

DIVISION 16 ELECTRICAL SPECIFICATIONS

GENERAL PROVISIONS

- A. THE PROVISIONS OF THE INSTRUCTION TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND THE PROVISIONS OF THE SPECIFICATION ARE PART OF THIS SPECIFICATION. A REQUIREMENT OCCURRING IN ONE IS AS BINDING AS THOUGH OCCURRING IN ALL. THEY ARE INTENDED TO BE COMPLEMENTARY AND TO DESCRIBE AND PROVIDE FOR A COMPLETE WORK. CONTRACTORS AND SUB-CONTRACTORS SHALL EXAMINE SAME AS WELL AS OTHER DIVISIONS OF THE SPECIFICATIONS WHICH AFFECT WORK UNDER THIS DIVISION.
- B. ELECTRICAL, ARCHITECTURAL, MECHANICAL, STRUCTURAL AND ALL OTHER DRAWINGS AS WELL AS THE SPECIFICATIONS ARE A PART OF THE CONTRACT DOCUMENTS.
- C. MATERIAL OR LABOR WHICH IS NOT INDICATED ON THE DRAWINGS OR SPECIFICATION BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK (AND IS USUALLY INCLUDED IN SIMILAR WORK) SHALL BE PROVIDED. DRAWINGS AND SPECIFICATIONS ARE TO BE CONSIDERED AS SUPPLEMENTING EACH OTHER. WORK SPECIFIED BUT NOT INDICATED, OR INDICATED BUT NOT SPECIFIED, SHALL BE PROVIDED AS THOUGH MENTIONED IN BOTH SPECIFICATIONS AND DRAWINGS.
- D. EQUAL AND EQUIVALENT: SHALL BE UNDERSTOOD TO MEAN OF THE SAME QUANTITY, SIZE, NUMBER, VALUE, GRADE, INTENSITY AND THE ITEMS SIMILAR IN ALL RESPECTS. THE FINAL DECISION OF ACCEPTANCE OF THESE ITEMS WILL BE MADE BY THE ENGINEER. IT SHALL BE UNDERSTOOD THAT FOR ANY SPECIFIED ITEM ON THE DRAWINGS AND IN THE SPECIFICATIONS, THIS TERM SHALL APPLY.
- E. DEFINITION OF SPECIAL TERMS SHALL BE INTERPRETED AS DESCRIBED HEREIN:
 - "PROVIDE" MEANS: FURNISH/SUPPLY ALL LABOR, MATERIALS, EQUIPMENT AND SUPPLIES, INCLUDING TESTS AND INSPECTIONS, NECESSARY TO INSTALL AND PLACE COMPONENTS AND/OR SYSTEMS IN A SAFE AND COMPLETE OPERATING CONDITION THAT IS FULLY FUNCTIONING.
 - "FURNISH" MEANS: SUPPLY AND/OR MAKE AVAILABLE AN ITEM, TO THE CONTRACTOR WHO WILL RECEIVE THE ITEM AND DO SOMETHING WITH IT. EXAMPLES INCLUDES OWNER FURNISHED ITEM OR ITEMS FURNISHED BY ANOTHER TRADE.
 - "INSTALL" MEANS: PLACE, SET OR FIX AND CONNECT AN ITEM INTO A POSITION READY FOR USE. RECEIVE AN INDICATED ITEM FROM A SUPPLIER (INCLUDING OFF LOADING AND MOVING INTO PLACE WHEN REQUIRED) AND OPERATED TO INSTALL THE ITEM COMPLETE WITH ALL REQUIRED PARAMETERS TO MAKE A COMPLETE, SAFE AND OPERATIONAL SYSTEM INCORPORATING THE ITEM FURNISHED.
- F. MATERIAL AND WORK REQUIRED UNDER THIS AND OTHER SECTIONS OF THIS DIVISION SUCH AS CONCRETE, MASONRY, REINFORCING STEEL AND PAINTING, ETC. REQUIRED AND/OR NOT SPECIFIED IN DETAIL, SHALL BE AS SPECIFIED IN OTHER APPLICABLE DIVISIONS COVERING SUCH WORK.
- G. RESOLVE CODE VIOLATIONS OCCURRING IN CONTRACT DOCUMENTS WITH THE ARCHITECT/ENGINEER PRIOR TO AWARD OF CONTRACT.
- H. PROVIDE ALL EXCAVATION, CONCRETE AND BACKFILL REQUIRED FOR ELECTRICAL WORK EXCLUSIVELY. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE IN WHICH CONSTRUCTION TO TAKE PLACE.

WORK INCLUDES

- A. INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, PERMITS AND CERTIFICATES OF INSPECTION NECESSARY FOR THE PROPER COMPLETION OF ALL ELECTRICAL WORK. ITEMS OMITTED, BUT NECESSARY TO MAKE THE ELECTRICAL SYSTEM COMPLETE, SAFE, AND WORKABLE, SHALL BE UNDERSTOOD TO FORM PART OF THE WORK.
- B. IT IS THE PURPOSE OF THE ELECTRICAL DRAWINGS TO INDICATE THE APPROXIMATE LOCATION OF ALL EQUIPMENT, OUTLETS, ETC. ACCURATE EXACT LOCATIONS AND ARRANGE WORK ACCORDINGLY. THE RIGHT IS RESERVED TO EFFECT REASONABLE CHANGES IN THE LOCATION OF OUTLETS UP TO THE TIME OF ROUGH-IN. WITHOUT ADDITIONAL COST TO THE OWNER. CHANGES IN LOCATION OF OUTLETS OR EQUIPMENT NECESSITATED BY THE WORK OF OTHER TRADES SHALL BE MADE ONLY WITH THE CONSENT OF THE ARCHITECT OR OWNER'S REPRESENTATIVE AND AT NO ADDITIONAL COST.
- C. THE ELECTRICAL CONTRACTOR SHALL COOPERATE WITH THE OWNER'S REPRESENTATIVE AND ALL OTHER TRADES IN AN EFFORT TO OVERCOME DIFFICULTIES ENCOUNTERED THROUGH FIELD CONDITIONS.
- D. THE ELECTRICAL DESIGN IS BASED ON THE LATEST VERSION OF THE NEC APPLICABLE TO WORK ON THIS SITE. THE ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID THE COST OF PROVIDING MATERIALS AND EQUIPMENT NECESSARY TO SATISFY LOCAL OR REGIONAL CODES.

