

SPECIFICATIONS:

1. SUMMARY

- A. FURNISH ALL LABOR, EQUIPMENT, MATERIALS, TOOLS, TRANSPORTATION, PERMITS, ETC., NECESSARY FOR, OR INCIDENTAL TO, THE INSTALLATION OF COMPLETE SYSTEMS OF ELECTRIC WIRING FOR LIGHTING, POWER, AND MISCELLANEOUS SYSTEMS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- B. CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS TO ROOFTOP UNITS, LIGHT FIXTURES, DEVICES, OR PIECES OF EQUIPMENT.

2. SYSTEM DESCRIPTION

- A. APPARATUS, APPLIANCES, MATERIAL, OR WORK NECESSARY TO MAKE THE WORK COMPLETE AND READY FOR OPERATIONS, EVEN THOUGH NOT SPECIFIED OR INDICATED ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL EXPENSE TO THE OWNER.
- B. SHOULD THERE BE ANY DISCREPANCIES OR A QUESTION OF INTENT, REFER THE MATTER TO THE ENGINEER FOR A DECISION BEFORE ORDERING ANY EQUIPMENT, MATERIALS, OR BEFORE STARTING ANY RELATED WORK.
- C. FURNISH, ERECT, INSTALL, CONNECT, CLEAN, ADJUST, TEST, AND CONDITION ALL MANUFACTURED ARTICLES, MATERIALS, AND EQUIPMENT, AND PLACE IN SERVICE IN ACCORDANCE WITH THE INSTRUCTIONS AND RECOMMENDATIONS OF THE MANUFACTURER.
- D. CAREFULLY EXAMINE THE CONTRACT DOCUMENTS, VISIT THE SITE, AND THOROUGHLY BECOME FAMILIAR WITH THE LOCAL CONDITIONS RELATING TO THE WORK. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF THE OBLIGATIONS OF THE CONTRACT.

3. STANDARDS AND REGULATIONS

- A. THE WORK AND MATERIALS SHALL COMPLY WITH THE LATEST EDITION OF ALL APPLICABLE SAFETY AND PERFORMANCE STANDARDS AND CODES, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - B. SHOULD WORK BE PERFORMED WHICH DOES NOT COMPLY WITH THE REQUIREMENTS OF APPLICABLE BUILDING CODES, STATE AND FEDERAL LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS, AND UTILITY COMPANY REGULATIONS, CHANGES FOR COMPLIANCE SHALL BE PERFORMED AT NO ADDITION TO THE CONTRACT SUM.
 - C. NOTIFY THE ENGINEER OF ANY MATERIALS OR APPARATUS BELIEVED TO BE INADEQUATE, UNSUITABLE, IN VIOLATION OF LAWS, ORDINANCES, RULES OR REGULATIONS OF AUTHORITIES HAVING JURISDICTION.

4. RULES, REGULATIONS AND CODES

- A. ALL WORK SHALL CONFORM TO THE 2018 CITY OF CHICAGO ELECTRICAL CODE AND FEDERAL, STATE, AND LOCAL GOVERNING CODES, AND CITY OF CHICAGO BUREAU OF FIRE PREVENTION CODE.
- B. ALL MATERIAL AND EQUIPMENT SHALL CONFORM TO THE STANDARDS, WHERE AVAILABLE, OF THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), THE REQUIREMENTS OF OSHA, AND UNDERWRITERS' LABORATORIES, INC. (UL).
- C. ALL MATERIALS AND WORKMANSHIP SHALL BE ACCEPTABLE TO ALL LOCAL AUTHORITIES HAVING JURISDICTION.
- D. INSTALLATION SHALL ALSO BE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF CODED.

5. PERMITS AND FEES

- A. OBTAIN THE BUILDING PERMIT WHICH INCLUDES THE ELECTRICAL PERMIT FEE.
- B. OBTAIN AND PAY FOR ANY ADDITIONAL PERMITS, GOVERNMENTAL FEES, TAXES, LICENSES, BONDS, INSPECTIONS, AND CERTIFICATES OF APPROVAL REQUIRED BY THE AUTHORITIES HAVING JURISDICTION.

