SECTION 260100 ELECTRICAL GENERAL PROVISIONS

A. THE PROVISIONS OF THE INSTRUCTION TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, ALTERNATES, ADDENDA, AND DIVISION 1 ARE A 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 SUBCONTRACTORS SHALL EXAMINE SAME AS WELL AS OTHER DIVISIONS OF THE SPECIFICATIONS WHICH AFFECT WORK UNDER THIS DIVISION.

B. 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.

C. IN THE EVENT OF DISCREPANCIES BETWEEN THE CONTRACT DOCUMENTS (DRAWINGS AND SPECIFICATIONS), THE CONTRACTOR SHALL ADHERE TO THE MORE STRINGENT REQUIREMENT.

D. VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH CONDITIONS AFFECTING THE INSTALLATION. SUBMISSION OF A PROPOSAL SHALL PRESUPPOSE KNOWLEDGE OF SUCH CONDITIONS AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED WHERE EXTRA LABOR OR MATERIALS ARE REQUIRED BECAUSE OF IGNORANCE OF THESE CONDITIONS.

E. DEFINITIONS

1. "CONTRACTOR" AS USED WITHIN THE ELECTRICAL SPECIFICATIONS SHALL REFER TO THE ELECTRICAL CONTRACTOR.

2. "EQUAL" OR "EQUIVALENT" SHALL BE UNDERSTOOD TO MEAN OF THE SAME QUANTITY, SIZE, NUMBER, VALUE, DEGREE, INTENSITY AND THE ITEMS ARE SIMILAR IN ALL RESPECTS. THE ENGINEER WILL MAKE THE FINAL DECISION OF ACCEPTANCE OF THESE ITEMS.

3. "CONTRACT DOCUMENTS" SHALL BE UNDERSTOOD TO ENCOMPASS DRAWINGS AND SPECIFICATIONS FOR ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, ELECTRICAL AND ALL OTHER PERTINENT DISCIPLINES.

4. "PROVIDE" SHALL BE INTERPRETED TO MEAN THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND SUPPLIES INCLUDING TESTS AND INSPECTIONS NECESSARY TO INSTALL, CONNECT, APPLY, ERECT, CONSTRUCT, AND PLACE IN OPERATING CONDITION.

5. "FURNISH" SHALL BE INTERPRETED TO MEAN THE CONTRACTOR SHALL SUPPLY AND DELIVER TO THE JOB SITE SPECIFIED MATERIAL, EQUIPMENT, AND SUPPLIES.

6. "INSTALL" SHALL BE INTERPRETED TO MEAN ASSEMBLING, PLACING, ERECTING, WIRING AND TO MAKE FULLY OPERATIONAL.

F. INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, TRANSPORTATION, INSURANCE, TEMPORARY PROTECTION, SUPERVISION, SERVICES FOR THE PROPER COMPLETION OF ALL ELECTRICAL WORK. ITEMS OMITTED, BUT NECESSARY TO MAKE THE ELECTRICAL SYSTEM COMPLETE AND WORKABLE, SHALL BE UNDERSTOOD TO FORM PART OF THE WORK. SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED AND TURN OVER ALL CERTIFICATES OF APPROVAL TO THE OWNER.

G. TEMPERATURE CONTROLS ARE PROVIDED AND WIRED BY A CONTROLS CONTRACTOR PER MECHANICAL SPECIFICATIONS. LINE VOLTAGE (120 VOLT) CONTROL DEVICES SUCH AS THERMOSTATS AND AQUA STATS THAT CONTROL FRACTIONAL HORSEPOWER, 120V MOTOR SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR AND SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.

H. WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF LOCAL AND STATE CODES AS WELL AS THE NATIONAL ELECTRICAL CODE (NEC), AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

I. AFTER INSTALLATION BUT PRIOR TO ENERGIZATION, PERFORM TESTS FOR GROUNDS, SHORT CIRCUITS AND PROPER FUNCTION. FAULTS IN THE INSTALLATION SHALL BE CORRECTED.

