

ELECTRICAL SYMBOL LEGEND

SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE USED FOR THIS PROJECT.

- A. GENERAL**
- JUNCTION BOX (4" SQUARE MINIMUM)
 - INDICATES HOMERUN
 - CIRCUIT CONDUCTORS.
 - LONG DASH INDICATES NEUTRAL CONDUCTOR, SHORT DASH INDICATES PHASE CONDUCTORS. CODE SIZED EQUIPMENT GROUND NOT INDICATED BUT REQUIRED.
 - ISOLATED GROUNDING CONDUCTOR, GREEN, INSULATED WITH YELLOW STRIPE.
 - GROUNDING CONDUCTOR, GREEN, INSULATED, SIZE PER PLAN.
 - SURFACE PANELBOARD
 - FLUSH PANELBOARD
 - TRANSFORMER, (KVA SIZE AS NOTED), GROUNDING SYSTEM TO BUILDING STEEL (IF APPLICABLE).
 - CONDUIT STUB-UP ABOVE CEILING
 - CONDUIT STUB-DOWN TO FLOOR BELOW
 - CONDUIT IN UNDERGROUND/SLAB
 - CONDUIT STUB-UP WITH CAP
 - CONDUIT SEAL-OFF
 - FLEXIBLE CONDUIT, PROVIDE LIGHT TIGHT FLEX IN WET OR EXTERIOR LOCATIONS AND AT CONNECTIONS TO VIBRATING EQUIPMENT AND/OR TRANSFORMERS.
 - CONDUIT CONCEALED IN WALLS OR ABOVE CEILING.

- B. POWER**
- 20A SPEC GRADE SINGLE RECEPTACLE MOUNTED AT +15" TO BOTTOM OR AS NOTED
 - 20A SPEC GRADE DUPLEX RECEPTACLE MOUNTED AT +15" TO BOTTOM OR AS NOTED
 - 20A SPEC GRADE FOURPLEX RECEPTACLE MOUNTED AT +15" TO BOTTOM OR AS NOTED
 - 20A SPEC GRADE DUPLEX CONVENIENCE OUTLET MOUNTED ABOVE COUNTER, VERIFY EXACT HEIGHT WITH ARCHITECTURAL ELEVATIONS.
 - 20A SPEC GRADE FOURPLEX CONVENIENCE OUTLET MOUNTED ABOVE COUNTER, VERIFY EXACT HEIGHT WITH ARCHITECTURAL ELEVATIONS.
 - SPECIAL OUTLET AS NOTED ON DRAWINGS - VERIFY NEMA RATING BEFORE INSTALLATION
 - SPECIAL OUTLET AS NOTED ON DRAWINGS
 - X = WASHED IN CEILING
 - RF = REFRIGERATOR
 - SD = SINK DISPOSAL, PROVIDE SWITCH ABOVE COUNTER.
 - UCR = UNDERCOUNTER REFRIGERATOR
 - WM = WENDING MACHINE
 - PD = PEDIATRIC SAFE
 - ISOLATED GROUNDING OUTLET AT +15" TO BOTTOM OR AS NOTED, "LEVITON" #5362-10 (ORANGE) RECEPTACLE WITH ISOLATED GROUND.
 - 20A SPEC GRADE HALF SWITCHED DUPLEX RECEPTACLE AT +15" TO BOTTOM OR AS NOTED.
 - DUAL COMPARTMENT POWER/TELE DATA POLE
 - FLUSH FLOOR POWER OUTLET - WITH 20A SPEC GRADE RECEPTACLES DUPLEX OR FOURPLEX, HUBBLE, THOMAS & BETTS, CARLON OR EQUAL.
 - *F BOX FLUSH MOUNTED IN WALL FOR SYSTEMS FURNITURE POWER, COORDINATE EXACT LOCATION AND REQUIREMENTS WITH SUPPLIER PRIOR TO ROUGH-IN. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FINAL CONNECTION TO SYSTEM FURNITURE.
 - WIRE MOLD, LENGTH AND TYPE AS NOTED ON DRAWINGS, MOUNT AS NOTED ON THE DRAWINGS.

- C. COMMUNICATIONS**
- FLUSH FLOOR COMBINATION TELEPHONE/DATA OUTLET - PROVIDE 1/4" MIN CONDUIT TO ABOVE ACCESSIBLE CEILING, HUBBLE, THOMAS & BETTS, CARLON OR EQUAL.
 - DATA OUTLET AT +15" A.F.F. TO BOTTOM OF WALL FIXTURE OR AS NOTED, PROVIDE 3/4" CONDUIT STUBBED TO +4" ABOVE FINISHED CEILING.
 - TELEPHONE OUTLET AT +15" A.F.F. TO BOTTOM OF WALL FIXTURES OR AS NOTED, PROVIDE 3/4" CONDUIT STUBBED TO +4" ABOVE FINISHED CEILING OR AS NOTED.
 - X = PAY PHONE
 - W = WALL PHONE OUTLET MOUNTED AT +44" A.F.F.
 - COMBINATION TELEPHONE/DATA OUTLET AT +15" A.F.F. TO BOTTOM OF WALL FIXTURES OR AS NOTED, PROVIDE 3/4" CONDUIT STUBBED TO +4" ABOVE FINISHED CEILING.
 - DIGITAL CABLE TELEVISION OUTLET
 - TELEPHONE OUTLET WITH DEVICES
 - *F BOX FLUSH MOUNTED IN WALL FOR SYSTEMS FURNITURE TELE/DATA WITH 1/4" EMPTY CONDUIT STUBBED ABOVE CEILING, COORDINATE EXACT LOCATION AND REQUIREMENTS WITH SUPPLIER PRIOR TO ROUGH-IN. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FINAL CONNECTION TO SYSTEM FURNITURE.
 - TELEPHONE TERMINAL BOARD "TMB", 3/4" PLYWOOD TELEPHONE MOUNTING BOARD WITH #6 COPPER GROUND & DESIGNATED FOURPLEX CONVENIENCE OUTLET, FURNISH IN ACCORDANCE WITH TELEPHONE COMPANY'S REQUIREMENTS, SIZE AS NOTED ON DRAWINGS, PLYWOOD SHALL BE TYPE "CDX".

