

PART 1: GENERAL

- 1.1 SCOPE
A. THE WORK INDICATED IN THIS DIVISION AND ON THE ELECTRICAL DRAWINGS IS SUBJECT TO THE REQUIREMENTS OF THE INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS...
B. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR SERVICES NECESSARY FOR THE COMPLETE INSTALLATION OF EQUIPMENT INDICATED HEREIN...
C. ALL WORK SHALL BE PERFORMED BY EXPERIENCED PERSONNEL QUALIFIED TO CARRY OUT THE WORK IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS...
D. THE ELECTRICAL CONTRACTOR/TRADE SHALL BE RESPONSIBLE FOR COORDINATION AND DISTRIBUTION OF WORK TO HIS SUBCONTRACTORS...
E. CONTRACTOR SHALL NOT CUT ANY BEAM OR COLLUMS OR ANY PORTION OF STRUCTURAL SYSTEM WITHOUT SPECIFIC PERMISSION.

- 1.2 CONTRACT DOCUMENTS
A. THE ELECTRICAL DRAWINGS LISTED IN THE DRAWING INDEX, TOGETHER WITH THESE SPECIFICATIONS, ARE AN INTEGRAL PART OF THE ELECTRICAL CONTRACT...
B. THE ELECTRICAL AND MECHANICAL DRAWINGS ARE DIAGNOSTIC ONLY, BUT ARE TO BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION OF THE PROJECT...
C. ELECTRICAL AND MECHANICAL DRAWINGS ARE NOT TO BE SCALED FOR THE PURPOSE OF EQUIPMENT INSTALLATION...
D. ONE-LINE DIAGRAMS AND KEY PLANS ARE SHOWN ONLY AS A CONVENIENCE TO THE CONTRACTOR...
E. INCREASED COST OF WIRING RESULTING FROM INCREASED ELECTRICAL RATINGS OVER THAT SHOWN ON THE ELECTRICAL DRAWINGS IS TO BE BORNE BY THE CONTRACTOR...
F. INCLUDE CONTROL WIRING, AS CALLED FOR ON THE MECHANICAL DRAWINGS AND SPECIFICATIONS...

- 1.3 ALTERNATES
A. SEE BID FORM AND DIVISION 0 AND 1 OF SPECIFICATIONS AS APPLICABLE.

- 1.4 SUPERVISION
A. HAVE A THOROUGHLY COMPETENT SUPERINTENDENT IN CHARGE OF THE WORK AT ALL TIMES, EXPERIENCED IN THE WORK TO BE DONE UNDER THIS CONTRACT...
1.5 CODES, STANDARDS AND PERMITS
A. ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE AND LOCAL CODES IN FORCE AT TIME OF BIDDING...

- 1.6 DEFINITIONS
A. CONCEALED: EMBEDDED IN WALLS, CEILINGS, FLOORS OR OTHER SPACES. NOT EXPOSED TO VIEW.
B. EXPOSED: NOT CONCEALED OR INSTALLED UNDERGROUND.
C. FURNISH: PROVIDE, SUPPLY, INSTALL, CONNECT AND PUT INTO OPERATION.
D. WORK: WIRING, EQUIPMENT, RACEWAYS, COORDINATION, ETC. AS REQUIRED BY THE CONTRACT DOCUMENTS FOR A COMPLETE AND OPERATING SYSTEM.

- 1.7 MATERIALS AND EQUIPMENT
A. WHERE "OR PRE-APPROVED EQUAL" CLAUSE IS INDICATED, IT MEANS MATERIAL, APPARATUS, EQUIPMENT AND SUPPLIES HAVING RECOGNIZED STANDARDS OF QUALITY AND PERFORMANCE WHICH, IN THE JUDGEMENT OF THE ENGINEER/ARCHITECT...
B. WHERE "OR EQUAL" CLAUSE IS INDICATED, IT MEANS MATERIAL AND EQUIPMENT OF EQUAL OR BETTER QUALITY AND PERFORMANCE THAN THAT LISTED IN THE PLANS AND SPECIFICATIONS...