J. PROVIDE NAMEPLATES ON PANEL BOARDS, DISTRIBUTION PANELS, MOTOR STARTERS, SAFETY SWITCHES, CONTROL PANELS, CONTROL DEVICES, JUNCTION AND PULL BOXES. LETTERING SHALL INCLUDE NAME OF EQUIPMENT, HORSEPOWER, VOLTAGE RATING AND SERVICE DESIGNATION. NAMEPLATES SHALL BE LAMINATED PHENOLIC WITH A BLACK SURFACE AND WHITE CORE. NAMEPLATES MAY BE ATTACHED TO WALL ADJACENT TO EQUIPMENT IF AREA FOR ATTACHMENT IS TOO SMALL. IDENTIFICATION WITH A DYMO TYPE INSTRUMENT IS NOT PERMISSIBLE.

K. BEFORE FINAL PAYMENT, DEMONSTRATE TO THE OWNER'S SATISFACTION THE PROPER OPERATION OF EACH OF THE SYSTEMS COMPRISING THIS CONTRACT. INSTRUCT THE OWNER'S MAINTENANCE PERSONNEL IN THE OPERATION AND MAINTENANCE OF ALL ELECTRICAL EQUIPMENT AND CONTROLS.

L. AFTER ALL TESTS HAVE BEEN COMPLETED, CLEAN ALL EQUIPMENT LEAVING EVERYTHING IN WORKING ORDER AT THE COMPLETION OF THIS WORK. ALL ELECTRICAL EQUIPMENT SHALL BE COMPLETELY CLEANED INSIDE AND OUT PRIOR TO INITIAL ENERGIZING.

M. AVOID CUTTING INTO THE WORK OF OTHERS BY USING SLEEVES, INSERTS, CHASES AND SIMILAR ITEMS NECESSARY FOR THE INSTALLATION. EXCEPT WHERE OTHERWISE SPECIFIED OR NOTED ON DRAWINGS, THE ELECTRICAL CONTRACTOR SHALL PERFORM ALL CUTTING AND PATCHING OF THE BUILDING AS REQUIRED TO INSTALL SLEEVES, INSERTS, CONDUITS AND ELECTRICAL EQUIPMENT. PATCHING SHALL BE DONE BY SKILLED MECHANICS. WORK SHALL MATCH THE GENERAL CONSTRUCTION WORK. ALL CUTTING SHALL BE DONE IN A MANNER TO RETAIN THE STRUCTURAL INTEGRITY OF THE UNIT BEING CUT. WHERE EXISTING EQUIPMENT IS REMOVED OR RELOCATED, PATCH TO MATCH THE EXISTING BUILDING FINISHES (WALLS, CEILINGS, FLOORS, ETC.).

N. GUARANTEE ALL WORKMANSHIP AND MATERIALS PROVIDED UNDER THE CONTRACT FOR ONE YEAR AFTER ACCEPTANCE BY THE OWNER AND COMPLETION OF ALL PUNCH LIST ITEMS. REPAIR OR REPLACE ANY DEFECT WITHOUT COST TO THE OWNER.

O. PROVIDE TEMPORARY ELECTRIC SERVICE OF SUFFICIENT CAPACITY TO SUPPLY THE ELECTRIC LIGHT AND POWER REQUIREMENTS OF CONSTRUCTION SITE.

SECTION 260500 BASIC MATERIALS AND METHODS

A. EQUIPMENT AND MATERIAL USED ON THIS PROJECT SHALL BE NEW AND U.L. LABELED FOR THE APPLICATION.

B. DEDICATED EQUIPMENT SPACE SHALL BE PROVIDED FOR PANELBOARDS. PRIOR TO INSTALLING PANELBOARDS AND THEIR ASSOCIATED INCOMING/DISTRIBUTION FEEDERS AND BRANCH CIRCUITS, CONTRACTOR SHALL COORDINATE PANELBOARD LOCATIONS WITH HVAC AND PLUMBING CONTRACTORS TO ENSURE DEDICATED SPACE IS MAINTAINED PER NEC ARTICLE 110.26.

