD CATALOG DESIGN.

PROVIDE PANELBOARDS THAT BEAR UL LABELS FOR THEIR SPECIFIC APPLICATIONS.

PROVIDE PANELBOARDS SUITABLE FOR SERVICE VOLTAGE WITH NUMBER OF BRANCH CIRCUITS OF CAPACITY SCHEDULED.

PROVIDE PANELBOARDS, AND SECTIONS THEREOF IF APPLICABLE, WITH MAIN-LUGS-ONLY OF CAPACITY EQUAL TO, OR GREATER THAN, THE RATING OR SETTING OF THE OVERCURRENT PROTECTIVE DEVICE NEXT BACK ON THE LINE.

PROVIDE PANELBOARD BRANCHES AS SCHEDULED ON THE DRAWINGS.

PROVIDE CIRCUIT BREAKER PANELBOARD BUS ASSEMBLIES WITH DISTRIBUTED (SEQUENCE) TYPE BUSSING THROUGHOUT, SO THAT ANY TWO ADJACENT SINGLE-POLE BREAKERS, OR SPACES, ARE REPLACEABLE BY A TWO-POLE INTERNAL COMMON TRIP BREAKER, AND SO THAT ANY THREE ADJACENT SINGLE-POLE BREAKERS, OR SPACES, ARE REPLACEABLE BY THREE-POLE INTERNAL COMMON TRIP BREAKER. THIS APPLIES FOR BRANCH BREAKERS SIZED 15 AMP THROUGH 70 AMP INCLUSIVE, WITHOUT DISTURBING ANY OTHER BREAKER.

PROVIDE PANELBOARDS THAT ARE UL LISTED AND LABELED FOR USE AS SERVICE ENTRANC