6. INSURANCE

- A. CONTRACTOR SHALL ADD THE OWNER AND ARCHITECT/ENGINEER AS ADDITIONAL INSURED TO THE CONTRACTOR'S (OR CONSTRUCTION MANAGER'S) GENERAL LIABILITY AND UMBRELLA LIABILITY POLICIES. OWNER REQUESTS THE CONTRACTOR (OR CONSTRUCTION MANAGER) TO REQUIRE ALL SUBCONTRACTORS OF EVERY TIER TO ALSO ADD THE OWNER AND ARCHITECT/ENGINEER AS ADDITIONAL INSURED TO THEIR RESPECTIVE GENERAL LIABILITY AND UMBRELLA LIABILITY POLICIES.

7. DEFINITIONS

- A. FURNISH: EXCEPT AS OTHERWISE DEFINED IN GREATER DETAIL, TERM "FURNISH" IS USED TO MEAN SUPPLY AND DELIVER TO PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, ETC., AS APPLICABLE IN EACH INSTANCE.
- B. INSTALL: EXCEPT AS OTHERWISE DEFINED IN GREATER DETAIL, TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT PROJECT SITE INCLUDING UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, CONNECTIONS, WIRING, ADJUSTING, TESTING (IF REQUIRED), AND SIMILAR OPERATIONS, AS APPLICABLE IN EACH INSTANCE.
- C. PROVIDE: EXCEPT AS OTHERWISE DEFINED IN GREATER DETAIL, TERM "PROVIDE" MEANS FURNISH AND INSTALL, COMPLETE AND READY FOR OPERATION, AS APPLICABLE IN EACH INSTANCE.

8. EXAMINATION OF SITE

- A. THE CONTRACTOR SHALL VISIT AND CAREFULLY EXAMINE THE SITE AT WHICH THIS WORK IS TO BE PERFORMED, AND SHALL FAMILIARIZE HIMSELF WITH THE EXTENT OF WHICH THE WORK UNDER THIS CONTRACT EXTENDS INTO AND AFFECTS OTHER EXISTING BUILDING AREAS.
- B. IT IS UNDERSTOOD THAT THE CONTRACTOR, IN MAKING UP HIS BID, HAS KNOWLEDGE OF THE CONDITIONS AT THE SITE, AND THE REQUIREMENTS OF THESE SPECIFICATIONS.

9. MATERIALS AND EQUIPMENT

- A. MATERIALS AND EQUIPMENT SHALL BE NEW, UL OR CSA LABELED, AND SHALL BEAR THE MANUFACTURER'S NAME, MODEL NUMBER, AND OTHER IDENTIFICATION MARKINGS.
- B. MATERIALS AND EQUIPMENT SHALL BE THE STANDARD PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE PRODUCTION OF THE REQUIRED TYPE OF MATERIAL OR EQUIPMENT FOR AT LEAST FIVE YEARS (UNLESS SPECIFICALLY EXEMPTED BY THE ENGINEER) AND SHALL BE THE MANUFACTURER'S LATEST DESIGN WITH PUBLISHED PROPERTIES.
- C. EQUIPMENT AND MATERIALS OF THE SAME GENERAL TYPE SHALL BE OF THE SAME MANUFACTURER THROUGHOUT THE PROJECT TO PROVIDE UNIFORM APPEARANCE, OPERATION, AND MAINTENANCE.
- D. REFER TO MATERIAL LISTS AND SCHEDULES ON THE DRAWINGS FOR MATERIAL NOT DESCRIBED IN THE SPECIFICATION.

10. ACCEPTABLE MANUFACTURERS

- A. EQUIPMENT FURNISHED UNDER THIS SPECIFICATION SHALL BE MANUFACTURED BY ONE OF THE MANUFACTURERS LISTED FOR EACH CLASS OF EQUIPMENT.
 - 1. WHEN TWO OR MORE PRODUCTS ARE SPECIFIED FOR ANY ITEM OF WORK, ANY ONE IS ACCEPTABLE AND THE CHOICE IS LEFT TO THE CONTRACTOR.
 - 2. WHEN "OR EQUAL" IS USED IN CONJUNCTION WITH THE SPECIFIED PRODUCT(S), THE CONTRACTOR MAY, IF HE SO DESIRES, OFFER FOR APPROVAL BY THE ENGINEER A SUBSTITUTE PRODUCT WHICH WILL COMPLETELY ACCOMPLISH THE SAME PURPOSE AS THE SPECIFIED PRODUCT.
- 3. WHERE NO MANUFACTURER IS LISTED, EQUIPMENT CONFORMING TO THE SPECIFICATIONS SHALL BE PROVIDED.