C. CONDUIT SHALL BE RIGID GALVANIZED, OR EMT. ALL OTHER INTERIOR CONDUITS SHALL BE EMT. CONDUITS SHALL BE 3/4" TRADE SIZE MINIMUM, UNLESS OTHERWISE NOTED ON THE DRAWINGS OR IN THESE SPECIFICATIONS.

D. MAKE CONDUIT CONNECTIONS TO MOTORS AND TRANSFORMERS WITH FLEXIBLE METAL CONDUIT, AS SPECIFIED HEREIN, OF THE SAME SIZE AS THE FEEDER CONDUIT, AND MAKE SUCH CONNECTION AS SHORT AS PRACTICAL.

E. WIRE AND CABLE FOR POWER AND LIGHTING FEEDERS LARGER THAN #6AWG SHALL BE COPPER STRANDED 600 VOLT TYPE THHN/THWN OR XHHW COPPER. WIRE AND CABLE FOR POWER AND LIGHTING BRANCH CIRCUITS SHALL BE THHN/THWN COPPER FOR #10 AND SMALLER AND THHW OR XHHW COPPER FOR #8 AND LARGER. MINIMUM WIRE SIZE FOR POWER AND LIGHTING CIRCUITS SHALL BE #12.

F. METAL CLAD (TYPE MC) CABLE OR ARMORED (TYPE AC) CABLE MAY BE UTILIZED, ONLY IF LOCAL JURISDICTION ALLOWS, IN LIEU OF BRANCH CIRCUIT EMT CONDUIT. INSTALLATION OF MC CABLE SHALL COMPLY WITH ARTICLE 330 OF THE NATIONAL ELECTRICAL CODE. ALL BRANCH CIRCUIT HOMERUNS SHALL BE INSTALLED IN TYPE EMT CONDUITS WITHIN THE CEILING SPACE TO RESPECTIVE PANELBOARDS. WIRING SHALL BE AS SPECIFIED ELSEWHERE IN THIS SECTION. A GREEN EQUIPMENT GROUNDING CONDUCTOR SHALL BE PROVIDED IN ALL MC CABLE OR AC CABLE SYSTEMS.

G. ALL BOXES SHALL BE RIGIDLY SUPPORTED FROM BUILDING STRUCTURE INDEPENDENT OF THE CONDUIT SYSTEM. ALL BOXES SHALL BE 4" SQUARE BOXES MINIMUM WITH RAISED COVERPLATE SUITABLE FOR WALL MATERIAL TO ALLOW BOX TO BE FLUSH.

H. LOCAL LIGHT SWITCHES SHALL BE BACK AND SIDE WIRED, 20 AMPERE, 120/277 VOLTS, AC SPECIFICATION GRADE. HUBBELL #HBL-1221 SERIES. APPROVED ALTERNATES: EQUIVALENT SERIES BY PASS & SEYMOUR, LEVITON, BRYANT, AND ARROW HART. COLORS SHALL BE SELECTED BY ARCHITECT.

I. DUPLEX RECEPTACLES SHALL BE "SPECIFICATION GRADE" 20 AMPERES, 125 VOLT, 3 WIRE, GROUNDING TYPE. HUBBELL #HBL 5362. APPROVED ALTERNATES: EQUIVALENT SERIES BY PASS & SEYMOUR, LEVITON, BRYANT, ARROW HART.

J. INDOOR AND OUTDOOR RECEPTACLES, WHERE REQUIRED BY LOCAL CODE, SHALL HAVE INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER OR GROUND FAULT CIRCUIT INTERRUPTER CIRCUIT BREAKER PROTECTION. GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES, WHERE REQUIRED, SHALL BE HUBBELL #GF5362.

K. ALL COVER PLATES SHALL BE SMOOTH HIGH IMPACT COMMERCIAL GRADE THERMOPLASTIC OR SMOOTH NYLON WHITE FINISH. IN UNFINISHED AREAS, USE CADMIUM PLATED, ROUND CORNER, STEEL COVER PLATES FOR SURFACE MOUNTED OUTLET BOXES. BOTH THE WIRING DEVICES AND THE COVER PLATES SHALL BE BY THE SAME MANUFACTURER.