RELATED WORK SPECIFIED ELSEWHERE

- A. TEMPERATURE CONTROLS ARE INTEGRATED AND WIRED BY A CONTROLS CONTRACTOR UNDER DIVISION 15.
- B. STARTERS - SUPPLIED AS AN INTEGRAL PART OF THE EQUIPMENT SHALL BE FURNISHED UNDER THE DIVISION PROVIDING THE EQUIPMENT. WIRING AND DISCONNECT SHALL BE UNDER DIVISION 16. ALL OTHER STARTERS AND AUXILIARY CONTROL EQUIPMENT SHALL BE SUPPLIED AND WIRED UNDER DIVISION 16 UNLESS OTHERWISE NOTED.
- C. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH OTHER TRADES, MECHANICAL, PLUMBING, ETC., AND SHALL VERIFY EQUIPMENT AND DEVICE VOLTAGE, PHASE AND AMPACITY SPECIFICATION. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY WIRING, RACEWAYS AND PROTECTIVE DEVICES, ETC., AS REQUIRED FOR THE CORRECT AND PROPER OPERATION OF THE INSTALLED EQUIPMENT, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

MATERIAL SUBSTITUTIONS

- A. THESE SPECIFICATIONS ESTABLISH QUALITY STANDARDS OF MATERIALS AND EQUIPMENT TO BE PROVIDED. SPECIFIC ITEMS ARE IDENTIFIED BY MANUFACTURER, TRADE NAME OR CATALOG DESIGNATION. THIS CONTRACTOR SHALL SUBMIT HIS BASE BID PRICE FOR EACH ITEM DESCRIBED HEREIN AND AS DETAILED BELOW SHALL BE SHOWN AS A SEPARATE ADD OR DEDUCT PRICE TO BE FACTORED INTO THE BASE BID PRICE BY THE ARCHITECT AND OWNER IF ACCEPTED.
- B. THESE SPECIFICATIONS ARE NOT TO BE CONSIDERED PROPRIETY AND THE CONTRACTOR MAY SUBMIT MATERIALS OR MANUFACTURERS (OTHER THAN THOSE LISTED) FOR REVIEW BY THE ARCHITECT AND ENGINEER NO LATER THAN TEN (10) DAYS BEFORE BIDS ARE SUBMITTED. MANUFACTURERS OF PRODUCTS ACCEPTED BY THE ARCHITECT AND ENGINEER WILL BE LISTED IN THE SPECIFICATIONS AS AN ACCEPTABLE EQUIVALENT. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS AND EQUIPMENT OTHER THAN THOSE SPECIFIED, OR APPROVED BY ADDENDUM, SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS TO THE ARCHITECT.
- C. SUBMIT (AT HIS COST) INSPECTION SAMPLES OF BOTH THE SPECIFIED AND THE PROPOSED SUBSTITUTE ITEMS.

LED LUMINAIRES AND DRIVERS

- A. ALL LUMINAIRES
 1. COMPLY WITH IES LM-79-08 APPROVED METHOD FOR MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES.
 2. COMPLY WITH IES LM-80-08 APPROVED METHOD FOR ELECTRICAL AND PHOTOMETRIC MEASUREMENT OF SSL PRODUCT.
 3. COMPLY WITH IN-SITU TESTING FOR MORE RELIABLE RESULTS.
 4. LED'S SHALL BE RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE (ROHS) COMPLIANT.
 5. LED ARRAYS SHALL BE SEALED, HIGH PERFORMANCE, LONG LIFE TYPE; MINIMUM 70K HOURS OUTPUT AT 50,000 HOURS.
 6. LED LUMINAIRES SHALL DELIVER A MINIMUM OF 80 LUMENS PER WATT.
 7. DRIVERS SHALL BE OF SOLID STATE AND ACCESSIBLE FROM THE OUTLET AT 80 HZ INPUT.
 8. THE LED LIGHT SOURCE SHALL BE FULLY DIMMABLE WITH USE OF COMPATIBLE DIMMERS SWITCH DESIGNATED FOR LOW VOLTAGE LOADS UNLESS OTHERWISE NOTED.
 9. LED COLOR TEMPERATURES: CR > 85, 2700K AS NOTED +/- 140K.
 10. LED COLOR TEMPERATURES: CR > 85, 4000K AS NOTED +/- 270K.
 11. LED COLOR TEMPERATURES: CR > 85, 5000K AS NOTED +/- 280K.
 12. LUMINAIRES SHALL HAVE INTERNAL THERMAL PROTECTION.
 13. LUMINAIRES SHALL NOT DRAW POWER IN THE OFF STATE. LUMINAIRES WITH INTERNAL OCCUPANCY, MOTION, PHOTO-CONTROLS OR OTHERWISE ADDRESSABLE LUMINAIRES WITH EXTERNAL CONTROL AND INTELLIGENCE ARE EXEMPT FROM THIS REQUIREMENT. THE POWER DRAW FOR SUCH LUMINAIRES SHALL NOT EXCEED 0.5 WATTS WHEN IN THE OFF STATE.
 14. COLOR SPATIAL UNIFORMITY SHALL BE WITHIN .004 OF CIE 1976 DIAGRAM.
 15. COLOR MAINTENANCE OVER RATED LIFE SHALL BE WITHIN .007 OF CIE 1976.
 16. INDOOR LUMINAIRES SHALL HAVE A MINIMUM CR OF 85.
 17. LUMINAIRES MANUFACTURERS SHALL ADHERE TO QUALITY MANUFACTURER GUIDELINES, CERTIFICATION PROGRAMS, AND TEST PROCEDURES FOR THERMAL MANAGEMENT.
 18. LED PACKAGE(S)/MODULE(S)/ARRAY(S) USED IN QUALIFIED LUMINAIRES SHALL DELIVER A MINIMUM 70% OF INTD. LUMENS, WHEN INSTALLED IN-SITU, FOR A MINIMUM OF 50,000 HOURS.
 19. LUMINAIRES SHALL BE FULLY ACCESSIBLE FROM BELOW CEILING PLANS FOR CHANGING FUSE, POWER SUPPLIES AND ARRAYS.