11. SUBMITTAL

- A. PRODUCT DATA:
 - 1. ALL EQUIPMENT, MATERIAL, AND FIXTURES SHALL BE REVIEWED BY THE ENGINEER BEFORE ORDERS ARE PLACED. THE ENGINEER RESERVES THE RIGHT TO REJECT ANY MATERIAL WHICH, IN THE OPINION OF THE ENGINEER, IS NOT IN ACCORDANCE WITH SPECIFICATIONS EITHER BEFORE OR AFTER INSTALLATION.
 - 2. ALL EQUIPMENT, MATERIAL, AND FIXTURES SHALL BE OF MANUFACTURERS LISTED AND APPROVED BY UNDERWRITERS LABORATORIES, INC. AND OFFICIAL LISTS OF ALL GOVERNMENT AND INSURANCE BOARDS HAVING JURISDICTION.
- B. SHOP DRAWINGS:

- 1. INTENT OF DRAWINGS: ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO SHOW EVERY BEND, OFFSET, FITTING, OR ACCESSORY THAT MAY BE REQUIRED FOR A COMPLETE INSTALLATION.
- 2. COORDINATION:
 - a. EXISTING ARCHITECTURAL AND ALL MECHANICAL TRADE DRAWINGS FOR DIMENSIONS, LOCATION OF PARTITIONS AND WALLS, STRUCTURAL DETAILS, AND LOCATION OF MECHANICAL PIPES AND DUCTS, SO THAT THE ELECTRICAL INSTALLATION WILL BE COORDINATED WITH THAT OF THE OTHER TRADES.
 - b. COORDINATE THE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SLEEVES TO BE SET IN POUR-IN-PLACE CONCRETE AND OTHER STRUCTURAL COMPONENTS, AS THEY ARE CONSTRUCTED.
 - c. WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, INSTALL ELECTRICAL SERVICES AND OVERHEAD EQUIPMENT TO PROVIDE THE MAXIMUM HEADROOM POSSIBLE.
 - d. INSTALL ELECTRICAL EQUIPMENT TO FACILITATE MAINTENANCE AND REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS, AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS.

12. ERECTION

- A. PROVIDE ALL NECESSARY HOISTS, RIGGINGS, SCAFFOLDING, TOOLS, TACKLE, LABOR, ETC., WHICH MAY BE NECESSARY FOR THE COMPLETE INSTALLATION OF THE ELECTRICAL WORK.

13. MISCELLANEOUS STEEL WORK AND EQUIPMENT SUPPORTS

- A. FURNISH AND INSTALL ALL MISCELLANEOUS STRUCTURAL MEMBERS AS REQUIRED TO INSTALL ALL ELECTRICAL EQUIPMENT INCLUDING CONDUITS AND LIGHTING FIXTURES. NONE OF THESE ITEMS WILL BE PERMITTED TO BE ATTACHED TO OR SUPPORTED FROM OTHER TRADES' SUPPORT SYSTEMS OR CONVEYORS. ELECTRICAL SUPPORT SYSTEM SHALL BE A COMPLETELY INDEPENDENT SYSTEMS.

14. PREPARATION

- A. INSPECT THE SITE AND SOURCE ENERGY SYSTEMS TO DETERMINE WORKING CONDITIONS AND TO TAKE MEASUREMENTS.
- B. CONDUITS PASSING THROUGH ROOFS OR OTHER SURFACES EXPOSED TO WEATHER SHALL BE PROPERLY FLASHED AND MADE WATERIGHT AS SPECIFIED IN ROOFING AND WATERPROOFING SECTIONS. THE FLASHING WORK SHALL BE PART OF THIS DIVISION OF WORK.
- C. CUTTING AND PATCHING: PROVIDE ALL REQUIRED CUTTING AND PATCHING FOR THE INSTALLATION OF EQUIPMENT AND WIRING. ANY CUTTING OF CONCRETE SHALL BE DONE WITH CORE DRILLS OR CONCRETE SAWS.
- D. EXCAVATION AND BACKFILL: PROVIDE ALL REQUIRED TRENCHING, EXCAVATION, BRACING, SHORING, BACKFILL, AND DISPOSITION OF EXCESS EXCAVATED MATERIAL REQUIRED FOR THE INSTALLATION OF UNDERGROUND DUCTS, WIRING, HANDHOLES, MANHOLES, EQUIPMENT FOUNDATIONS, AND POLE FOUNDATIONS.