L. SAFETY SWITCHES SHALL BE HEAVY-DUTY UNFUSED OR FUSED AND SHALL BE INSTALLED WHERE INDICATED ON THE DRAWINGS AND/OR WHERE REQUIRED BY CODE AND SHALL BE SUITABLE FOR VOLTAGE AND CURRENT RATING AS SHOWN ON THE DRAWINGS. ACCEPTABLE MANUFACTURERS SHALL BE: SQUARE D, GENERAL ELECTRIC, EATON/CUTLER-HAMMER, OR SIEMENS.

M. ALL CONDUIT PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS SHALL BE PROTECTED BY MATERIALS TESTED IN ACCORDANCE WITH UL1479/ASTM E-814. INSTALLATION SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS AND MAINTAIN THE FIRE RATING OF WALLS AND/OR FLOORS AFFECTED. PROVIDE HILTI C5240 FIRESTOP SEALANT, CSFM LISTING NO. 4060-1200:100, OR EQUIVALENT STATE FIRE MARSHAL APPROVED AND LISTED MATERIAL.

SECTION 260526 GROUNDING AND BONDING

A. GROUND ALL CONDUITS, CABINETS, MOTORS, PANELS, FIXTURES, AND OTHER EXPOSED NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ALL PROVISIONS OF THE NATIONAL ELECTRIC CODE AND LOCAL CODES.

B. GROUNDING OF THE ELECTRICAL SYSTEM SHALL BE BY MEANS OF AN INSULATED GROUNDING CONDUCTOR INSTALLED WITH CIRCUIT CONDUCTORS IN ALL CONDUITS. GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH N.E.C. 250.122 AND SHALL RUN FROM GROUNDING BUS OF SERVING PANEL TO GROUND BUS OF SERVED PANEL, GROUNDING TERMINAL OF RECEPTACLES, LIGHTING FIXTURE HOUSINGS, GROUNDING TERMINAL OF LIGHT SWITCHES OR METAL ENCLOSURES OF SERVED EQUIPMENT.

C. INSTALL BONDING JUMPERS ACROSS ALL BUILDINGS, EXPANSION JOINTS, AND ACROSS CONDUIT EXPANSION FITTINGS.

SECTION 260573 FAULT CURRENT, COORDINATION STUDY, AND ARC FLASH

A. ELECTRICAL CONTRACTOR SHALL CONDUCT A FAULT CURRENT CALCULATION AND COORDINATION STUDY TO ENSURE THE CORRECT AIC RATING OF NEW ELECTRICAL EQUIPMENT INCLUDING SWITCHBOARDS, DISTRIBUTION PANELS, BRANCH CIRCUIT PANELBOARDS, ETC. AND TO DETERMINE THE APPROPRIATE SETTINGS OF ANY ADJUSTABLE BREAKERS. THE RESULTS OF THESE STUDIES SHALL BE SUBMITTED WITH THE ELECTRICAL EQUIPMENT SHOP DRAWINGS.

B. ELECTRICAL CONTRACTOR SHALL PROVIDE AN ARC-FLASH STUDY AND LABEL ALL EQUIPMENT AS REQUIRED PER THE N.E.C.

SECTION 262416 BRANCH CIRCUIT BREAKER PANELS

B. PANELBOARD BUS STRUCTURE AND MAIN LUG/MAIN CIRCUIT BREAKER SHALL HAVE THE CURRENT RATING AS SHOWN ON THE CONTRACT DRAWINGS.

C. PANELBOARD BUSSING SHALL BE COPPER, (TIN-PLATED COPPER).

D. BUS BAR CONNECTIONS SHALL ACCEPT BOLT-ON CIRCUIT BREAKERS. PANELBOARDS SHALL BE DEAD FRONT SAFETY TYPE.

E. BUS BARS SHALL HAVE ANTI-TURN SOLDERLESS LUG CONNECTIONS FOR ATTACHING FEEDERS.

F. PANELBOARDS SHALL BE EQUIPPED WITH CIRCUIT BREAKERS OF THE FRAME & TRIP RATING AS SPECIFIED HEREIN & AS SHOWN ON THE CONTRACT DRAWINGS.