POWER SUPPLIES AND DRIVERS

- 1. POWER FACTOR: 0.90 OR HIGHER.
- 2. MAXIMUM DRIVER CASE TEMPERATURE NOT TO EXCEED MANUFACTURER'S MAXIMUM IN-SITU OPERATION.
- 3. OUTPUT OPERATING FREQUENCY: 60HZ.
- 4. EFFICIENCY: 85% OR HIGHER.
- 5. TOTAL HARMONIC DISTORTION RATING: 20% MAXIMUM.
- 6. MEET ELECTRICAL AND THERMAL CONDITIONS AS DESCRIBED IN LM-80.
- 7. PRIMARY CURRENT: CONFORM PRIMARY CURRENT WITH DRAWING.
- 8. SECONDARY CURRENT: CONFORM SECONDARY CURRENT WITH INDIVIDUAL LUMINAIRES MANUFACTURERS.
- 9. CONFORM WITH ALL OTHER APPLICABLE REQUIREMENTS WITH INDIVIDUALLY SPECIFIED LUMINAIRES AND MANUFACTURER'S SPECIFICATIONS.
- 10. COLD-STATE CONDUCTANCE: CONDUCTANCE SHALL PER EACH SPECIFIED LUMINAIRES.
- 11. REMOTE CONTROL: G.E. SHALL BE USED IN CLASS 1, CLASS 2, OR NEW 3R ENCLOSURES AS REQUIRED.
- C. COLLER AND CONTROL SYSTEM ELECTRONICS DRIVER / CONTROLLER TO USE COORDINATED COMMUNICATION PROTOCOLS: DMX512, DMX, DALI, OR PROPRITARY AS REQUIRED.
- 2. CONTRACTOR TO ENSURE THAT EXTERNAL CONTROL EQUIPMENT IS COMPATIBLE WITH LED CONTROL SYSTEMS.
- 3. PROVIDE DIMMING DIMMERS AND WIRING AS APPROPRIATE FOR UN-INTERRUPTED COMMUNICATION BETWEEN DEVICES, SHOWING DISTANCE MARKINGS, FIELD OBSTRUCTIONS, AND ACCESSIBILITY. ENSURE THAT CONNECTION POINTS ARE OPTICALLY ISOLATED FOR SYSTEM NOISE REDUCTION.
- 4. FOR CONTROL COMPONENTS THAT ARE PART OF OVERALL AREA CONTROL SYSTEM SEE DIMMING CONTROLS SPECIFICATIONS.
- 5. COMPATIBILITY: CERTIFIED BY MANUFACTURER FOR USE WITH INDIVIDUALLY SPECIFIED LUMINAIRES AND INDIVIDUALLY SPECIFIED POWER SUPPLIES AND/OR DRIVERS.

CODES, PERMITS AND FEES

- A. SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR ELECTRICAL WORK. TURN OVER ALL CERTIFICATES OF APPROVAL, BY GOVERNING AGENCIES, TO THE ARCHITECT FOR TRANSMITTAL TO OWNER BEFORE PAYMENT IS MADE FOR THE WORK.
- B. GIVE THE PROPER AUTHORITIES NOTICES AS REQUIRED BY LAW RELATIVE TO THE WORK IN HIS CHARGE. COMPLY WITH THE REGULATIONS REGARDING TEMPORARY ENCLOSURES, OBSTRUCTIONS OR EXCAVATIONS AND PAY ALL LEGAL FEES INVOLVED.
- C. WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF THE LATEST EDITION OF THE NEC, APPLICABLE TO WORK ON THIS SITE, AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION, AS WELL AS ANY FURTHER MODIFICATIONS OR REGULATIONS OF LOCAL OR STATE AUTHORITIES.
- D. PROVISIONS OF THE LATEST REVISIONS TO THE FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) SHALL BE SATISFIED.

TESTS

- A. AFTER INSTALLATION BUT PRIOR TO ENERGIZATION, TEST FOR GROUNDS, SHORT CIRCUITS AND PROPER FUNCTION. FAULTS IN THE INSTALLATION SHALL BE CORRECTED.
- B. INSULATION RESISTANCE TESTS SHALL BE MADE ON THE ELECTRICAL SYSTEM WITH NOT LESS THAN 1000V D.C. USING AN APPROVED MEGOHMMETER (BIDDLE, MEGGER OR EQUAL) AND ALSO COMPLETE RESISTANCE/CONTINUITY TEST ON GROUNDING SYSTEM.
- C. CONDUCT SUCH TESTS AND ADJUSTMENTS OF THE EQUIPMENT AS REQUIRED BY THE ARCHITECT/ENGINEER OR AS NECESSARY TO VERIFY PERFORMANCE REQUIREMENTS. SUBMIT DATA TO THE ARCHITECT.
- D. INSPECT WIRE AND CABLE FOR PHYSICAL DAMAGE AND INSURE PROPER CONNECTIONS AND BENDING RADI.