- D. LIGHTING**
- STANDARD SWITCH AND COVER PLATE WITH LOCKING DEVICE (BRADY NO. 24F98 OR EQUAL)
 - SINGLE POLE SWITCH MOUNTED AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - TWO POLE SWITCH MOUNTED AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - THREE WAY SWITCH MOUNTED AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - FOUR WAY SWITCH MOUNTED AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - SINGLE POLE SWITCH WITH PILOT LIGHT AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - 2000W INCANDESCENT SLIDE CONTROL DIMMER AT AT +44" TO CENTER OF DEVICE OR AS NOTED, LUTRON #N2003P-WL
 - SWITCH KEY OPERATED MTD AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - 1500W LOW VOLTAGE SLIDE CONTROL DIMMER WITH PRESET AT +44". CONTRACTOR SHALL SUPPLY SPECIFIC (ELECTRONIC AND/OR MAGNETIC) TO SUIT LOADS.
 - WALL MOUNTED OCCUPANCY SENSOR, WATSTOPPER-DUAL TECHNOLOGY OR EQUAL, IN RESTROOMS, WATSTOPPER-ULTRASONIC.
 - SINGLE POLE UP-OFF-DOWN SWITCH FOR CONTROL OF PROJECTION SCREEN, MOUNTED AT +44" TO CENTER OF DEVICE OR AS NOTED.
 - PUSH BUTTON CONTROL STATION AS NOTED, VERIFY MOUNTING HEIGHT.
 - ROOF MOUNTED PHOTOCELL (AM NORTH) INTERMATIC #K1121.
 - ASTRONOMIC ELECTRONIC 4 POLE LIGHTING TIMERSWITCH, INTERMATIC #T513119C
 - CEILING MOUNTED OCCUPANCY SENSOR 360°, WATSTOPPER-DUAL TECHNOLOGY OR EQUAL, IN RESTROOMS, WATSTOPPER-ULTRASONIC, IN WAREHOUSE: WATSTOPPER-HIGHBAY (WIDE ANGLE) (LR) LONG RANGE.
 - OCCUPANCY SENSOR - POWER PACK OR SLAVE PACK.
 - FLUORESCENT STRIP LIGHTING FIXTURE - AS NOTED ON DRAWINGS.
 - FLUORESCENT LIGHTING FIXTURE - AS NOTED ON DRAWINGS SURFACE MOUNTED.
 - RECESSED GRID W/FLEXIBLE CONNECTION.
 - INDICATES NIGHTLIGHT (NL) AND/OR EMERGENCY FIXTURE WITH INVERTER 1400 LUMEN MINIMUM (UNSWITCHED) - AS NOTED ON DRAWING.
 - WALL MOUNTED LIGHTING FIXTURE - AS NOTED ON DRAWINGS.
 - CEILING MOUNTED LIGHTING FIXTURE - AS NOTED ON DRAWINGS.
 - H.L.D. HIGH/LOW BAY FIXTURE
 - WALL WASH LIGHTING FIXTURE, AIM AS DIRECTED BY ARCHITECT.
 - TRACK LIGHTING SYSTEM WITH TRACK FIXTURE HEADS AS INDICATED ON PLANS, VERIFY TYPE LINE OR LOW VOLTAGE.
 - POLE MOUNTED AREA LIGHT (ARM MOUNTED) VERIFY HEIGHT SEE POLE DETAIL.
 - POLE MOUNTED AREA LIGHT (POST TOP) VERIFY HEIGHT SEE POLE DETAIL.
 - WALL PACK.
 - SINGLE FACE EXIT SIGN, SEE LIGHTING FIXTURE SCHEDULE FOR SPECIFICATION, DIRECTIONAL ARROW AS INDICATED ON PLANS (CEILING OR WALL).
 - COMBINATION EMERGENCY EXIT SIGN WITH DUAL HEAD LIGHTS WITH EMERGENCY BATTERY BACK-UP.
 - DOUBLE FACE EXIT SIGN, SEE LIGHTING FIXTURE SCHEDULE FOR SPECIFICATION, DIRECTIONAL ARROW AS INDICATED ON PLANS (CEILING OR WALL).
 - DUAL HEAD EMERGENCY BATTERY PACK, SEE LIGHTING FIXTURE SCHEDULE FOR SPECIFICATIONS.

- E. MECHANICAL**
- FURNISH AND INSTALL A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM IN ACCORDANCE WITH PLANS AND SPECIFICATIONS
 - CONTACTOR - FURNISHED/INSTALLED BY ELECTRICAL CONTRACTOR SIZE AS NOTED
 - MOTOR STARTER/CONTROLLER - FURNISHED WITH MOTOR.
 - MOTOR STARTER/CONTROLLER - FURNISHED/INSTALLED BY ELECTRICAL CONTRACTOR.
 - MOTOR - SIZE AS INDICATED ON DRAWINGS.
 - DISCONNECT SWITCH - AS NOTED AND USES AS PER MANUFACTURER'S RECOMMENDATIONS (WEATHERPROOF WHERE OUTSIDE), N.F. INDICATES NON-FUSED.
 - HORSEPOWER RATED MANUAL MOTOR STARTER WITH THERMAL OVERLOAD(S), OVERLOAD HEADERS TO BE SIZED PER HORSEPOWER AND MANUFACTURER'S REQUIREMENTS.

- F. FIRE ALARM**
- FIRE ALARM PULL STATION AT +48".
 - FIRE ALARM STATION: +80" AFF OR 6" BELOW CEILING, WHICHEVER IS LOWER.
 - FIRE ALARM HORN/STROBE: +80" AFF OR 6" BELOW CEILING, WHICHEVER IS LOWER.
 - FIRE ALARM MAGNETIC DOOR HOLDER
 - FIRE ALARM BELL
 - FIRE ALARM ANNUNCIATOR PANEL
 - FIRE ALARM CONTROL PANEL
 - FIRE ALARM HEAT DETECTOR.
 - FIRE ALARM SMOKE DETECTOR.
 - FIRE ALARM DUCT SMOKE DETECTOR.
 - FIRE ALARM TAMPER SWITCH.
 - FIRE ALARM FLOW SWITCH.
 - SPEAKER.

- G. ONE LINE DIAGRAM**
- (M) METER, (S) SOCKET, (B) BLANK
 - (M) METER, (S) SOCKET, (B) BLANK, WITH CURRENT TRANSFORMERS.
 - BREAKER AS INDICATED.
 - SWITCH SWITCH.
 - BREAKER WITH SHUNT TRIP (SIZE AS INDICATED)
 - PULLOUT FUSE