G. WHERE MULTI-POLE CIRCUIT BREAKERS ARE REQUIRED, THEY SHALL BE COMMON TRIP TYPE.

H. ALL PANELBOARDS SHALL BE LOCKABLE AND KEYED ALIKE.

I. PANEL ENCLOSURES SHALL BE AT LEAST 20 INCHES WIDE.

J. CIRCUIT BREAKERS SHALL BE THERMAL MAGNETIC, MOLDED CASE BOLT-ON TYPE.

K. PROVIDE A SEPARATE NEUTRAL CONDUCTOR PROPERLY SIZED FOR EVERY BRANCH CIRCUIT. SHARING OF A NEUTRAL CONDUCTOR BETWEEN MULTIPLE CIRCUITS SHALL NOT BE PERMITTED.

L. BRANCH CIRCUIT PANELBOARDS (AS A COMPLETE UNIT, INCLUDING BREAKERS) SHALL HAVE A MINIMUM SHORT CIRCUIT RATING OF 208(240)/120 - 22,000 AIC FOR BIDDING PURPOSES, UNLESS OTHERWISE NOTED. AIC RATINGS SHALL BE MODIFIED AS REQUIRED TO MEET OR EXCEED THE AVAILABLE FAULT CURRENT AT THEIR CONNECTION POINT(S) AS A RESULT OF THE FAULT CURRENT STUDY REPORT.

M. PANELBOARDS SHALL BE LISTED BY UNDERWRITERS LABORATORIES AND BEAR THE "UL" LABEL. PANELBOARDS SHALL BE MANUFACTURED BY SQUARE D, SIEMENS, GENERAL ELECTRIC, OR EATON/CUTLER-HAMMER.

N. WHEN WORK IS COMPLETE, BALANCE THE CONTINUOUS LOAD ON EACH PHASE OF ALL PANELBOARDS.

O. A GLAZED DIRECTORY FRAME SHALL BE PROVIDED INSIDE THE DOOR AND SHALL BE OF SUFFICIENT SIZE TO GIVE DESCRIPTION OF EACH CIRCUIT. TYPED DIRECTORY CARDS SHALL BE PROVIDED LISTING EACH CIRCUIT SERVED.

P. PROVIDE ENGRAVED NAMEPLATE MATCHING PANELBOARD DESIGNATION ON THE DRAWINGS.

SECTION 262413 CIRCUIT BREAKER DISTRIBUTION PANELS

A. DISTRIBUTION PANELBOARD BUS STRUCTURE AND MAIN LUGS/MAIN CIRCUIT BREAKER SHALL HAVE THE CURRENT RATING AS SHOWN ON THE CONTRACT DRAWINGS. BUS BAR CONNECTION SHALL ACCEPT BOLT-ON CIRCUIT BREAKERS.

B. DISTRIBUTION PANELBOARD SHALL BE OF THE FULLY RATED DEAD FRONT SAFETY TYPE.

C. BUS BARS SHALL HAVE ANTI-TURN SOLDERLESS LUG CONNECTIONS FOR ATTACHING FEEDERS.

D. PROVIDE DISTRIBUTION PANELBOARD EQUIPPED WITH CIRCUIT BREAKERS OF THE FRAME AND TRIP RATING AS SPECIFIED HEREIN AND AS SHOWN ON THE CONTRACT DRAWINGS.

E. WHERE MULTI-POLE CIRCUIT BREAKERS ARE REQUIRED, THEY SHALL BE COMMON TRIP TYPE.

F. ALL PANELBOARDS SHALL BE LOCKABLE AND KEYED ALIKE.

G. DISTRIBUTION PANEL ENCLOSURES SHALL BE 32" WIDE BY 12.75" DEEP. TOTAL AVAILABLE CIRCUIT SPACE SHALL BE 45" WITH FULL LENGTH BUSSING.