EQUIPMENT IDENTIFICATION AND LABELING

- A. PROVIDE NAME PLATES ON ALL EQUIPMENT OF THE TYPE LISTED IN THE FOLLOWING SCHEDULE:
 1. PANELBOARDS AND DISTRIBUTION EQUIPMENT
 2. MOTOR STARTERS
 3. SAFETY SWITCHES
 4. CONTROL PANELS
 5. CONTROL DEVICES
 6. JUNCTION AND PULL BOXES
- B. LETTERING SHALL INCLUDE NAME OF EQUIPMENT, HORSEPOWER, VOLTAGE RATING AND SERVICE DESIGNATION.
- C. NAME PLATES SHALL BE LAMINATED PHENOLIC WITH A BLACK SURFACE AND WHITE CORE. NAME PLATES MAY BE ATTACHED TO WALL ADJACENT TO THE EQUIPMENT IF ATTACHMENT IS TOO SMALL. IDENTIFICATION WITH A DYMO TYPE INSTRUMENT IS NOT PERMISSIBLE.
- D. NAMEPLATES ON PANELBOARDS, DISTRIBUTION PANELS, ETC., IN UNFINISHED AREAS SHOULD BE ON EXTERIOR TRIM NEAR TOP.
- E. CABINET AND PANEL DOORS SHALL BE MARKED WITH NAME PLATE IDENTIFICATION NUMBERS USED ON THE DRAWINGS.
- F. IDENTIFICATION OF BRANCH CIRCUITS SHALL BE TYPENITRATED ON DIRECTORY CARDS FURNISHED WITH ALL PANELS AND PLACED IN THE CARD HOLDER ON THE DOOR. SPARE CIRCUITS SHALL BE LEFT BLANK FOR FUTURE IDENTIFICATION. TYPE OF IDENTIFICATION SHALL BE MADE ONLY WITH THE CONSENT OF THE ARCHITECT OR OWNER'S REPRESENTATIVE AND AT NO ADDITIONAL COST.
- G. IDENTIFY FEEDER SOURCE FOR PANELBOARDS INDICATING FEEDER FUSE/CIRCUIT BREAKER SIZE AND LOCATION ON THE NAMEPLATE.

CLEANING AND FINISHING

- A. AFTER ALL TESTS HAVE BEEN COMPLETED, CLEAN ALL EQUIPMENT LEAVING EVERYTHING IN WORKING ORDER AT THE COMPLETION OF THIS WORK. CLEAN INSIDE OF CONTROL PANELS, ENCLOSURES, PANELBOARDS, SWITCHES, ETC. BEFORE ENERGIZING.
- B. ALL DEBRIS CREATED BY THE EXECUTION OF THIS WORK SHALL BE REMOVED ON A DAILY BASIS LEAVING A BROOM CLEAN FINISH.

CUTTING, PATCHING AND PAINTING

- A. AVOID CUTTING INTO THE WORK OF OTHERS BY USING SLEEVES, INSERTS, CHASES AND SIMILAR ITEMS NECESSARY FOR THE INSTALLATION.
- B. EXCEPT WHERE OTHERWISE SPECIFIED OR NOTED ON DRAWINGS, THE GENERAL CONTRACTOR SHALL DO ALL CUTTING AND PATCHING OF THE BUILDING AS REQUIRED TO INSTALL SLEEVES, INSERTS, CONDUITS AND ELECTRICAL EQUIPMENT.
- C. PAINTING SHALL BE PROVIDED UNDER OTHER DIVISIONS OF THIS SPECIFICATION (EXCEPT FIELD APPLIED TOUCH-UP MATCHING EXISTING SURFACE AND FIELD APPLIED CORROSION RESISTANT FINISH TO FIELD CUTS AND THROATS).

TEMPORARY ELECTRICAL SERVICE

- A. PROVIDE A TEMPORARY ELECTRICAL SERVICE ADEQUATE IN SIZE FOR THE USE OF ALL TRADES AND THE LIGHTING OF EACH ROOM DURING CONSTRUCTION. INCLUDE ALL UTILITY COMPANY CHARGES FOR PROVIDING A TEMPORARY SERVICE TO THE JOB SITE. THE COST OF ELECTRICITY USED DURING CONSTRUCTION IS DESCRIBED UNDER DIVISION 1.
- B. TEMPORARY WIRING SHALL BE TO NEC ARTICLE 305 AND O.S.H.A. REQUIREMENTS.

COORDINATION WITH OTHER TRADES

- A. CONSULT THE DRAWINGS COVERING THE WORK FOR THE VARIOUS OTHER TRADES, THE FIELD LOGS OF THE CONTRACTORS FOR THE TRADES AND THEIR SHOP DRAWINGS. COORDINATE SCHEDULE ACCORDINGLY LEAVING OUT WORK.
- B. KEEP FULLY INFORMED OF THE PROGRESS OF THE GENERAL CONSTRUCTION. INSTALL WORK THAT IS TO BE CONCEALED WITHIN THE BUILDING CONSTRUCTION IN SUFFICIENT TIME TO SECURE PROPER CONNECTIONS WITHOUT DELAY TO THE WORK OF OTHER TRADES. PLACE ALL EQUIPMENT TOO LARGE TO GO THROUGH OPENINGS STAIRWAYS, ETC. IN A TIMELY MANNER. ALL CONDUIT AND OUTLET BOXES CONCEALED IN MASONRY CONSTRUCTION SHALL BE INSTALLED DURING WALL CONSTRUCTION. ATTEND ELECTRICAL WORK DURING THE PROGRESS OF BUILDING-IN TO PREVENT MISALIGNMENTS AND DAMAGES TO THE ELECTRICAL WORK.
- C. EXAMINE THE WORK OF OTHER TRADES WHEN THEIR WORK COMES IN CONTACT WITH OR IS COVERED BY THIS WORK. DO NOT ATTACH TO, COVER UP, OR FINISH AGAIN, ANY DEFECTIVE WORK, OR INSTALL WORK IN A MANNER WHICH WILL PREVENT PROPER INSTALLATION OF THE ELECTRICAL WORK.
- D. ALL OUTLETS, SWITCHES AND RECEPTACLES SHALL BE CENTERED WITH REGARD TO PANELING, TRIM, EQUIPMENT, ETC., AND SHALL LINE UP WITH OTHER BOTTOM, TOP OR MASONRY COURSES.
- E. TAKE ALL FIELD MEASUREMENTS NECESSARY AND ASSUME RESPONSIBILITY FOR THEIR ACCURACY.