- H. ABBREVIATIONS**
- A AMPERE
 - AI AVAILABLE INTERRUPTING CURRENT
 - AL ALUMINUM
 - AFC AVAILABLE FAULT CURRENT
 - AFCI ARC FAULT CIRCUIT INTERRUPTER
 - AFB ABOVE FINISHED FLOOR
 - AFG ABOVE FINISHED GRADE
 - AH AIR HANDLER UNIT
 - ARS ARIZONA PUBLIC SERVICE - (UTILITY CO.)
 - C CONDUIT
 - CU CONDENSING UNIT
 - CO COPPER
 - D DEDICATED
 - DP STUB - IGNITION PROOF
 - E EXISTING
 - EM EMPTY CONDUIT
 - EDF ELECTRIC DRINKING FOUNTAIN
 - EF EXHAUST FAN - 150 WATT, 120V.
 - EG EQUIPMENT GROUND
 - EM EMERGENCY LIGHT, BYPASS LOCAL SWITCHING AND PROVIDED BATTERY PACK.
 - FC FAN COIL UNIT.
 - GFCI GROUND FAULT CIRCUIT INTERRUPTER
 - GFP GROUND FAULT PROTECTION
 - GND GROUND/BOND CONDUCTOR
 - QWH GAS WATER HEATER
 - IAW IN ACCORDANCE WITH
 - IG ISOLATED GROUND
 - MCC MAIN CIRCUIT BREAKER
 - MCC MOTOR CONTROL CENTER
 - MLO MAIN LOG ONLY
 - N NEW ITEM
 - NL NEW LOCATION OF RELOCATED EXISTING ITEM
 - NH NIGHT LIGHT, BYPASS LOCAL SWITCHING.
 - PNL PANELBOARD
 - R EXISTING TO BE RELOCATED
 - SER SERVICE ENTRANCE SECTION
 - SRP SALT RIVER PROJECT - (UTILITY CO.)
 - SWBD SWITCHBOARD
 - TMB 3/4" PLYWOOD TELEPHONE MOUNTING BOARD WITH #6 COPPER GROUND.
 - TTC TELEPHONE TERMINAL CABINET (SIZE INDICATED ON DRAWINGS)
 - UFGR CONCRETE ENCASED ELECTRODE
 - UG UNDERGROUND
 - UNO UNLESS NOTED OTHERWISE
 - VA VOLT AMPERES
 - W WATT
 - WG WIRE GUARD
 - WH WATER HEATER
 - WP WEATHERPROOF (RAIN TIGHT) NEMA 3R OR NEMA 4
 - X EXISTING TO BE REMOVED
 - XP EXPLOSION PROOF

- I.0 INTENT**
- FURNISH AND INSTALL A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM IN ACCORDANCE WITH PLANS AND SPECIFICATIONS
- ALL DRAWINGS ARE SCHEMATIC IN NATURE AND THE REQUIRED INSTALLATION IS NOT LIMITED TO WHAT IS SHOWN. ALL APPEARANCES NECESSARY TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM MUST BE INCLUDED IN THE CONTRACTORS BID AND WORK.

- 2.0 GENERAL**
- THE CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS WHICH MAY AFFECT HIS BID OR WORK. NO ALLOWANCES WILL BE MADE FOR EXISTING CONDITIONS OR THE CONTRACTORS FAILURE TO ACCOMMODATE EXISTING CONDITIONS ON HIS BID.
- IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN CLARIFICATION OF ANY APPARENT CONFLICT OR INCONSISTENCY IN THE DRAWINGS, SPECIFICATION, OR DESIGN, PRIOR TO HIS BID AND IN WRITING WITH THE ENGINEER. OTHERWISE THE CONTRACTOR ACCEPTS RESPONSIBILITY TO CORRECT (AT HIS COST) ANY SUCH ITEMS THAT MEET THE INTENT AS INTERPRETED BY THE ENGINEER.
- ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE MOST RECENT EDITIONS OF THE NFPA, NATIONAL ELECTRIC CODE, U.S.C., APPLICABLE CITY AND STATE CODES AND ORDINANCES, THE AMERICANS WITH DISABILITIES ACT, E.P.A. REGULATIONS (INCLUDING EPACT 1992), AND UTILITY COMPANY REQUIREMENTS. THE FOREGOING CODES AND REGULATIONS ARE INCORPORATED IN THIS SPECIFICATION FOR THE CONTRACTORS REFERENCE.
- THE CONTRACTOR SHALL COORDINATE AND PROVIDE INFORMATION AS REQUIRED TO ALL SERVING UTILITIES IN A TIMELY MANNER AS NECESSARY TO PROVIDE THE SERVICE REQUIRED AND MEET UTILITY REQUIREMENTS. IMMEDIATE COORDINATION WILL BE REQUIRED FOR MOST PROJECTS. FIELD COORDINATE ALL REQUIREMENTS PRIOR TO TRENCHING.
- REFER TO ARCHITECTURAL, MECHANICAL, CIVIL, STRUCTURAL, AND/OR EQUIPMENT SUPPLIERS DRAWINGS AND SPECIFICATIONS FOR EXACT EQUIPMENT LOCATIONS, LOADS AND ADDITIONAL REQUIREMENTS. REPRESENTATIONS OF THE WORK SPECIFIC TO THE PROJECT ARE SHOWN ON THE ELECTRICAL DRAWINGS FOR CLARITY ONLY.
- THE CONTRACTOR ASSUMES RESPONSIBILITY FOR ALL EQUIPMENT HE SUPPLIES. ALL EQUIPMENT SHALL BE INSTALLED STRICTLY PER MANUFACTURERS RECOMMENDATIONS. OTHERWISE THE CONTRACTOR ASSUMES RESPONSIBILITY (AT HIS COST) TO CORRECT AND REMEDY ANY INSTALLATION NOT IN COMPLIANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND INTENTIONS AS INTERPRETED BY THE ENGINEER.
- ANY VARIANCE OR EXCEPTIONS TO THE DRAWINGS AND SPECIFICATIONS MUST BE CONFIRMED AND APPROVED BY THE ENGINEER. APPROVALS WILL ONLY BE PROVIDED WHEN THE ENGINEER DETERMINES THIS TO BE JUSTIFIED AND MUST BE CONTAINED IN WRITING TO BE FINAL.
- THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL NECESSARY PERMITS, VARIANCES, AND APPROVALS, ETC. (AT HIS COST) WHICH MAY BE REQUIRED FOR COMPLETION OF THIS WORK.
- PRIOR TO ROUGH-IN, THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL LIGHT FIXTURES AND WIRING DEVICES; TO INCLUDE MOUNTING HEIGHT AND LOCATIONS. ALL CONDUITS SHALL BE REPORTED TO THE ENGINEER/ARCHITECT.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE EQUIPMENT AND SUPPORT FOR PROGRESS AND FINAL INSPECTIONS. THIS INCLUDES COMPLETE ACCESS TO ALL EQUIPMENT, ADDITIONAL SPARE FUSES FOR ALL SPARE FUSES FOR ALL SPARE CIRCUITS AND SIX ADDITIONAL ALL LIGHT BULBS PROVIDED IN FIXTURES (TO A MAXIMUM OF 15 FOR EACH STYLE) SHALL BE PROVIDED TO THE OWNER AT FINAL INSPECTION.