H. DISTRIBUTION PANELBOARD BUSSING SHALL BE COPPER, (TIN-PLATED COPPER).

I. MULTIPLE SECTION PANELBOARDS SHALL COMPRISE OF MATCHING ENCLOSURES, SIZED IDENTICALLY AND ABUTTED TO ONE ANOTHER. COVERS AND TRIMS SHALL BE IDENTICAL AND SUITABLE FOR SURFACE TUBS.

J. CIRCUIT BREAKERS SHALL BE THERMAL MAGNETIC, MOLDED CASE, "BOLT-ON" TYPE.

K. DISTRIBUTION PANELBOARD (AS A COMPLETE UNIT, INCLUDING BREAKERS) SHALL HAVE MINIMUM SHORT CIRCUIT RATING OF: 208/120V : (65,000) AIC.

L. PROVIDE UNINSULATED GROUND BUSSING WITH NECESSARY QUANTITY OF TERMINALS TO ACCEPT GROUNDING CONDUCTORS.

M. PROVIDE A (100%) RATED NEUTRAL BUSSING WITH NECESSARY QUANTITY TO TERMINALS TO ACCEPT NEUTRAL CONDUCTORS.

N. DISTRIBUTION PANELBOARDS SHALL BE LISTED BY UNDERWRITERS LABORATORIES AND BEAR THE "UL" LABEL. PANELBOARDS SHALL BE MANUFACTURED BY SQUARE D, SIEMENS, GENERAL ELECTRIC OR EATON ELECTRIC (CUTLER-HAMMER).

O. DISTRIBUTION PANELBOARDS SHALL BE WALL MOUNTED AS INDICATED ON THE DRAWINGS. DISTRIBUTION PANELBOARDS SHALL BE MOUNTED SO THAT THE HIGHEST CONTROL DEVICE IS BELOW 6'-7" FROM THE FLOOR.

P. PROVIDE NAMEPLATES FOR EACH BRANCH DEVICE TO GIVE DESCRIPTION OF EACH CIRCUIT OR FEEDER.

Q. PROVIDE ENGRAVED NAMEPLATE MATCHING PANELBOARDS DESIGNATION ON THE DRAWINGS.

SECTION 265100 LIGHTING

A. FLUORESCENT FIXTURES SHALL HAVE THERMALLY PROTECTED, HIGH POWER FACTOR (>99%), U.L. LISTED, CLASS P, CBM, ETL, AND CSA CERTIFIED, ONE, TWO, THREE, AND/OR FOUR LAMP (AS REQUIRED), RAPID START, PARALLEL, HIGH FREQUENCY, T-8, ELECTRONIC (<10% THD) BALLASTS, WITH 5 YEAR MINIMUM WARRANTY. APPROVED MANUFACTURERS SHALL BE MAGNETEK/TRIAD HP, OR ADVANCE CENTIUM.

B. COMPACT FLUORESCENT AND/OR T-5 FLUORESCENT FIXTURES SHALL HAVE THERMALLY PROTECTED, HIGH POWER FACTOR (>98%), U.L. LISTED, CLASS P, CBM, ETL, AND CSA CERTIFIED, ONE, TWO, AND/OR THREE LAMP (AS REQUIRED), RAPID START, PARALLEL, HIGH FREQUENCY, ELECTRONIC (<20%) BALLASTS. APPROVED MANUFACTURERS SHALL BE MOTOROLA, ENERGY SAVING INC., OR ROBERTSON.

C. LAMPS

1. PROVIDE ALL LAMPS REQUIRED. AT THE CONCLUSION OF THE WORK, EACH FIXTURE MUST BE EQUIPPED WITH THE PROPER NUMBER OF NEW LAMPS OF THE CORRECT SIZE AND TYPE, ALL IN GOOD OPERATING CONDITION.

2. INCANDESCENT LAMPS SHALL BE 130 VOLT ONLY.

3. FLUORESCENT LAMPS SHALL BE T-8, SP35 MEDIUM BI-PIN LAMPS WITH A CRI-85 TRI-PHOSPHOR COATING. APPROVED FLUORESCENT LAMP MANUFACTURERS SHALL BE G.E., PHILIPS, OR OSRAM/SYLVANIA.