- 1.8 SHOP DRAWINGS AND SUBMITTALS
A. PROVIDE ALL SUBMITTALS AS CALLED FOR IN DIVISION 1 OF THE SPECIFICATIONS INCLUDING SHOP DRAWINGS, SAMPLES, MATERIAL LISTS, SCHEDULE OF VALUE, ETC. SHOP DRAWINGS SHALL BE COMPLETELY REVIEWED AND APPROVED BY THE CONTRACTOR AND TRADE FURNISHING THE EQUIPMENT...
B. WHERE SHOP DRAWING SUBMITTALS ARE ASSEMBLED IN A FOLDER OR BOUND SETS, ALL FOLDERS OR SETS ARE TO BE IDENTICAL AND EACH SET MUST CONTAIN AN INDEX OF THE ITEMS ENCLOSED IN THE SET OR FOLDER...
C. REVIEW AND APPROVAL OF SHOP DRAWINGS BY THE ENGINEER/ARCHITECT IS FOR GENERAL CONFORMANCE TO DESIGN INTENT ONLY. THIS REVIEW DOES NOT AUTHORIZE CHANGES TO THE CONTRACT SUM OR RELIEVE THE CONTRACTOR IN ANY WAY OF HIS CONTRACT OBLIGATIONS.

- 1.9 PAINTING AND FINISHING
A. UNLESS OTHERWISE INDICATED IN OTHER DIVISIONS OF THE SPECIFICATIONS, AT NO ADDITIONAL COST TO THE OWNER, REPAINT ALL PATCHED AREAS TO MATCH ORIGINAL FINISH WHERE HOLES OR CHASES HAVE BEEN CUT TO RECEIVE ELECTRICAL WORK...
B. TOUCH UP MARRIED SURFACES OF EQUIPMENT HOUSING WITH ENAMEL OF A COLOR TO MATCH.

- 1.10 GUARANTEES AND WARRANTIES
A. ALL LABOR, MATERIALS AND EQUIPMENT SHALL BE GUARANTEED BY THE CONTRACTOR AND WARRANTED BY THE MANUFACTURER FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER...
B. THE CONTRACTOR SHALL MAKE ALL NECESSARY REPAIRS AND ALTERATIONS DURING THE GUARANTEE PERIOD AS MAY BE REQUIRED BY THE OWNER OR ARCHITECT FOR CORRECT SYSTEM OPERATION AND TO COMPLY WITH THE DRAWINGS AND SPECIFICATIONS...
C. THE OWNER RESERVES THE RIGHT TO MAKE EMERGENCY SYSTEM REPAIRS WITHOUT VOIDING THE CONTRACTOR'S GUARANTEE.

PART 2: PRODUCTS

- 2.1 RACEWAYS, FITTINGS, BOXES, AND CONDUIT BODIES
A. PROVIDE AND INSTALL RACEWAYS AS REQUIRED FOR THE NEW WORK. ALL RACEWAYS WILL BE EXPOSED (CONCEALED FROM VIEW AS MUCH AS PRACTICABLE) BY FOLLOWING THE STRUCTURAL ELEMENTS OF THE BUILDING...
B. PROVIDE AND INSTALL FITTINGS, JUNCTIONS BOXES, AND CONDUIT BODIES AS REQUIRED FOR NEW WORK. JUNCTION BOXES WILL BE CAST ALUMINUM WITH WEATHERPROOF COVER PLATES...
C. PROVIDE NEW DIRECTORIES IN PANELBOARDS TO WHICH NEW BRANCH CIRCUITS ARE CONNECTED OR TO WHICH EXISTING CIRCUITS ARE CHANGED.

- 2.2 CONDUCTORS
A. CONDUCTORS WILL BE THHN, THWN, OR XHHW, SIZED AS INDICATED AND INSTALLED IN ACCORDANCE WITH THE NEC. NO. 12 AWG WILL BE THE MINIMUM CONDUCTOR SIZE ALLOWED FOR BRANCH CIRCUIT WIRING...
B. CLASS 1 REMOTE-CONTROL AND SIGNAL CIRCUIT CONDUCTORS WILL NOT BE LESS THAN NO. 14 AWG. CLASS 2 LOW-ENERGY REMOTE-CONTROL AND SIGNAL CIRCUIT CONDUCTORS WILL NOT BE LESS THAN NO. 16 AWG.

- 2.3 BRANCH/DISTRIBUTION PANELBOARDS
A. PROVIDE NEW DIRECTORIES IN PANELBOARDS TO WHICH NEW BRANCH CIRCUITS ARE CONNECTED OR TO WHICH EXISTING CIRCUITS ARE CHANGED.