- 3.0 MATERIALS AND METHODS**
- THE USE OF EMT IS ACCEPTABLE IN ACCORDANCE WITH NEC ARTICLE "ELECTRICAL METALLIC TUBING". EMT SHALL NOT BE USED WHERE IT IS SUBJECT TO SEVERE PHYSICAL DAMAGE. EMT FITTINGS SHALL BE COMPRESSION TYPE (FOR LARGE PROTECT) OR SET SCREW TYPE (FOR SMALL TENANT IMPROVEMENTS) WITH A CODE SIZED COPPER BOND WIRE. MINIMUM TRADE CONDUIT SIZE IS 1/2" AND 3/4" FOR HOME RUNS.
- CONDUCTORS SHALL BE 600V COPPER (OR S CONDUCTIVITY), MINIMUM LINE VOLTAGE WIRE SIZE IS #12 A.W.G. #6 AND SMALLER SHALL HAVE THIN/THIN INSULATION. #4 AND LARGER SHALL HAVE MINIM/THIN-2 INSULATION. ALL CONDUCTORS SHALL HAVE #0 RATED INSULATION. ALL 120V, 20A BRANCH CIRCUIT CONDUCTORS (#12) OVER 100' IN LENGTH TO BE #12S/CONC/AL OR 277V, 20A BRANCH CIRCUIT CONDUCTORS (#10) OVER 200' IN LENGTH TO BE #10'S MINIMUM.
- WHEN SEPARATE BRANCH CIRCUIT NEUTRAL CONDUCTORS ARE USED WITH EACH PHASE CONDUCTOR OR SYSTEMS FURNITURE IS INDICATED, THE MINIMUM NEUTRAL CONDUCTOR SIZE SHALL BE #10 A.W.G. STANDARD COPPER.
- ALL WIRING DEVICES SHALL BE SPECIFICATION GRADE, (MINIMUM 20 AMPS RATED FOR RECEPTABLES AND SWITCHES), PASS A SEMI-CONDUCTOR, BRYANT, OR LEVITON ARE ACCEPTABLE. ALL SPECIAL RECEPTABLES AND GROUND FAULT PROTECTION DEVICES MUST BE PERMANENTLY MARKED WITH ENGRAVED COVER PLATES. INDICATE USE AND CIRCUIT NUMBER.
- COVER PLATES AND DEVICES SHALL BE PHENOLIC PLASTIC (WHITE OR COLOR SELECTED BY ARCHITECT) OR ALUMINUM (WHITE OR UNFINISHED). UNFINISHED STEEL IN WAREHOUSE/INDUSTRIAL/MANUFACTURING AREAS OR AREAS SUBJECT TO PHYSICAL ABUSE.
- ALL CONDUCTORS TO BE CONCEALED EXCEPT TO SURFACE MOUNTED PANELS AND AT PERPENDICULAR TO BUILDING AREAS. CONDUITS WILL BE RUN PARALLEL OR PERPENDICULAR TO STRUCTURE LINES.
- LIQUID TIGHT FLEXIBLE METAL CONDUIT (SEE LIST) SHALL BE USED FOR CONNECTIONS TO EQUIPMENT SUBJECT TO VIBRATION (E.G. MOTORS).
- THE USE OF MC-CABLE IS ACCEPTABLE (UPON OWNER NOTIFICATION AND APPROVAL) AND MAY BE USED IN ACCORDANCE WITH NEC ARTICLE "METAL-CLAD CABLE TYPE MC". BUT LIMITED TO USE FOR CONCEALED BRANCH CIRCUITS ONLY. ADDITIONALLY MC-CABLE MAY ALSO BE USED FOR HOME RUNS, OUTDOORS, AND MEDICAL/DENTAL ENVIRONMENTS.
- NON-METALLIC CONDUIT (SCHEDULE 40) MAY BE USED ONLY IN OR UNDER SLABS AND IN CONCRETE OR MASONRY WALLS. CARLON IS ACCEPTABLE.
- FUSES SHALL BE BUSSMAN, LITTELFUSE, OR COULD SHAWMUT.
- CONDUCTORS WILL BE SOLID AND/OR STRANDED WITH INSULATION CONTINUOUSLY COLOR CODED UP TO AND INCLUDING SIZE #6 A.W.G. GROUNDING/BONDING CONDUCTORS SHALL BE UL LISTED ROPPE STRAND.
- CONNECTIONS OR SPLICES SHALL BE EXOTHERMIC WELD (CND WELD OR THOMAS AND BETTS FUSEDWELD) FOR GROUNDING/BONDING CONDUCTORS.
- CONDUCTORS SHALL BE CONTINUOUS, HYDRAULIC CRIMP SPLICES OR CONNECTIONS ARE EXCEPTIONS AND REQUIRE SPECIFIC APPROVAL IN WRITING BY HAWKINS DESIGN GROUP.
- ALL CONDUIT SUPPORT SYSTEMS SHALL BE INSTALLED ON THE BUILDING STRUCTURE, UNSTRUT, BEZEL, SUPERSTRUT STEEL, CITY SPRING STEEL FASTENERS OR CADDED MOUNTING SYSTEMS ARE ACCEPTABLE, NO CONDUIT WILL BE SUPPORTED BY CEILING WRES, THE WIRE OR GRID SYSTEM, PERFORATED STRIPS OR OTHER PIPING AND CONDUIT STRAPS ARE NOT ACCEPTABLE SUPPORTS.
- ACCEPTABLE MANUFACTURERS FOR SWITCH GEAR, DISTRIBUTION GEAR AND RELATED COMPONENTS ARE: SQUARE D, AEGE TRANSFORMERS, GENERAL ELECTRIC, SIEMENS, AND CUTLER-HAMMER.
- CONDUCTORS SHALL BE COLOR CODED FOR BRANCH CIRCUITS AND PHASE LEGS OF FEEDERS TO PANEL BOARDS, SWITCHBOARDS, ETC. IN ACCORDANCE WITH NEC AND LOCAL MUNICIPAL REQUIREMENTS. SPECIFIC REQUIREMENTS INCLUDE THE FOLLOWING:
- 120V-1/20-V, 3-PHASE, 4-WIRE, GROUNDING NEUTRAL-WHITE; PHASE A-BLACK; PHASE B-RED; PHASE C-BLUE.
 - 240/120-V, 3 WIRE, SINGLE PHASE CIRCUIT; GROUNDING NEUTRAL-WHITE; PHASE A-BLACK; PHASE B-RED.
 - 240-V DELTA, 3-PHASE, 3-WIRE; PHASE A-BLACK; PHASE B-RED; PHASE C-BLUE.
 - 240/120-V, 3-PHASE, 4-WIRE, HIGH-LEG DELTA; GROUNDING NEUTRAL-WHITE; HIGH LEG (208-V TO NEUTRAL)-ORANGE; PHASE A-BLACK; PHASE B-BLUE.
 - 480Y/277-V, 3-PHASE, 4-WIRE, GROUNDING NEUTRAL-GRAY; PHASE A-BROWN; PHASE B-BROWN; PHASE C-YELLOW.
 - 480-V DELTA, 3-PHASE, 3-WIRE; PHASE A-BROWN; PHASE B-ORANGE; PHASE C-YELLOW.
 - EQUIPMENT GROUNDING CONDUCTORS-ORANGE; ISOLATED GROUNDING-GREEN WITH A YELLOW STRIPE.
- ALL INSTALLATIONS WITHIN PLenum RATED CEILING SPACE SHALL BE IN ACCORDANCE WITH ARTICLE "WIRING METHODS" WITH REGARD TO SMOKE DEVELOPMENT AND FLAME SPREAD.