GUARANTEE

- A. GUARANTEE ALL WORKMANSHIP AND MATERIALS PROVIDED UNDER THE CONTRACT FOR ONE YEAR AFTER COMPLETION OF THE WORK OR REPAIR OR REPLACEMENT OF ANY DEFECT WITHOUT COST TO THE OWNER.
- B. WHEN DAMAGE TO OTHER WORK OR FINISHINGS WAS CAUSED BY THE DEFECTS, OR BY THE WORK COVERED BY THIS GUARANTEE, THE CONTRACTOR SHALL RESTORE OR REPLACE AT THE ELECTRICAL CONTRACTOR'S EXPENSE THAT WHICH ORIGINALLY EXISTED PRIOR TO THE DAMAGE.

SUBMITTALS

- A. SUBMIT DRAWINGS AND WIRING DIAGRAMS IN ACCORDANCE WITH DIVISION 1 ON ALL ITEMS OF EQUIPMENT INTENDED FOR REVIEW BY THE ENGINEER. THESE SHALL INCLUDE THE FOLLOWING: LIGHTING FIXTURES & PANELS, PANELBOARDS, BATTERY PACKS, WIRING DEVICES, FIRE ALARM DEVICES, AND WIRING DIAGRAMS.
 1. THE SUBMITTALS WILL BE REVIEWED ONLY FOR GENERAL COMPLIANCE AND NOT FOR DIMENSIONS, QUANTITIES, ETC. THE SUBMITTALS THAT ARE RETURNED SHALL BE USED FOR PROCUREMENT. THE RESPONSIBILITY OF CORRECT PROCUREMENT REMAINS SOLELY WITH THE CONTRACTOR. THE SUBMITTAL REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS AND DEVIATIONS FROM THE CONTRACT REQUIREMENTS.
- B. THE CONTRACTOR SHALL INSURE SUBMITTALS BEAR THE CONTRACTOR'S DATED APPROVAL STAMP AND INDICATE ALL OPTIONS. IF THE SUBMITTALS SHOWS VARIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, FOR ANY REASON, THE CONTRACTOR SHALL MAKE SPECIFIC MENTION OF SUCH VARIATION IN HIS LETTER OF TRANSMITTAL. THE CONTRACTOR SHALL NOTE IN RED ON THE SUBMITTAL ANY CHANGE IN DESIGN OR DIMENSION ON THE ITEM SUBMITTED INCLUDING CHANGES MADE BY THE MANUFACTURER WHICH MAY DIFFER FROM CATALOG INFORMATION.
- C. THE CONTRACTOR AGREES THAT SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS; THAT THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT, THAT HE DEMONSTRATES HIS UNDERSTANDING BY INDICATING WHICH EQUIPMENT AND MATERIAL HE INTENDS TO PROVIDE AND BY DETAILING THE FABRICATION AND INSTALLATION METHODS HE INTENDS TO USE.
- D. CONTRACTOR FURTHER AGREES THAT IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SHOP DRAWING SUBMITTALS AND THE CONTRACT DOCUMENTS IN THE FORM OF DESIGN DRAWINGS AND SPECIFICATIONS ARE DISCOVERED EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.

ROUGH-IN

- A. VERIFY FINAL LOCATIONS FOR ROUGH-INS WITH SHOP DRAWINGS, FIELD MEASUREMENTS AND WITH THE REQUIREMENTS OF THE ACTUAL EQUIPMENT TO BE CONNECTED PRIOR TO ROUGH-IN.

INSTALLATION

- A. ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED IN A NEAT AND FIRST CLASS MANNER, LEVEL AND PLUMB, AND SECURELY SUPPORTED. THE ENTIRE INSTALLATION, AND MANNER OF INSTALLATION SHALL MATCH THE COMPLETE REPRESENTATION OF THE OWNER'S REPRESENTATIVE OR IT SHALL BE REMOVED AND REWORKED AS DIRECTED BY THE OWNER'S REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
- B. ALL WIRING SHALL BE IN CONDUIT. THE USE OF E.N.T., BX, NM, ETC. OR PRE-MANUFACTURED CABLE ASSEMBLIES SUCH AS AC OR MC, OR ALUMINUM WIRE WILL NOT BE PERMITTED.
- C. CO-ORDINATE CONNECTION OF ELECTRICAL SYSTEMS WITH UTILITIES AS INDICATED ON THE DRAWINGS. IF UTILITY REQUIRES A DIFFERENT SERVICE SCHEME THAN WHAT IS SHOWN, COORDINATE WITH ENGINEER AND PROVIDE UTILITY REQUIRED EQUIPMENT.

RECORD DRAWINGS

- A. DURING CONSTRUCTION ACTIVITIES, KEEP A MARKED UP SET OF DRAWINGS AND LOG OF ACTUAL ROUTING OF CIRCUIT RUNS AS INSTALLED, INSTALLED ITEMS AND IDENTIFY THESE AS "AS-BUILT DOCUMENTS".
- B. AFTER THE PROJECT IS COMPLETED, THE CONTRACTOR SHALL DELIVER TO THE ARCHITECT ONE SET OF REPRODUCIBLES OF THE INSTALLATION AS ACTUALLY CONSTRUCTED AND A COPY OF THE FIELD NOTED "AS-BUILT DOCUMENTS".

WORKMANSHIP

- A. WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE. ELECTRICAL WORK SHALL BE INSTALLED BY JOURNEMENT ELECTRICIANS UNDER THE SUPERVISION OF A COMPETENT FOREMAN.

EQUIPMENT AND MATERIALS

- A. EQUIPMENT AND MATERIALS USED ON THIS JOB SHALL BE NEW, U.L. LABELED OR AHA APPROVED NRTL AND O.S.H.A. APPROVED.
- B. EQUIPMENT AND MATERIALS SHALL BE PROTECTED AND BE THE RESPONSIBILITY OF THIS CONTRACTOR UNTIL FORMALLY ACCEPTED BY THE OWNER.
- C. ALL MANUFACTURERS OF ELECTRICAL EQUIPMENT SHALL VERIFY TO THE SATISFACTION OF THE CONTRACTOR AND ENGINEER THAT THEIR EQUIPMENT WILL FUNCTION PROPERLY UNDER THE CONDITIONS OF USE AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. DIMENSIONS, WEIGHTS, OPERATING CHARACTERISTICS AND ALL OTHER RELATED APPURTENANCES SHALL BE VERIFIED BEFORE SUBMITTAL OF SHOP DRAWINGS.
- D. CONTRACTOR SHALL INSURE THAT ALL EQUIPMENT SUPPLIERS UNDERSTAND THAT THEIR EQUIPMENT IS REQUIRED TO MEET SPECIFIC RATINGS AND REQUIREMENTS UNDER ACTUAL INSTALLED CONDITIONS.