15. PHASE SEQUENCE AND ROTATION

- A. ALL FEEDERS, POWER SUB-FEEDS TO MOTORS, ETC., SHALL BE COMPLETELY COORDINATED AS TO SEQUENCE AND ROTATION. PHASE SEQUENCE SHALL BE A-B-C AS FOLLOWS:
 - 1. FRONT TO REAR, TOP TO BOTTOM, OR LEFT TO RIGHT WHEN FACING EQUIPMENT.
 - 2. DISTRIBUTE SINGLE PHASE LOADS UNIFORMLY ON EACH PHASE TO OBTAIN LOAD BALANCE.

16. WIRING METHODS - GENERAL

- A. ALL WIRING SHALL BE INSTALLED IN CONDUIT, MINIMUM 3/4 INCH SIZE.
- B. IN FINISHED AREAS, ALL CONDUIT SHALL BE CONCEALED IN WALLS OR CEILING SPACE WHENEVER POSSIBLE.

17. CONDUIT

- A. RIGID HEAVYWALL STEEL CONDUIT WITH THREADED COUPLINGS AND FITTINGS SHALL BE USED FOR INCOMING ELECTRIC SERVICE AND WHERE NOTED ON DRAWINGS.
- B. ELECTRICAL METALLIC TUBING (EMT) WITH STEEL COMPRESSION TYPE COUPLINGS AND FITTINGS SHALL BE USED FOR ALL INTERIOR CONDUITS EXPOSED OR CONCEALED IN FURRED WALLS AND DROPPED CEILING SPACES.
- C. FINAL CONNECTIONS TO MOTORS AND SIMILAR EQUIPMENT SUBJECT TO VIBRATION OR ADJUSTMENT SHALL BE MADE WITH SECTIONS OF LIQUIDTIGHT FLEXIBLE CONDUIT, MINIMUM 18 INCHES LONG, AND MAXIMUM 36 INCHES LONG. MINIMUM SIZE SHALL BE 1/2 INCH.
- D. IN SUSPENDED CEILING CAVITIES WHERE RECESSED LIGHTING FIXTURES ARE INSTALLED, PROVIDE JUNCTION BOXES NEAR FIXTURES FOR EXTENDING BRANCH CIRCUIT CONDUCTORS TO FIXTURE THROUGH FLEXIBLE METAL CONDUIT. FLEXIBLE METAL CONDUIT SHALL BE 3/8 INCH MINIMUM SIZE, IN LENGTHS NOT IN EXCESS OF SIX FEET.
- E. THE CONTRACTOR MAY REUSE EXISTING CONDUITS WHENEVER POSSIBLE PROVIDED THEY ARE OF SUITABLE SIZE, IN GOOD CONDITION, AND ARE PROPERLY SUPPORTED. ALL WIRING SHOWN SHALL BE NEW.

18. MOISTURE SEALS

- A. WALL ENTRANCE: 0-2/GEDNEY TYPE FSK OR LINK-SEAL.
- B. ROOF PENETRATIONS: SEAL WITH FLASHINGS COMPATIBLE WITH ROOF DESIGN AND APPROVED BY ROOFING SYSTEM MANUFACTURER AND ARCHITECT/ENGINEER.
- C. CONDUITS: JOHN'S MANVILLE "DUXSEAL" NON-SETTING ELECTRICAL MASTIC.

19. FIRE SEALS

- A. OPENINGS AROUND CONDUIT PENETRATIONS THROUGH FIRE RATED WALLS, PARTITIONS, FLOORS, OR CEILINGS SHALL BE SEALED WITH DOW CORNING'S 3-6548 SILICONE RTV FOAM, JOHN'S MANVILLE DUXSEAL OMS6646, OR NELSON "FLAMESEAL" PUTTY, PROVIDING A TWO HOUR FIRE RATING AS CALLED FOR BY ASTM-119.
- B. PROVIDE SEALS ON BOTH SIDES OF WALLS WHERE FOUR HOUR RATING IS REQUIRED.

20. DISCONNECT SWITCHES

- A. DISCONNECT SWITCHES SHALL BE FUSIBLE OR NON-FUSIBLE, 600 VOLT CLASS, VISIBLE BLADE CONSTRUCTION, NEMA HEAVY DUTY TYPE HD SAFETY SWITCHES, UL LISTED, AS MANUFACTURED BY EATON OR SQUARE D.
- B. LUGS SHALL BE COMPRESSION TYPE.
- C. SWITCHES SHALL BE FURNISHED IN NEMA 1 GENERAL PURPOSE ENCLOSURE FOR INDOOR APPLICATIONS AND NEMA 3R FOR EXTERIOR APPLICATIONS.