- 2.4 GROUNDING AND BONDING
A. PROVIDE GROUNDING CONDUCTORS IN ALL METALLIC AND NONMETALLIC RACEWAYS. NOTE: THAT GROUNDING CONDUCTORS ARE NOT INDICATED ON THE DRAWINGS (WHERE WIRE COUNTS ARE SHOWN) BUT ARE REQUIRED TO BE PROVIDED IN ALL RACEWAYS...
B. PROVIDE BONDING CONDUCTORS BETWEEN NEW AND EXISTING STRUCTURAL STEEL OF THE BUILDING. REFER TO THE NEC FOR CORRECT BONDING CONDUCTOR SIZING AND REQUIREMENTS.

PART 3: EXECUTION

- 3.1 COORDINATION
A. TO AVOID CONFLICTS, COORDINATE EXACT PLACEMENT OF ELECTRICAL ITEMS AND ELEVATION OF CONDUIT ROUTES WITH OTHER TRADES PRIOR TO INSTALLATION...
B. PROVIDE APPROPRIATE FIRESTOPPING MATERIAL AROUND ALL PENETRATIONS THROUGH FIRE RATED WALLS...
C. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, UL LISTING REQUIREMENTS AND ACCEPTED PRACTICES...
D. TEMPERATURE CONTROL WIRING AS CALLED FOR OR REFERENCED BY THE ELECTRICAL DRAWINGS AND SPECIFICATIONS WILL BE PROVIDED BY THE ELECTRICAL CONTRACTOR...
E. THE ELECTRICAL CONTRACTOR/TRADE SHALL BE RESPONSIBLE FOR COORDINATION AND DISTRIBUTION OF WORK TO HIS SUBCONTRACTORS...

- 3.2 CUTTING AND PATCHING
A. LAY OUT WORK CAREFULLY IN ADVANCE, AND WHERE CUTTING, CHANNELING, OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILING OR OTHER SURFACES IS NECESSARY FOR THE PROPER INSTALLATION, SUPPORT, OR ANCHORAGE OF THE CONDUIT, RACEWAYS, OR OTHER ELECTRICAL WORK, THE WORK IS TO BE CAREFULLY DONE AND ANY DAMAGE TO THE BUILDING, PIPING, OR EQUIPMENT REPAIRED BY SKILLED MECHANICS OF THE TRADE INVOLVED, AT NO ADDITIONAL COST TO THE OWNER.

- 3.3 RECORD DRAWING
A. PROVIDE ELECTRICAL RECORD DRAWINGS AS CALLED FOR IN DIVISION 1 AND INCLUDE ALL PERTINENT INFORMATION NOT SHOWN AND ALL CHANGES FROM THE ORIGINAL PLANS: ROUTE OF ALL UNDERGROUND AND OVERHEAD FEED CONDUITS FROM THE MAIN SWITCHBOARD TO THE VARIOUS PANELS AND EQUIPMENT; INTERCONNECTING CONDUITS BETWEEN BRANCH CIRCUIT, JUNCTION BOXES, AND PANELS (ACTUAL ROUTE OF CONDUIT IS NOT REQUIRED, ONLY HOW THE VARIOUS BRANCH ITEMS ARE INTERCONNECTED WITH CONDUIT AND NUMBER OF WIRES); CIRCUIT NUMBERS FOR ALL ITEMS WHERE THEY DO NOT AGREE WITH THE PLANS...
B. UPON COMPLETION OF THE WORK AND AT A DESIGNATED TIME, PROVIDE INSTRUCTIONS TO THE INSTITUTION'S REPRESENTATIVE IN OPERATION AND MAINTENANCE OF ALL MECHANICAL EQUIPMENT.

- 3.4 CHANGES, CONTRACT DOCUMENTS
A. THE CONTRACT DOCUMENT MAY BE SUPERSEDED BY LATER REVISED DRAWINGS OR SPECIFICATION ADDENDA PREPARED BY THE ENGINEER/ARCHITECT, AND ALL REASONABLE CHANGES (UP TO 3 FEET) IN LOCATION OF EQUIPMENT PRIOR TO ITS INSTALLATION, SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.