- 4.0 SUBMITTALS**
- SUBMIT 4 SETS OF SHOP DRAWINGS AND SAMPLES FOR ALL EQUIPMENT PRIOR TO ORDERING IN A TIMELY MANNER. SUBMITTALS SHALL INCLUDE LIGHT FIXTURES (INCLUDING LIGHT POLES), SWITCHBOARDS, PANELBOARDS, BREAKERS, STARTERS, HVAC ELECTRICAL EQUIPMENT AND TRANSFORMERS.
- SHOP DRAWINGS SHALL INCLUDE LAYOUT DIMENSIONS AND IDENTIFICATION OF SPECIFIC EQUIPMENT FOR INSTALLATION. MINIMUM NEC CLEARANCES SHALL BE MAINTAINED.
- THE CONTRACTOR SHALL INCLUDE COMPARISON DATA AND SAMPLES FOR BOTH THE SUBSTITUTE AND SPECIFIED ITEMS WHEN SUBSTITUTIONS ARE PROPOSED. THE CONTRACTOR REMAINS RESPONSIBLE TO PROVIDE THE ORIGINALLY SPECIFIED INSTALLATION IN ACCORDANCE WITH THE ORIGINAL DELIVERY DATE (AT HIS COST) WHEN SUBSTITUTIONS ARE NOT APPROVED.
- THE CONTRACTOR SHALL PROVIDE PROOF OF PERFORMANCE BOND WITH HIS INITIAL SUBMITTALS (E.G. SHOP DRAWINGS) TO INCLUDE WARRANTY FOR THE WARRANTY PERIOD (2 YEARS).
- THE CONTRACTOR SHALL SUBMIT COMPLETE AND ACCURATE "AS BUILT" DRAWING TO THE OWNER AND ENGINEER WITHIN 2 WEEKS OF COMPLETION. PROVIDE 4 SETS OF BLUELINES OR REPRODUCEABLES. FAILURE TO COMPLY WILL RESULT IN WITHHOLDING OF PAYMENTS, AND ASSESSMENT OF CHARGES (AGAINST THE CONTRACTOR) FOR AS-BUILT DEVELOPMENT BY THE ENGINEER AT THE CURRENT HOURLY RATE.
- PROVIDE A LETTER TO THE OWNER AND ENGINEER CERTIFYING ALL EQUIPMENT AND TERMINALS ARE PROPERLY TIGHTED. THIS CERTIFICATION SHALL BE EXECUTED BY A LICENSED CONTRACTOR, AND WRITTEN CERTIFICATION PROVIDED ON COMPANY LETTERHEAD.
- PROVIDE 2 COPIES OF ALL MANUFACTURER/SUPPLIER WARRANTIES AND GUARANTEES TO THE OWNER WITHIN 2 WEEKS OF FINAL ACCEPTANCE BY THE OWNER.

- 5.0 WARRANTY**
- THE CONTRACTOR SHALL GUARANTEE ALL MATERIAL AND/OR WORKMANSHIP FURNISHED BY HIM UNDER THIS CONTRACT FOR A PERIOD OF 24 MONTHS FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. ANY DEFECTS DEVELOPING DURING THE WARRANTY PERIOD SHALL BE CORRECTED AT HIS COST. MATERIALS OR WORKMANSHIP SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.
- THE OWNER RETAINS THE RIGHT TO REMOVE AND REINSTALL (AT ANY TIME) ANY MATERIAL OR EQUIPMENT NOT IN COMPLIANCE WITH THE PROVISIONS AND STANDARDS OF THESE DRAWINGS AND SPECIFICATIONS. NO CLAIM FOR ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK PERFORMED IN THIS REGARD.
- THE CONTRACTOR AGREES TO TRANSFER ALL MANUFACTURER/SUPPLIER WARRANTIES AND GUARANTEES TO THE OWNER. THIS INCLUDES COMPLETION OF ALL DOCUMENTATION FOR THE MANUFACTURER/SUPPLIER.
- 6.0 SERVICE**
- IF THE CONTRACTOR INSTALLS NEW SERVICE SECTION AS SHOWN ON DRAWINGS, S.E.S. SHALL BEAR UL LABEL, HAVE COPPER BUSSING - SILVER PLATED, AND AMPERAGE RATING AS SHOWN ON DRAWINGS. ALL SERVICE SECTION SHALL BE BARRIRED FROM OTHER WORK AND APPROVED BY BOTH THE LOCAL UTILITY COMPANY AND AUTHORITY HAVING JURISDICTION.
- GROUND FAULT PROTECTION SHALL BE PROVIDED FOR SERVICES (480V L-L) WITH DISCONNECTS 1000A OR GREATER.
- GROUND FAULT PROTECTION ON MAINS AND SUB-MAINS MUST HAVE AUDIBLE/VISIBLE ALARMS.
- ENCLOSURES SHALL MEET UL AND PUBLIC UTILITY REQUIREMENTS-PHYSICALLY BARRIRED FROM SERVICES, LINE, BOTH BARRIRED.
- NO COVERS GREATER THAN 1/32 HEIGHT OF EQUIPMENT.
- FULL SIZED NEUTRAL BUSSING AND FULLY RATED (NON-TAPERED) BUSSING WILL BE STANDARD. THIS INCLUDES MAXIMUM RATINGS FOR SUPPLY AND SECTION (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z) AREAS WITH NEUTRALS. GFCI ON AMBIENT SUPPLY BUSSES SHALL BE MAXIMUM RATED ON EITHER SIDE OF THE FEED. ALL SPACE WILL BE FULLY BUSSED FOR FUTURE AIR HANDLING GRILLES.
- ALL SERVICES SHALL BE UL LISTED FOR FRONT ACCESSIBILITY ONLY.
- ALL SERVICE SECTIONS SHALL BE OF A CONSISTENT HEIGHT AND INCLUDE PROTECTION OF OPERATIONAL DEVICES AND METERS FROM PHYSICAL DAMAGE.
- PROVIDE CONCRETE HOUSEKEEPING PADS FOR ALL FREESTANDING ELECTRICAL SERVICE ENTRANCE EQUIPMENT PER LOCAL UTILITY COMPANY SPECIFICATIONS.
- PROVIDE CONCRETE HOUSEKEEPING PADS FOR ALL FREESTANDING ELECTRICAL SERVICE ENTRANCE EQUIPMENT PER LOCAL UTILITY COMPANY SPECIFICATIONS.