FIRE STOPPING

- A. IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN, REFER TO DIVISION 1 SPECIFICATIONS FOR FIRE STOPPING GUIDELINES.
- B. ALL OPENINGS IN FIRE RATED FLOORS, SHAFTS AND WALLS ACCOMMODATING PENETRATING ITEMS SUCH AS CABLES, CONDUITS, RACEWAYS, CABLE TRAYS, OR BUSWAYS SHALL BE FIRE STOPPED.
- C. PROVIDE FIRE STOPPING FOR STEEL ELECTRICAL OUTLET BOXES THAT EXCEED 16 SQUARE INCHES IN AREA AND/OR WHEN THE AGGREGATE SURFACE OF THE BOXES EXCEEDS 100 SQUARE INCHES IN ANY 100 SQUARE FOOT OF WALL AREA. IN ADDITION, PROVIDE FIRE STOPPING FOR STEEL ELECTRICAL OUTLET BOXES ON OPPOSITE SIDES OF THE WALL THAT ARE NOT SEPARATED BY A HORIZONTAL DISTANCE OF 24 INCHES.
- D. PROVIDE FIRE STOPPING WHERE A PENETRATION OCCURS THROUGH A STRUCTURAL FLOOR OR ROOF AND A SPACE WOULD OTHERWISE REMAIN OPEN BETWEEN THE SURFACE OF THE PENETRATION AND THE EDGE OF THE ADJOINING STRUCTURAL FLOOR OR ROOF.
- E. PROVIDE FIRE STOPPING TO COMPLETELY FILL SPACES AROUND PENETRATIONS WHERE PENETRATIONS OCCUR AT FIRE RATED SHAFTS AND WALLS OF HOLLOW TYPE CONSTRUCTION.
- F. THE INSTALLATION OF THE FIRE STOPPING MATERIALS SHALL CONFORM TO THE LATEST FIRE STOPPING DIRECTORY AS PUBLISHED BY U.L.
- G. FIRE STOPPING SHALL BE PERFORMED BY A CONTRACTOR TRAINED OR APPROVED BY THE FIRE STOPPING MANUFACTURER. EQUIPMENT USED SHALL BE IN ACCORDANCE WITH THE FIRE STOPPING MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- H. ACCEPTABLE FIRE STOPPING MATERIAL MANUFACTURERS ARE SPECIFIED TECHNOLOGIES, TREMCO, INC., JM, AND HILL.

GROUNDING

- A. ALL SWITCHES AND SUPPORTS SHALL CONFORM TO LATEST REQUIREMENTS OF ANSI CODES, UNDERWRITERS LABORATORIES, INC., LISTED WHERE APPLICABLE. PROVIDE WITH CORROSION RESISTANT PRIMER AND FINISH PAINT.
- B. STEEL CHANNEL, FITTINGS, BRACKETS, BEAM CLAMPS AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- C. METAL FRAMING, FITTINGS, ETC., AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- D. E. CONCRETE INSERTS, ETC., AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- E. RUSTPROOF SELF DRILLING ANCHOR, SLEEVE ANCHOR, STUD ANCHOR, EXPANSION SHIELD (MALLEABLE IRON OR DIE CAST), EXPANSION ANCHOR SIMILAR TO THOSE MANUFACTURED BY "RED HEAD", ITI PHILLIPS DRILL CO.; UNIFAST INDUSTRIES, INC.; STAR; RAWL; ARRO, DIVISION MID-CON OR AN APPROVED EQUAL. SIZE AS INDICATED ON DRAWINGS.
- F. CONCRETE WEDGE ANCHORS MATERIAL SHALL BE ZINC PLATED CARBON STEEL. WEDGE ANCHORS SHALL BE SIMILAR TO UNIFAST INDUSTRIES, INC. OR AN APPROVED EQUAL.

MISCELLANEOUS STEEL

- A. CONTRACTOR TO FURNISH AND INSTALL ALL MISCELLANEOUS CARBON, GALVANIZED, STAINLESS STEEL REQUIRED FOR SIGN HANGERS, SIGN BRACKETS, OR AS MAY BE REQUIRED FOR INSTALLATION OF EQUIPMENT AND MATERIALS FURNISHED AND INSTALLED UNDER THIS DIVISION.
- B. DESIGN ALL MISCELLANEOUS STEEL IN ACCORDANCE WITH AISC STEEL HANDBOOK.

SUPPORTING DEVICES

- A. ALL HANGERS AND SUPPORTS SHALL CONFORM TO LATEST REQUIREMENTS OF ANSI CODES, UNDERWRITERS LABORATORIES, INC., LISTED WHERE APPLICABLE. PROVIDE WITH CORROSION RESISTANT PRIMER AND FINISH PAINT.
- B. STEEL CHANNEL, FITTINGS, BRACKETS, BEAM CLAMPS AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- C. METAL FRAMING, FITTINGS, ETC., AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- D. E. CONCRETE INSERTS, ETC., AS MANUFACTURED BY UNISTRUT, ALLIED AND KINDORF OR AN APPROVED EQUAL.
- E. RUSTPROOF SELF DRILLING ANCHOR, SLEEVE ANCHOR, STUD ANCHOR, EXPANSION SHIELD (MALLEABLE IRON OR DIE CAST), EXPANSION ANCHOR SIMILAR TO THOSE MANUFACTURED BY "RED HEAD", ITI PHILLIPS DRILL CO.; UNIFAST INDUSTRIES, INC.; STAR; RAWL; ARRO, DIVISION MID-CON OR AN APPROVED EQUAL. SIZE AS INDICATED ON DRAWINGS.
- F. CONCRETE WEDGE ANCHORS MATERIAL SHALL BE ZINC PLATED CARBON STEEL. WEDGE ANCHORS SHALL BE SIMILAR TO UNIFAST INDUSTRIES, INC. OR AN APPROVED EQUAL.