D. WHERE LIGHTING FIXTURES ARE INSTALLED IN LAY-IN CEILINGS, EACH FIXTURE SHALL BE PROVIDED WITH CLIPS (4 REQUIRED) OR EQUIVALENT MEANS TO PREVENT THE ACCIDENTAL DISENGAGEMENT OF THE FIXTURE FROM THE CEILING SUPPORT OR "T-BAR". IN ADDITION, ALL FLUORESCENT LIGHTING FIXTURES SHALL BE SUPPORTED AT EACH CORNER WITH FOUR (4) #12 AWG GALVANIZED STEEL WIRES AND SECURED TO THE BUILDING STRUCTURE IN ACCORDANCE WITH N.E.C. REQUIREMENTS.

SECTION 271500 COMMUNICATION CABLING SPECIFICATIONS:

A. PERFORMANCE REQUIREMENTS: COMPLY WITH TIA/EIA-568-B.1

B. COMPLY WITH NFPA 70, "NATIONAL ELECTRICAL CODE."

C. COMPLY WITH THE TIA-EIA-569-A, "COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES."

D. COMPLY WITH ANSI-J-STD-607-A, "COMMERCIAL BUILDING GROUNDING (EARTHING) AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS."

E. COORDINATE LAYOUT AND INSTALLATION OF TELECOMMUNICATIONS PATHWAYS AND CABLING WITH TENANT'S TELECOMMUNICATIONS AND LAN EQUIPMENT AND SERVICE SUPPLIERS.

F. COORDINATE TELECOMMUNICATIONS OUTLET/CONNECTOR LOCATIONS WITH LOCATION OF POWER RECEPTACLES AS EACH WORK AREA.

G. CABLE SUPPORT: NRTL LABELED FOR SUPPORT OF CATEGORY 6 CABLING, DESIGNED TO PREVENT DEGRADATION OF CABLE PERFORMANCE AND PINCH POINTS THAT COULD DAMAGE CABLE.

H. CONDUIT AND BOXES: SHALL BE A MINIMUM OF 2" W X 3" H X 2-1/2" DEEP.

I. BACKBOARDS SHALL BE 3/4" X 48" X 96" FIRE-RETARDANT-TREATED PLYWOOD WITH TWO (2) COATS OF GRAY FIRE-RETARDANT PAINT ON ALL SIDES AND EDGES AND SHALL BE MOUNTED VERTICALLY.

J. ALL COMMUNICATION CABLING SHALL BE CATEGORY 5E, PLENUM RATED, AND MANUFACTURED BY WEST PENN, OR APPROVED EQUIVALENT.

K. ALL COMMUNICATION CABLES ROUTED IN UNFINISHED SPACES ALONG WALLS SHALL BE ROUTED IN EXPOSED CONDUIT. ALL COMMUNICATION CABLING ROUTED IN UNFINISHED SPACES ALONG CEILINGS SHALL BE SUPPORTED WITH CABLE SUPPORTS SUCH AS J-HOOKS A MINIMUM OF 4'-0" ON CENTER.

L. ALL COMMUNICATION CONDUITS SHALL BE PROVIDED WITH RADIUS ELBOWS SIZE AS RECOMMENDED BY CABLING MANUFACTURER TO ENSURE THAT CABLING INSULATION IS NOT DAMAGED DURING INSTALLATION.

M. ALL COMMUNICATION CABLING INSTALLED IN FINISHED SPACES WITH EXPOSED CEILING STRUCTURE SHALL BE ROUTED IN CONDUIT AND CONCEALED IN NEW WALL CONSTRUCTION. ALL COMMUNICATION CONDUITS ROUTED ALONG CEILING STRUCTURE SHALL BE INSTALLED AT 4" MINIMUM FROM CEILING, SUPPORTED EVERY 6'-0" AND SHALL BE ROUTED PARALLEL OR PERPENDICULAR TO WALLS.