- 6.1.1.1 ANALYSIS**
- ANALYZE THE SHORT CIRCUIT CALCULATIONS AND HIGHLIGHT ANY EQUIPMENT OR CONDITIONS THAT REQUIRE ADDITIONAL PROTECTION OR COORDINATION. PROPOSE APPROACHES TO EFFECTIVELY PROTECT THE UNDERBATED EQUIPMENT. LIMITED BY THE DEFINITION, ALL WIRING MODIFICATIONS WILL BE TAKEN UNDER ADVICE BY THE ENGINEER AND THE CONTRACTOR WILL BE GIVEN FURTHER INSTRUCTIONS.
- 6.1.1.2 REPORT**
- SCOPE OF THE MANUFACTURER TIME CURRENT CURVES FOR THE DEVICES STUDIED AND PLOTTED ON THE TIME CURRENT CURVES.
- ACCEPTABLE MANUFACTURERS FOR PANELBOARDS, SWITCHBOARDS, AND TRANSFORMERS SHALL BE PER SECTION 3.15 OF THIS SPECIFICATION. TRANSFORMERS 15 KVA AND ABOVE SHALL BE 1500V TEMPERATURE RISE ABOVE 40°C AMBIENT. ALL INSULATING MATERIALS TO BE IN ACCORDANCE WITH NEMA 210-1972 STANDARDS FOR A 200V UL COMPONENT RECOGNIZED INSULATION SYSTEM. SINGLE PHASE TRANSFORMERS 15 KVA THROUGH 100 KVA AND THREE PHASE TRANSFORMERS THROUGH 45 KVA SHALL BE DESIGNED SO THEY CAN BE EITHER FLOOR OR WALL MOUNTED. THE TRANSFORMER PROPER PRIMARY/SECONDARY RATIO, AMBIENT COMPENSATED, RED RUNNING LIGHT, HAND-OFF-AUTO, ACROSS THE LINE STARTERS TO 25HP, WILL BE PROVIDED WITH EACH MOTOR AS SHOWN ON THE DRAWING (ONE HORSERPOWER TO 25 HP.).
- LABEL ALL PANELS/TRANSFORMERS/DISCONNECTS WITH "WARNING" - ELECTRICAL EQUIPMENT - DANGER - QUALIFIED PERSONNEL ONLY TO OPERATE ON OPEN EQUIPMENT.
- DISCONNECT SWITCHES WILL BE COMMERCIAL-DUTY, QUICK-MAKE, QUICK-BREAK, RATED IN ACCORDANCE WITH NEMA 3R GASKETED, 400A, NEMA 12, OR NEMA 7 AS APPLICABLE WITH FUSES PER DRAWING.
- MANUAL MOTOR STARTERS WITH THERMAL OVERLOADS WILL BE PROVIDED FOR FRACTIONAL HORSEPOWER MOTORS 1/2 HP OR GREATER. SQUARE "D" CLASS 2510, 2511, 2512, AMBIENT COMPENSATED AS REQUIRED.
- MAGNETIC MOTOR STARTERS WITH THERMAL OVERLOADS, (2) AUXILIARY CONTACT SWITCHES, INTERNAL LINE VOLTAGE TO 24 VOLT TRANSFORMER (250VA MIN) WITH PROPER PRIMARY/SECONDARY RATIO, AMBIENT COMPENSATED, RED RUNNING LIGHT, HAND-OFF-AUTO, ACROSS THE LINE STARTERS TO 25HP, WILL BE PROVIDED WITH EACH MOTOR AS SHOWN ON THE DRAWING (ONE HORSERPOWER TO 25 HP.).
- CONTROL PANELS**
- CONTROL PANELS SHALL HAVE A WITHSTAND RATING OF 10,000 AMPS FOR .5 SEC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS.

- 6.0 LIGHT FIXTURES**
- FURNISH AND INSTALL ALL LIGHTING FIXTURES COMPLETE WITH LAMPS, WHIPS AND ACCESSORIES. ALL RECESSED FIXTURES WILL BE RATED FOR USE IN ANY CEILING APPLICATIONS AND BE THERMALLY PROTECTED.
- MOUNTING TYPE AND VOLTAGE OF FIXTURES IS THE RESPONSIBILITY OF THE CONTRACTOR. (4) EMBEDED WITH NEARBY MINIMUM 1/2" FROM FUTURE MOUNTED GRID OR FLANGE TYPE CEILING. FLUORESCENT FIXTURE LENSES WILL BE 100% ACRYLIC, 1/2" THICK MINIMUM.
- FIXTURES TO BE INSTALLED IN SYMMETRICAL MANNER FREE FROM LIGHT LEAKS AND LAY-LINES OR REFLECTORS.
- ALL DAY-LN FIXTURES IN ACCUSTICAL CEILING SYSTEMS WILL BE INSTALLED PER U.B.C. STANDARD. VERIFY WITH LOCAL BUILDING AUTHORITY.
- SUPPORT FIXTURES PER IBC WITH TWO LOOSE SIZE #9 WIRES TO STRUCTURES ON OPPOSITE CORNERS AND 2 TAUGHT SIZE #8 WIRE TO STRUCTURE AT CORNERS AND/OR FIXTURE SHALL BE FASTENED BY SCREWS INTO T-BAR RUNNERS IN ACCORDANCE WITH LOCAL AUTHORITY HAVING JURISDICTION.
- LAMPS**
- LAMP LAMPS SHALL BE:
- 8.5.1 T8-3500 KELVIN TEMPERATURE UNLESS NOTED OTHERWISE.
 - 8.5.2 70 CR (COLOR RENDERING INDEX) MINIMUM.
- H.L.D. LAMPS:
- 8.5.3 AS NOTED ON PLANS.
 - 8.5.4 INCANDESCENT LAMPS.
 - 8.5.4 120V. FOR ALL "A" TYPE BASES.
- BALLASTS**
- BALLASTS SHALL BE:
- 8.6.1
 - 8.6.1.1 HIGH POWER FACTOR, UL LISTED, CBM CERTIFIED AND ETL TESTED.
 - 8.6.1.2 HAVE A SOUND RATING OF "A"
 - 8.6.1.3 HAVE THE 100% FACTOR OFFICE ENVIRONMENT.
 - 8.6.1.4 HAVE FUSE START TECHNOLOGY.
 - 8.6.2 FLUORESCENT BALLASTS SHALL:
 - 8.6.2.1 START RELIABLY DOWN TO AT LEAST 60°F (0°F WHEN INDICATED AS OR OUTDOORS)
 - 8.6.2.2 BE RATED FOR AN AMBIENT OF AT LEAST 140°F.
 - 8.6.2.3 ELECTRONIC TYPE
 - 8.6.3
 - 8.6.3.1 START RELIABLY DOWN TO AT LEAST - 20°F.
 - 8.6.3.2 BE RATED FOR AN AMBIENT OF AT LEAST 131°F.
 - 8.6.3.3 POTTED AND NOT FOR OFFICE ENVIRONMENT.
 - 8.6.3.4 HAVE FUSE START TECHNOLOGY.
 - 8.6.4 ELECTRONIC DIMMING BALLAST SHALL:
 - 8.6.4.1 WITHSTAND SURGES AS SPECIFIED IN ANSI C82.41.
 - 8.6.4.2 PREHEAT LAMP CATHODES BEFORE APPLYING ARC VOLTAGE.
 - 8.6.4.3 INTERNALLY LIMIT INRUSH CURRENT TO NOT EXCEED THREE AMPS AT 277 VOLTS OR SEVEN AMPS AT 120 VOLTS.
 - 8.6.4.4 BE UL LISTED AND CLASS P THERMALLY PROTECTED.
 - 8.6.4.5 BE INAUDIBLE IN A 27dB AMBIENT THROUGHOUT THE DIMMING RANGE.
 - 8.6.4.6 ELECTRONIC DIMMING BALLASTS SHALL HAVE A DIMMING RANGE FROM 10% TO 100% ILLUMINANCE LEVELS.
 - 8.6.4.7 ACCEPTABLE BALLAST MANUFACTURERS ARE: ADVANCE, MOTOROLA, LUTRON, HONEYWELL AND MAGNETEK.