21. GROUNDING

- A. GENERAL:
 - 1. GROUND ELECTRICAL SYSTEMS AND EQUIPMENT AS REQUIRED BY CODE, UTILITY, LOCAL ORDINANCES, AND REQUIREMENTS HEREIN.
 - 2. INSTALL SEPARATE CODE-RATED GROUNDING CONDUCTORS TO SPECIAL EQUIPMENT AND ACTIVITY AREAS AS REQUIRED BY CODE.
 - 3. BOND METALLIC PIPING SYSTEMS AND SERVICE EQUIPMENT AS REQUIRED BY NEC.
- B. SYSTEM GROUND:
 - 1. ATTACH GROUND WIRE IN CONDUIT TO POINT AHEAD OF WATER METER OR SERVICE SHUTOFF VALVE.
 - 2. INSTALL JUMPER OR SHUNT AROUND WATER METER AND/OR SHUTOFF VALVE.

22. LIGHTING FIXTURES

- A. PROVIDE LIGHTING FIXTURES OF SIZE, TYPE, AND RATING INDICATED IN LIGHTING FIXTURE SCHEDULE, COMPLETE WITH, BUT NOT NECESSARILY LIMITED TO, LAMPS, LAMP HOLDERS, REFLECTORS, BALLASTS, STARTERS, HANGERS, JUNCTION BOXES, WIRING, AND ANY OTHER DETAILS REQUIRED FOR COMPLETE WORKING INSTALLATION.
- B. RECESSED FIXTURE CONSTRUCTION: ALL RECESSED FIXTURES SHALL BE PROVIDED WITH HOUSINGS OR PARTITIONS SUITABLE AND APPROVED FOR THE PARTICULAR CONSTRUCTION THEY ARE TO BE INSTALLED IN. FIXTURES MOUNTED IN RETURN AIR CEILINGS SHALL HAVE APPLICABLE CODE AUTHORITY APPROVAL.
- C. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ORDERING RECESSED FIXTURES WITH CORRECT TRIM TO PROVIDE EXACT FIT REQUIRED FOR THE TYPE OF CEILING AND CEILING SUPPORTING GRID SPECIFIED. BEFORE PLACING ORDER FOR FIXTURES, CONTRACTOR SHALL CHECK WITH AND EXAMINE HIS FINAL APPROVED CEILING SHOP DRAWINGS TO MAKE SURE OF COMPATIBILITY BETWEEN FIXTURES AND SUSPENDED CEILING.

23. CLEAN UP

- A. AFTER THE COMPLETION OF THE ELECTRICAL INSTALLATION, THE ENTIRE SYSTEM SHALL BE THOROUGHLY CLEANED. CLEAN AND VACUUM FOREIGN MATTER FROM ALL ENCLOSURES, LIGHTING FIXTURES, EQUIPMENT, AND CONDUITS.

24. FINAL INSPECTION

- A. UPON COMPLETION OF THE WORK, THE ENGINEER SHALL CONDUCT A COMPLETE INSPECTION OF ALL ITEMS OF WORK PROVIDED UNDER THE CONTRACT, AND THE CONTRACTOR SHALL MAKE WHATEVER CORRECTIONS OR ADJUSTMENTS DEEMED NECESSARY TO COMPLY WITH THE DRAWINGS AND SPECIFICATIONS AND FOR THE PROPER FUNCTIONING OF ALL SYSTEMS. ALL NAMEPLATES ON EQUIPMENT SHALL BE KEPT CLEAN AND FREE OF PAINT FOR EASY READING.

25. DEFECTIVE WORK AND MATERIALS

- A. ALL MATERIALS OR WORK FOUND TO BE DEFECTIVE OR NOT IN STRICT CONFORMITY WITH THE DRAWINGS, DIFFERENT FROM REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, DEFACED OR DAMAGED THROUGH ACTION OF FIRE, WEATHER, OR ANY OTHER CAUSE, WILL BE REJECTED AND SHALL BE IMMEDIATELY REMOVED FROM THE PREMISES BY THE CONTRACTOR AND SATISFACTORY MATERIAL AND WORK SUBSTITUTED THEREFORE WITHOUT DELAY OR ADDITIONAL COST TO OWNER.
- B. ANY DEFECTIVE OR IMPERFECT WORK WHICH MAY BE DISCOVERED SHALL BE CORRECTED IMMEDIATELY UPON NOTICE. NO PREVIOUS INSPECTION OR CERTIFICATES ON ACCOUNT SHALL BE HELD TO RELIEVE THE CONTRACTOR FROM THE OBLIGATION TO FURNISH SOUND MATERIAL AND TO PERFORM SATISFACTORY WORK.