N. ALL COMMUNICATION CABLING INSTALLED IN FINISHED SPACES WITH LAY-IN CEILINGS SHALL BE INSTALLED IN CONDUIT AND CONCEALED IN NEW WALL CONSTRUCTION AND STUBBED ABOVE ACCESSIBLE CEILING. SUPPORT EVERY 4'-0" MAXIMUM WITH J-HOOKS OR OTHER METHOD TYPICALLY USED AS AN INDUSTRY STANDARD.

O. PROVIDE PLASTIC BUSHING ON EACH END OF CONDUIT RUN.

P. SURFACE RACEWAY SHALL ONLY BE PERMITTED TO BE INSTALLED IN FINISHED AREAS IF SPECIFICALLY APPROVED BY ARCHITECT IN ADVANCE OF COMMENCING WORK.

Q. IDENTIFICATION PRODUCTS SHALL COMPLY WITH TIA/EIA 606-a, AND SHALL MEET UL 969 FOR LABELING MATERIALS, INCLUDING LABEL STOCKS, LAMINATING ADHESIVES, AND INKS USED BY LABEL PRINTERS.

R. PROVIDE MACHINE PRINTED ADHESIVE TAPE LABEL ON EACH END OF COMMUNICATION CABLE WITH IDENTIFICATION TAGGING REQUIRED BY TENANT. LABELS SHALL BE PRINTED WITH PRINTING AREA AND TYPE COLOR THAT IS CONTRASTING WITH CABLE JACKET COLOR, BUT STILL COMPLYING WITH TI1/EIA-606-A.

S. PROVIDE SINGLE-GANG DEEP BACKBOX AT ALL WALL PHONE DEVICE LOCATIONS AND ROUTE 3/4" CONDUIT BACK TO SOURCE.

T. PROVIDE TWO-GANG DEEP BACKBOX AT ALL OTHER DATA OUTLET BACKBOXES AND ROUTE 1" MINIMUM CONDUIT TO EACH.

U. INSTALLATION OF CABLES SHALL COMPLY WITH TIA-EIA-B.1 AND TIA/EIA-568.B.2.

V. PROVIDE COMMUNICATION OUTLETS AS DIRECTED BY TENANT (SUCH AS OUTLETS WITH RJ45 CONFIGURATION) WITH ASSOCIATED FACEPLATES. PROVIDE TERMINATIONS REQUIRED TO COMPLY WITH BICSI ITSIM, CH. 6, "CABLE TERMINATION PRACTICES."

W. CONSOLIDATION POINTS FOR CABLING MAY BE USED ONLY FOR MAKING A DIRECT CONNECTION TO TELECOMMUNICATIONS OUTLET/CONNECTORS.

X. TERMINATE CONDUCTORS; NO CABLE SHALL CONTAIN UNTERMINATED ELEMENTS. MAKE TERMINATIONS ONLY AT INDICATED OUTLETS, TERMINALS, AND CROSS-CONNECT AND PATCH PANELS.

Y. CABLES MAY NOT BE SPLICED. SECURE AND SUPPORT CABLES AT INTERVALS NOT EXCEEDING 30" AND NOT MORE THAN 6" FROM CABINETS, BOXES, FITTINGS, OUTLETS, RACKS, FRAMES, AND TERMINALS.

Z. AFTER COMPLETION OF ALL COMMUNICATION CABLING, CONTRACTOR SHALL CONDUCT ALL TESTING REQUIRED AND SHALL RECORD RESULTS OF THE TEST AND PROVIDE TO TENANT FOR FUTURE REFERENCE. ANY DEFICIENCIES FOUND SHALL BE RECORDED AND ANY CORRECTIVE MEASURES COMPLETED SHALL ALSO BE NOTED ON THE REPORT.

AA. CONTRACTOR SHALL PROVIDE ALL OUTLETS WITH CONFIGURATIONS AS SELECTED BY TENANT. ALL OUTLETS SHALL BE PROVIDED WITH MATCHING FACEPLATES AND PROPER ICON IDENTIFICATION TABS FOR FACEPLATES.

SECTION 283111 SUPERVISORY ALARM SYSTEM (NOT USED)

Date	Issue
05/28/2021	Bid Permit Set
08/06/2021	Addendum A

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Electrical Specifications

ES 1.0