- 3.5 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTION
A. PROVIDE TWO (2) BOUND SETS OF COMPLETE INSTALLATION, OPERATING, AND MAINTENANCE INSTRUCTIONS AS OUTLINED IN DIVISION 1 OF THESE SPECIFICATIONS...
B. UPON COMPLETION OF THE WORK AND AT A DESIGNATED TIME, PROVIDE INSTRUCTIONS TO THE INSTITUTION'S REPRESENTATIVE IN OPERATION AND MAINTENANCE OF ALL MECHANICAL EQUIPMENT.

- 3.6 WORKMANSHIP
A. INSTALL ALL MATERIALS AND EQUIPMENT IN A NEAT AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AS APPROVED BY THE ENGINEER/ARCHITECT TO CONFORM WITH THE CONTRACT DOCUMENTS.

- 3.7 ACCESSIBILITY
A. MAINTAIN ACCESSIBILITY TO ALL EQUIPMENT FOR OPERATION, MAINTENANCE AND REPAIR.

- 3.8 TESTS
A. AFTER THE INSTALLATION IS COMPLETED, AND AT SUCH TIME AS THE ENGINEER/ARCHITECT MAY DIRECT, THE CONTRACTOR IS TO CONDUCT AN OPERATING TEST FOR APPROVAL...
B. UPON COMPLETION OF THE WORK AND AT A DESIGNATED TIME, PROVIDE INSTRUCTIONS TO THE INSTITUTION'S REPRESENTATIVE IN OPERATION AND MAINTENANCE OF ALL MECHANICAL EQUIPMENT.

- 3.9 TEMPORARY SERVICE
A. FURNISH AND MAINTAIN TEMPORARY POWER AND LIGHTING SYSTEM FOR WORK WITHIN BOUNDARIES OF CONSTRUCTION...
B. UPON COMPLETION OF THE WORK AND AT A DESIGNATED TIME, PROVIDE INSTRUCTIONS TO THE INSTITUTION'S REPRESENTATIVE IN OPERATION AND MAINTENANCE OF ALL MECHANICAL EQUIPMENT.

- 3.10 UTILITY COORDINATION
A. THE UTILITY SHALL APPLY TO ELECTRICAL, TELEPHONE, NATURAL GAS OR CABLE TELEVISION UTILITIES AS REQUIRED BY WORK OF THIS CONTRACT.
B. COORDINATE ANY ELECTRIC OUTAGE WITH THE OWNER AND OTHER TRADES. FURNISH TEMPORARY POWER CONNECTIONS AS REQUIRED TO MAINTAIN OPERATIONS FOR EXTENDED OUTAGES EXCEEDING 4 HOURS.

END OF SECTION

ELECTRICAL LEGEND

Table mapping electrical symbols to their descriptions. Includes symbols for motor location, disconnect switches, junction boxes, relays, thermostats, transformers, and various types of conduits and wires.

LIGHTING FIXTURE SCHEDULE

Table with columns for SYMBOL, DESCRIPTION, LAMP # and TYPE, VOLT., MOUNTING, CEILING TYPE, MANUFACTURER, and REMARKS. Lists various lighting fixtures such as 2'x4' fluorescent troffers, decorative exterior fixtures, and emergency exit signs.

- NOTES
1. WHERE DISCREPANCIES BETWEEN DESCRIPTION AND PART NUMBER EXIST, THE GREATER QUANTITY OR BETTER QUALITY SHALL PREVAIL.
2. FOR FIXTURE APPROVAL, SUBMIT CATALOG CUTS AND PHOTOMETRIC INFORMATION IN ACCORDANCE WITH THE SPECIFICATIONS.
3. PROVIDE 1 BAR CLIP AND SUPPORTS FOR ALL L.I.C. FIXTURES PER SPECIFICATIONS.
4. ALL RECESSED LIGHT FIXTURES SHALL BE ONE HOUR RATED.
5. ALL ACRYLIC LENSES SHALL BE A MINIMUM 1/8" THICK.
6. ALL ELECTRONIC BALLASTS TO BE INSTANT START AND THD <10%. UNLESS OTHERWISE NOTED.
7. ALL FLUORESCENT FIXTURES MARKED AS NIGHT LIGHT/EMERGENCY LIGHTS (EM/NL) SHALL BE EQUIPPED WITH BATTERY INVERTER BALLAST CONNECTED TO A LOCAL UNSWITCHED CIRCUIT.

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