IDENTIFICATION

- A. AFTER FINISHED PAINTING IS COMPLETE, IDENTIFY EACH FEEDER CABLE AND CONDUIT SERVICE. LOCATE IDENTIFICATION:
 1. BEHIND EACH ACCESS DOOR.
 2. AT EACH CHANGE OF DIRECTION AND AT JUNCTION BOXES.
 3. AT NOT MORE THAN 40 FEET APART IN STRAIGHT RUNS OF CONDUIT BEHIND REMOVABLE ENCLOSURES SUCH AS LAY-IN TYPE CEILING, BUT ON BOTH SIDES OF SLEEVES THROUGH WALLS OF FLOORS.
 4. ABOVE EACH FLOOR OR PLATFORM FOR VERTICAL EXPOSED CONDUITS, PREFERABLY 60" ABOVE FLOOR OR PLATFORM.
 5. USE STENCILS AND STENCIL PAINT OR LAMACOD PLATES ON ALL CONDUIT.
 6. USE MINIMUM 1" HIGH LETTERS.
 7. THE IDENTIFICATION SHALL DESCRIBE SYSTEM VOLTAGE AND SERVICE, I.E. "120/208 VOLT LIGHTING TO TERMINAL ROOM".
- B. IDENTIFY OUTLET BOXES FOR THE VARIOUS SYSTEMS BY THE USE OF THE FOLLOWING DISTINCTIVE COLOR PAINTS: APPLY A SMALL AREA OF PAINT TO THE INSIDE OF EACH OUTLET BOX, PULL BOX AND PANEL AS IT BEING INSTALLED. IDENTIFY JUNCTION BOXES IN SUSPENDED CEILING AREAS WITH COLOR ON BOTH INSIDE AND OUTSIDE. PROVIDE CIRCUIT NUMBER ON EXTERIOR OF COVER OR PLATE (SUCH AS 1P-1).

RACEWAYS

- A. TYPES OF RACEWAYS SPECIFIED IN THIS SECTION INCLUDE THE FOLLOWING:
 1. ELECTRICAL METAL TUBING (EMT); MINIMUM TRADE SIZE 1/2".
 2. FLEXIBLE METAL CONDUIT; MINIMUM TRADE SIZE 1/2".
 3. LIQUID-TIGHT FLEXIBLE METAL CONDUIT (SEALTHIGHT) MINIMUM TRADE SIZE 1/2".
 4. RIGID METAL CONDUIT; MINIMUM TRADE SIZE 1/2". 5. RIGID NONMETALLIC CONDUIT (PVC), SCHEDULE 40, MINIMUM TRADE SIZE 1/2".
- B. FITTINGS
 1. FITTINGS FOR EMT SHALL BE STEEL SET SCREW OR COMPRESSION TYPE WITH FACTORY INSTALLED INSULATED THROUGH CONNECTORS; DIE CAST OR POT METAL FITTINGS ARE NOT ACCEPTABLE.
 2. FITTINGS FOR FLEXIBLE CONDUIT SHALL BE STEEL OR CAST IRON.
 3. FITTINGS FOR RIGID CONDUIT SHALL BE STEEL THREADED TYPE.
 4. FITTINGS FOR PVC SHALL BE SCHEDULE 40 GLEE-ON TYPE.
 - a. BLACK - 120/208 VOLT SYSTEM
 - b. GREEN - TELEPHONE/DATA SYSTEM
 - c. RED - FIRE ALARM SYSTEM

GROUNDING

- A. GROUND ALL CONDUITS, CABINETS, MOTORS, PANELS AND OTHER EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ALL PROVISIONS OF THE NATIONAL ELECTRICAL CODE AND LOCAL CODES APPLICABLE TO WORK ON THIS SITE.
- B. SYSTEM NEUTRAL CURRENT CONDUCTORS SHALL BE GROUNDED AT THE SOURCE, BUT THEY SHALL NOT BE USED FOR EQUIPMENT GROUNDING. GROUND SYSTEM NEUTRALS AT TRANSFORMERS.
- C. GROUND ALL CONDUITS BY MEANS OF GROUNDING. PROVIDE BUSHINGS ON TERMINATIONS AT PANELBOARDS WITH AN INSTALLED #12 CONDUCTOR TO GROUNDING BUS.
- D. GROUNDING OF THE ELECTRICAL SYSTEM EQUIPMENT SHALL BE BY MEANS OF AN INSULATED GROUNDING

INSTALLATION OF RACEWAYS

- A. ALL CONDUITS SHALL BE INSTALLED CONCEALED, EXCEPT IN EQUIPMENT ROOM, CHASES OR AS INDICATED ON THE DRAWINGS. ALL CONDUITS EXPOSED AND CONCEALED SHALL BE RUN PARALLEL AND PERPENDICULAR TO BUILDING LINES AND SHALL BE GROUDED TOGETHER AS MUCH AS POSSIBLE, EVEN ABOVE LAY-IN CEILING.
- B. A SEPARATE GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL RUNS WHERE SIZES LARGER THAN #12 AWG ARE REQUIRED BY THE NEC. THE CONDUCTOR SHALL BE SIZED AS INDICATED IN THE NEC. ALL GROUNDING CONDUCTORS SHALL HAVE A GREEN OUTER COVERING, OR GREEN MARKING TAPE OVER THEIR ENTIRE EXPOSED LENGTHS.
- C. MECHANICALLY FASTEN TOGETHER METAL CONDUITS, ENCLOSURES, AND RACEWAYS FOR CONDUCTORS TO FORM A CONTINUOUS ELECTRICAL CONDUCTOR. CONNECT TO ELECTRICAL BOXES, FITTINGS AND CABINETS TO PROVIDE ELECTRICAL CONTINUITY AND FIRM MECHANICAL ASSEMBLY.
- D. AVOID USE OF DISSIMILAR METALS THROUGH SYSTEM TO ELIMINATE POSSIBILITY OF ELECTROLYSIS.
- E. INSTALL EXPANSION FITTINGS IN RACEWAYS EVERY 200' LINEAR RUN OR WHEREVER STRUCTURAL EXPANSION JOINTS ARE CROSSED.
- F. PROVIDE NYLON PULL CORD IN ALL EMPTY CONDUITS (MINIMUM 90% TENSILE STRENGTH).