26. WORK INCLUDED

- PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND SERVICES FOR PROVIDING COMPLETE IN PLACE READY FOR OPERATION ELECTRICAL SYSTEMS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- A. CONDUITS, WIRING, AND ALL FINAL ELECTRICAL CONNECTIONS.
- B. DISCONNECT SWITCHES FOR ALL MOTORS, HEATERS, FIXED EQUIPMENT.
- C. PROVIDING, FURNISHING, INSTALLATION AND WIRING OF MOTOR STARTERS FOR HVAC SYSTEMS AND PLUMBING SYSTEMS.
- D. ALL REQUIRED GROUNDING AS PER APPLICABLE CODES AND AS SPECIFIED HEREIN.
- E. ALL POWER, CONTROL AND SIGNAL WIRING AS SPECIFIED HEREIN OR AS SHOWN ON THE DRAWINGS.
- F. ALL RECEPTACLES, COVER PLATES, MISCELLANEOUS WIRING DEVICES, LIGHTING FIXTURES, EXIT SIGNS INCLUDING LAMPS.
- G. ALL REQUIRED PERMIT FEES, BONDS AND TAXES.
- H. ALL REQUIRED CUTTING, CORING AND PATCHING.
- I. ALL TESTING, CORRECTING, AND RETESTING.
- J. IDENTIFICATION OF ALL EQUIPMENT, PANELBOARDS, SWITCHES, CIRCUIT BREAKERS, STARTERS, AS TO WHAT EACH PIECE OF EQUIPMENT CONTAINS.
- K. SHOP DRAWINGS AND RECORD DRAWINGS.
- L. ALL CONDUIT RACEWAYS, JUNCTION BOXES, PULL BOXES, FITTINGS, BUSHINGS AS REQUIRED.
- M. ALL CABLE, WIRE AND FINAL CONNECTIONS FOR ALL FEEDERS AND BRANCH CIRCUITS.
- N. ALL GUARANTEES AND WARRANTIES ON EQUIPMENT.
- O. MISCELLANEOUS HANGERS AND CHANNELS.
- P. PROVIDE COMPLETE 120/208V,3Ø,4W ELECTRICAL SYSTEMS COMPLETE IN PLACE CERTIFIED READY FOR OPERATION IN ALL RESPECTS.
- Q. ALL RECEPTACLES, COVERPLATES, MISCELLANEOUS WIRING DEVICES, SWITCHES AND LIGHTING FIXTURES, EXIT SIGNS, INCLUDING LAMPS.
- R. EMERGENCY LIGHTING, EXIT SIGNS, LAMPS, SEPARATE CIRCUITS, AND SEPARATE NEUTRALS COMPLETE IN PLACE READY FOR OPERATION.
- S. ALL LIGHT FIXTURES, LAMPS, SUPPORTS, BOXES, BALLASTS, BRACKETS, WIRING, AND ALL FINAL CONNECTIONS FOR A COMPLETE LIGHTING SYSTEM.
- T. SEPARATE CONDUIT AND WIRING SYSTEM FOR LIFE SAFETY SYSTEMS, FIRE ALARM SYSTEM, EMERGENCY AND EXIT LIGHTING SYSTEM, AS APPROVED BY THE APPLICABLE CODES.

27. WORK NOT INCLUDED

- IN GENERAL, WITH EXCEPTION NOTED, THE FOLLOWING WORK SHALL BE FURNISHED, INSTALLED AND/OR PERFORMED UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS OR BY THE UTILITY COMPANY.