- SOME SPECIFICATIONS MAY NOT BE USED FOR THIS PROJECT.**
- THE FOLLOWING SPECIFIC INFORMATION SHALL ALSO BE SHOWN ON THE COORDINATION CURVES AND CURRENT RATIO CURVES:
1. DEVICE IDENTIFICATIONS.
 2. TIME AND CURRENT RATIO FOR RELAYS.
 3. FUSE, CIRCUIT BREAKER, AND CURVE CURVES, SHOWING COMPLETE OPERATING BANDS OF LOW VOLTAGE CIRCUIT BREAKER TRIP CURVES.
 4. LOW VOLTAGE EQUIPMENT CIRCUIT BREAKER TRIP DEVICES, INCLUDING MANUFACTURERS TOLERANCE BANDS.
 5. PERTINENT TRANSFORMER FULL-LOAD CURRENTS AT 100 AND 600 PERCENT.
 6. GROUND FAULT PROTECTIVE DEVICE SETTINGS.
 7. OTHER SYSTEM LOAD PROTECTIVE DEVICES FOR LARGEST BRANCH CIRCUIT OR FEEDER CIRCUIT BREAKER IN EACH MOTOR CONTROL CENTER AND PANELBOARD.
- DEVELOP A TABLE TO SUMMARIZE THE SETTINGS SELECTED FOR THE PROTECTIVE DEVICES AS INDICATED IN TABLE THE FOLLOWING:
1. DEVICE IDENTIFICATIONS.
 2. CURRENT TRANSFORMER RATIO, RELAY TAP, TIME DELAY AND INSTANTANEOUS CIRCUIT BREAKER SENSOR RATING, LONG-TIME, SHORT-TIME AND INSTANTANEOUS SETTINGS AND TIME BANDS.
 3. FUSE RATING AND TYPE.
 4. GROUND FAULT PICKUP AND TIME DELAY.

- 6.1.1.3 ANALYSIS**
- ANALYZE THE SHORT CIRCUIT CALCULATIONS AND HIGHLIGHT ANY EQUIPMENT OR CONDITIONS THAT REQUIRE ADDITIONAL PROTECTION OR COORDINATION. PROPOSE APPROACHES TO EFFECTIVELY PROTECT THE UNDERBATED EQUIPMENT. LIMITED BY THE DEFINITION, ALL WIRING MODIFICATIONS WILL BE TAKEN UNDER ADVICE BY THE ENGINEER AND THE CONTRACTOR WILL BE GIVEN FURTHER INSTRUCTIONS.
- 6.1.1.4 REPORT**
- SCOPE OF THE MANUFACTURER TIME CURRENT CURVES FOR THE DEVICES STUDIED AND PLOTTED ON THE TIME CURRENT CURVES.
- ACCEPTABLE MANUFACTURERS FOR PANELBOARDS, SWITCHBOARDS, AND TRANSFORMERS SHALL BE PER SECTION 3.15 OF THIS SPECIFICATION. TRANSFORMERS 15 KVA AND ABOVE SHALL BE 1500V TEMPERATURE RISE ABOVE 40°C AMBIENT. ALL INSULATING MATERIALS TO BE IN ACCORDANCE WITH NEMA 210-1972 STANDARDS FOR A 200V UL COMPONENT RECOGNIZED INSULATION SYSTEM. SINGLE PHASE TRANSFORMERS 15 KVA THROUGH 100 KVA AND THREE PHASE TRANSFORMERS THROUGH 45 KVA SHALL BE DESIGNED SO THEY CAN BE EITHER FLOOR OR WALL MOUNTED. THE TRANSFORMER PROPER PRIMARY/SECONDARY RATIO, AMBIENT COMPENSATED, RED RUNNING LIGHT, HAND-OFF-AUTO, ACROSS THE LINE STARTERS TO 25HP, WILL BE PROVIDED WITH EACH MOTOR AS SHOWN ON THE DRAWING (ONE HORSERPOWER TO 25 HP.).
- LABEL ALL PANELS/TRANSFORMERS/DISCONNECTS WITH "WARNING" - ELECTRICAL EQUIPMENT - DANGER - QUALIFIED PERSONNEL ONLY TO OPERATE ON OPEN EQUIPMENT.
- DISCONNECT SWITCHES WILL BE COMMERCIAL-DUTY, QUICK-MAKE, QUICK-BREAK, RATED IN ACCORDANCE WITH NEMA 3R GASKETED, 400A, NEMA 12, OR NEMA 7 AS APPLICABLE WITH FUSES PER DRAWING.
- MANUAL MOTOR STARTERS WITH THERMAL OVERLOADS WILL BE PROVIDED FOR FRACTIONAL HORSEPOWER MOTORS 1/2 HP OR GREATER. SQUARE "D" CLASS 2510, 2511, 2512, AMBIENT COMPENSATED AS REQUIRED.
- MAGNETIC MOTOR STARTERS WITH THERMAL OVERLOADS, (2) AUXILIARY CONTACT SWITCHES, INTERNAL LINE VOLTAGE TO 24 VOLT TRANSFORMER (250VA MIN) WITH PROPER PRIMARY/SECONDARY RATIO, AMBIENT COMPENSATED, RED RUNNING LIGHT, HAND-OFF-AUTO, ACROSS THE LINE STARTERS TO 25HP, WILL BE PROVIDED WITH EACH MOTOR AS SHOWN ON THE DRAWING (ONE HORSERPOWER TO 25 HP.).
- CONTROL PANELS**
- CONTROL PANELS SHALL HAVE A WITHSTAND RATING OF 10,000 AMPS FOR .5 SEC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS.