CONDUIT INSTALLATION

- 1. USE RIGID METAL CONDUIT FOR ALL WEATHER EXPOSED WORK AND FOR ALL ROOF PENETRATIONS THROUGH RAPE FLUITS. MAY CONVERT A JUNCTION BOX BELOW ROOF.
- 2. USE P.V.C. FOR ALL INTERIOR CONCEALED AND FOR EXPOSED WORK NOT SUBJECT TO MECHANICAL INJURY.
- 3. USE P.V.C. FOR ALL UNDERGROUND WORK OR WORK INSTALLED IN CONCRETE. USE RIGID METAL CONDUIT FOR ALL UNDERGROUND WORK.
- 4. USE FLEXIBLE METAL CONDUIT FROM OUTLET BOXES TO RECESSED LIGHTING FIXTURE AND FINAL 24" OF CONNECTION TO ITEMS SUBJECT TO MOVEMENT OR VIBRATION.
- 5. USE LIQUID-TIGHT FLEXIBLE CONDUIT FOR FINAL 24" CONNECTION TO ITEMS WHERE SUBJECT TO ONE OR MORE OF THE FOLLOWING CONDITIONS:
 - a. EXTERIOR LOCATION.
 - b. MOIST OR HUMID ATMOSPHERE WHERE CONDENSATE CAN BE EXPECTED TO ACCUMULATE.
 - c. CORROSIVE ATMOSPHERE.
 - d. SUBJECT TO WATER SPRAY OR DRIPPING OIL, WATER OR GREASE.
 - e. FINAL CONNECTION TO ROTATING OR VIBRATING EQUIPMENT.
 - f. CUT CONDUITS STRAIGHT, PROPERLY REAM AND CUT THREADS FOR HEAVY WALL CONDUIT AND CLEAN.
 6. FIELD BEND CONDUIT WITH BENDERS DESIGNED FOR THE PURPOSE WITHOUT TO DISTORT WARY INTERNAL DIAMETER.

WIRE AND CABLE

- A. WIRE SIZE SHALL BE DETERMINED FROM THE APPROPRIATE N.E.C. TABLES USING THE NECESSARY DERATING FACTORS FOR TEMPERATURE, GROUNDING, MINIMUM WIRE SIZE FOR POWER, LIGHTING, CIRCUITS SHALL BE #12. WIRE SIZES #12 AND LARGER SHALL BE SOLID. WIRE SIZES #10 AND LARGER SHALL BE STRANDED.
- B. INDIVIDUAL CIRCUITS ARE INDICATED DIAGRAMMATICALLY ON THE DRAWINGS FOR CLARITY. CIRCUITS MAY BE GROUDED FOR HOMERUNS. NOTE THAT THE APPLICABLE ADJUSTMENT FACTORS MUST BE APPLIED.
- C. THE ELECTRICAL CONTRACTOR SHALL INSTALL SEPARATE NEUTRALS FOR EACH INDIVIDUAL BRANCH CIRCUIT UNLESS NOTED OTHERWISE. NEUTRALS MAY ONLY BE BUNDLED WITH THE ARCHITECT/ENGINEER'S APPROVAL AND ONLY FOR SHORT RUNS ON DIFFERENT FLOORINGS.
- D. WIRE SIZE IS NOT INDICATED ON 120 VOLT CIRCUITS. CONDUCTOR SIZE #12 MINIMUM SHALL BE USED FOR CIRCUITS LESS THAN 100 FEET AND SIZE #10 MINIMUM SHALL BE USED FOR CIRCUITS GREATER THAN 100 FEET. WIRE SIZES SHALL BE DETERMINED BASED UPON INSULATION TYPE, GROUP DERATING FACTORS AND AMBIENT TEMPERATURE FACTORS.
- E. COLOR CODING OF CONDUCTORS SHALL BE AS FOLLOWS FOR VOLTAGES WHEN PRESENT:
 1. 240/120V SYSTEMS: PHASE A - BLACK, PHASE B - RED, PHASE C - BLUE, NEUT. - WHITE, GND. - GREEN.
 2. 277V SYSTEM: PHASE A - YELLOW, PHASE B - BROWN, PHASE C - ORANGE, NEUT. - WHITE, GND. - GREEN.

OUTLET BOXES

- A. ALL OUTLET BOXES UPON WHICH LIGHTING FIXTURES ARE TO BE INSTALLED, SHALL BE EQUIPPED WITH 3/8" NIP INCH FUTURE STUDS.
- B. ALL BOXES SHALL BE RIGIDLY SUPPORTED FROM BUILDING STRUCTURE INDEPENDENT OF THE CONDUIT SYSTEM. BOXES CAST INTO MASONRY OR CONCRETE ARE CONSIDERED TO BE RIGIDLY SUPPORTED.
- C. FLUSH DEVICE BOXES IN MASONRY WALLS SHALL BE MASONRY BOXES DESIGNED FOR THE PURPOSE, OR 4-INCH SQUARE BOXES WITH RAISED SQUARE COVERS DESIGNED FOR MASONRY. FLUSH BOXES IN OTHER WALLS SHALL HAVE PROPER RAISED COVERS SUITABLE FOR WALL MATERIAL.

WIRING DEVICES

- A. LOCAL LIGHT SWITCHES SHALL BE BACK AND SIDE WIRE, 20 AMPERE, 120/277 VOLTS, AC SPECIFICATION GRADE. MANUFACTURERS SHALL BE LEVITON "SPECCLASS" TOGGLE SERIES, HUBBELL AND GENERAL ELECTRIC OR EQUAL.
- B. CONVENIENCE OUTLETS FOR 120 VOLT GENERAL USE SHALL