- A. THE FURNISHING OF ALL MOTORS EXCEPT AS NOTED.
- B. ALL TEMPERATURE CONTROL WIRING FOR HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS.
- 28. ALL INSTALLATIONS AND MATERIALS SHALL BE IN CONFORMANCE TO ALL APPLICABLE CODES AND APPLICABLE AMENDMENTS.
- 29. ALL MATERIALS SHALL BE NEW. ALL MATERIALS SHALL BEAR A U.L. LABEL.
- 30. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL ARCHITECTURAL, STRUCTURAL AND MECHANICAL FEATURES OF THE BUILDING. CONSULT ARCHITECTURAL AND MECHANICAL DRAWINGS. ADJUST WORK TO FIT ACTUAL JOB CONDITIONS. COORDINATE WITH ALL APPLICABLE TRADES.
- 31. THIS CONTRACTOR SHALL REMOVE ALL RUBBISH, DEBRIS, ETC., CAUSED BY HIS WORK AS FAST AS IT ACCUMULATES.
- 32. THIS CONTRACTOR SHALL GUARANTEE ALL HIS WORK FOR ONE YEAR AFTER DATE OF FINAL ACCEPTANCE BY OWNER AGAINST ALL DEFECTS OF MATERIAL, EQUIPMENT AND WORKMANSHIP. ALL SUCH DEFECTS APPEARING WITHIN THE GUARANTEE PERIOD SHALL BE PROMPTLY REMEDIATED WITHOUT COST TO OWNER. ENTIRE INSTALLATIONS SHALL BE GUARANTEED TO OPERATE SATISFACTORYLY.
- 33. THIS CONTRACTOR SHALL PROVIDE ALL REQUIRED CUTTING, CORING AND PATCHING REQUIRED FOR HIS WORK.
- 34. ALL GROUNDING SHALL BE IN CONFORMANCE TO ALL APPLICABLE CODES.
- 35. ALL MAIN SWITCHES AND FEEDER SWITCHES SHALL BE IDENTIFIED (USING ENGRAVED BAKELITE NAMEPLATES). ALL PANELS AND SERVICE ENTRANCE EQUIPMENT SHALL BE IDENTIFIED BY ENGRAVED BAKELITE NAMEPLATES. ALL BAKELITE NAMEPLATES SHALL BE WHITE LETTERING AND BLACK BACKGROUND. ALL LIGHTING AND POWER PANELS SHALL BE PROVIDED WITH TYPED/WRITTEN DIRECTORIES FOR ALL CIRCUITS INCLUDING SPARES.
- 36. OBTAIN AND PAY FOR ALL PLAN EXAMINATION FEES, PERMITS, AND JOB INSPECTION FEES REQUIRED FOR THIS WORK. SUBMIT DRAWINGS TO APPLICABLE CODE AUTHORITIES.
- 37. ALL WIRING SHALL BE COLOR CODED AS FOLLOWS:
 - A. 120/208 VOLT, 3 PHASE, 4 WIRE

- PHASE "A" - BLACK; PHASE "B" - RED; PHASE "C" - BLUE; AND NEUTRAL WHITE; GROUNDING CONDUCTOR - GREEN.

- B. ALL COLOR CODING OF WIRING SHALL BE SUBJECT TO APPROVAL BY APPLICABLE CODE AUTHORITIES.

38. RECORD DRAWINGS

- A. AT THE COMPLETION OF THE JOB AND BEFORE FINAL PAYMENT IS MADE, CONTRACTOR SHALL PROVIDE (1) CD OF RECORD DRAWINGS, INCLUDING REVISED DRAWINGS THAT MAY BE ISSUED, ON WHICH SHALL BE SHOWN THE LOCATION OF CONDUIT, CIRCUITING, AND EQUIPMENT, ETC. AS FINALLY INSTALLED. MARKED UP COPIES OF THE CONTRACT DOCUMENTS ARE NOT ACCEPTABLE.