- 6.0 LIGHT FIXTURES**
- FURNISH AND INSTALL ALL LIGHTING FIXTURES COMPLETE WITH LAMPS, WHIPS AND ACCESSORIES. ALL RECESSED FIXTURES WILL BE RATED FOR USE IN ANY CEILING APPLICATIONS AND BE THERMALLY PROTECTED.
- MOUNTING TYPE AND VOLTAGE OF FIXTURES IS THE RESPONSIBILITY OF THE CONTRACTOR. (4) EMBEDED WITH NEARBY MINIMUM 1/2" FROM FUTURE MOUNTED GRID OR FLANGE TYPE CEILING. FLUORESCENT FIXTURE LENSES WILL BE 100% ACRYLIC, 1/2" THICK MINIMUM.
- FIXTURES TO BE INSTALLED IN SYMMETRICAL MANNER FREE FROM LIGHT LEAKS AND LAY-LINES OR REFLECTORS.
- ALL DAY-LN FIXTURES IN ACCUSTICAL CEILING SYSTEMS WILL BE INSTALLED PER U.B.C. STANDARD. VERIFY WITH LOCAL BUILDING AUTHORITY.
- SUPPORT FIXTURES PER IBC WITH TWO LOOSE SIZE #9 WIRES TO STRUCTURES ON OPPOSITE CORNERS AND 2 TAUGHT SIZE #8 WIRE TO STRUCTURE AT CORNERS AND/OR FIXTURE SHALL BE FASTENED BY SCREWS INTO T-BAR RUNNERS IN ACCORDANCE WITH LOCAL AUTHORITY HAVING JURISDICTION.
- LAMPS**
- LAMP LAMPS SHALL BE:
- 8.5.1 T8-3500 KELVIN TEMPERATURE UNLESS NOTED OTHERWISE.
 - 8.5.2 70 CR (COLOR RENDERING INDEX) MINIMUM.
- H.L.D. LAMPS:
- 8.5.3 AS NOTED ON PLANS.
 - 8.5.4 INCANDESCENT LAMPS.
 - 8.5.4 120V. FOR ALL "A" TYPE BASES.
- BALLASTS**
- BALLASTS SHALL BE:
- 8.6.1
 - 8.6.1.1 HIGH POWER FACTOR, UL LISTED, CBM CERTIFIED AND ETL TESTED.
 - 8.6.1.2 HAVE A SOUND RATING OF "A"
 - 8.6.1.3 HAVE THE 100% FACTOR OFFICE ENVIRONMENT.
 - 8.6.1.4 HAVE FUSE START TECHNOLOGY.
 - 8.6.2 FLUORESCENT BALLASTS SHALL:
 - 8.6.2.1 START RELIABLY DOWN TO AT LEAST 60°F (0°F WHEN INDICATED AS OR OUTDOORS)
 - 8.6.2.2 BE RATED FOR AN AMBIENT OF AT LEAST 140°F.
 - 8.6.2.3 ELECTRONIC TYPE
 - 8.6.3
 - 8.6.3.1 START RELIABLY DOWN TO AT LEAST - 20°F.
 - 8.6.3.2 BE RATED FOR AN AMBIENT OF AT LEAST 131°F.
 - 8.6.3.3 POTTED AND NOT FOR OFFICE ENVIRONMENT.
 - 8.6.3.4 HAVE FUSE START TECHNOLOGY.
 - 8.6.4 ELECTRONIC DIMMING BALLAST SHALL:
 - 8.6.4.1 WITHSTAND SURGES AS SPECIFIED IN ANSI C82.41.
 - 8.6.4.2 PREHEAT LAMP CATHODES BEFORE APPLYING ARC VOLTAGE.
 - 8.6.4.3 INTERNALLY LIMIT INRUSH CURRENT TO NOT EXCEED THREE AMPS AT 277 VOLTS OR SEVEN AMPS AT 120 VOLTS.
 - 8.6.4.4 BE UL LISTED AND CLASS P THERMALLY PROTECTED.
 - 8.6.4.5 BE INAUDIBLE IN A 27dB AMBIENT THROUGHOUT THE DIMMING RANGE.
 - 8.6.4.6 ELECTRONIC DIMMING BALLASTS SHALL HAVE A DIMMING RANGE FROM 10% TO 100% ILLUMINANCE LEVELS.
 - 8.6.4.7 ACCEPTABLE BALLAST MANUFACTURERS ARE: ADVANCE, MOTOROLA, LUTRON, HONEYWELL AND MAGNETEK.

- 6.0 LIGHT FIXTURES**
- FURNISH AND INSTALL ALL LIGHTING FIXTURES COMPLETE WITH LAMPS, WHIPS AND ACCESSORIES. ALL RECESSED FIXTURES WILL BE RATED FOR USE IN ANY CEILING APPLICATIONS AND BE THERMALLY PROTECTED.
- MOUNTING TYPE AND VOLTAGE OF FIXTURES IS THE RESPONSIBILITY OF THE CONTRACTOR. (4) EMBEDED WITH NEARBY MINIMUM 1/2" FROM FUTURE MOUNTED GRID OR FLANGE TYPE CEILING. FLUORESCENT FIXTURE LENSES WILL BE 100% ACRYLIC, 1/2" THICK MINIMUM.
- FIXTURES TO BE INSTALLED IN SYMMETRICAL MANNER FREE FROM LIGHT LEAKS AND LAY-LINES OR REFLECTORS.
- ALL DAY-LN FIXTURES IN ACCUSTICAL CEILING SYSTEMS WILL BE INSTALLED PER U.B.C. STANDARD. VERIFY WITH LOCAL BUILDING AUTHORITY.
- SUPPORT FIXTURES PER IBC WITH TWO LOOSE SIZE #9 WIRES TO STRUCTURES ON OP