39. MOTOR WIRING

- A. PROVIDE, FURNISH, AND INSTALL ALL MOTOR STARTERS, POWER WIRING, AND DISCONNECT MEANS FOR ALL MOTORS INCLUDING BUT NOT LIMITED TO HEATING, VENTILATING, AIR CONDITIONING, AND PLUMBING SYSTEMS.
- B. MOTORS SHALL BE FURNISHED UNDER THE SECTION RESPONSIBLE FOR THE DRIVEN MACHINE OR SYSTEM. CONTRACTOR SHALL SET ALL LOOSE MOTORS AND WIRE SAME COMPLETE IN PLACE. CONTRACTOR SHALL PROVIDE, FURNISH, INSTALL, AND WIRE ALL MOTOR STARTERS. MOTOR STARTERS FOR "PACKAGE" TYPE EQUIPMENT SHALL BE FACTORY FURNISHED UNDER THE DIVISION RESPONSIBLE FOR THE PACKAGED EQUIPMENT SYSTEM.
- C. PROVIDE, FURNISH, AND INSTALL ALL NECESSARY CONNECTIONS BETWEEN CONTROLLERS AND MOTORS, IN CONDUIT, AND LEAVE MOTORS READY TO START. CHECK CONNECTIONS, IF NECESSARY, TO SECURE PROPER ROTATION OF MOTORS. THE POWER SUPPLY LEADS TO THE MOTORS, FROM THE CONTROLLERS, SHALL BE OF THE SAME SIZE AS THE FEEDS INDICATED ON THE DRAWINGS. FURNISH AND INSTALL ALL FUSES IN COMBINATION STARTERS AND DISCONNECT SWITCHES.
- D. PROVIDE, FURNISH, AND INSTALL ALL OVERLOAD HEATERS IN ALL STARTERS AND MOTOR CONTROL DEVICES REQUIRING SAME. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING OVERLOAD HEATERS, SIZED IN ACCORDANCE TO MOTOR NAMEPLATE DATA IN CONFORMANCE TO APPLICABLE CODES.

40. EXIT SIGNS AND EMERGENCY LIGHTING

- A. THIS CONTRACTOR SHALL SEEK APPROVAL FOR ALL EXIT AND/OR DIRECTIONAL SIGNS RELATIVE TO LOCATION AND QUANTITY AS REQUIRED TO BE IN CONFORMANCE WITH ALL APPLICABLE CODES AND WITH GOVERNMENTAL AGENCIES SPECIFIED HEREIN. WHERE ADDITIONAL EXIT AND/OR DIRECTIONAL SIGNS ARE REQUIRED AND/OR EXIT SIGNS SHOWN MUST BE RELOCATED TO COMPLY WITH APPLICABLE CODES, THIS CONTRACTOR SHALL FURNISH AND INSTALL SAME AT NO ADDITIONAL COST TO THE CONTRACT.
- B. EXIT SIGNS SHALL BE APPROVED BY APPLICABLE CODE AUTHORITIES. PROVIDE ALL REQUIRED HARDWARE FOR WALL MOUNTING, CEILING MOUNTING, OR END WALL MOUNTING AS REQUIRED. WORDING, COLOR, AND LETTERING AS APPROVED BY APPLICABLE CODE AUTHORITIES. EXIT SIGNS SHALL BE SINGLE OR DOUBLE FACE, WITH OR WITHOUT ARROWS, CEILING, WALL, OR END MOUNTED AS REQUIRED TO COMPLY WITH THE APPLICABLE CODES.

41. WIRING

- A. ALL WIRE AND CABLE SHALL BE COPPER 600 VOLT WIRE #10 AND SMALLER SHALL BE SOLID TYPE THIN/THIN. WIRE LARGER THAN #10 SHALL BE STRANDED THIN/THIN OR AS INDICATED ON THE DRAWINGS. ALL SPLICES #10 AND SMALLER SHALL BE MADE WITH APPROVED SOLDERLESS PRESSURE SPRING CONNECTORS RATED AT 105 DEGREES CENTIGRADE (AS MANUFACTURED BY 3M SCOTCHLOKS, T & B, IDEAL). SPLICES TO CONDUCTORS LARGER THAN #10 SHALL BE PRESSURE TYPE SOLDERLESS CONNECTORS (AS MANUFACTURED BY BURNDY, BLACKBURN, T & B). FEEDER SPLICES SHALL BE HIGH COMPRESSION TYPE CRIMPED WITH HIGH COMPRESSION TOOL. BRANCH CIRCUIT WIRING SHALL BE #12 COPPER THIN/THIN MINIMUM. WHERE HOMERUNS EXCEED 70 FEET FROM PANEL TO FIRST OUTLET, CONDUITOR SIZE SHALL BE #10 THIN/THIN COPPER. CABLE SHALL BE AETNA, REPUBLIC, OR SOUTHWIRE. MINIMUM WIRE SIZE IS #12.
- B. ALL CONDUCTORS SHALL BE INSTALLED IN METALLIC CONDUIT.

42. DAMAGE TO OTHER WORK

- A. THIS CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE CAUSED TO WORK OF OTHER DIVISIONS AND/OR EXISTING INSTALLATIONS NOT PERTINENT TO THE CONTRACT. THIS COST OF REPAIRS TO SUCH DAMAGED WORK SHALL BE CHARGED TO THIS CONTRACTOR.

43. DISCONNECT MEANS

- A. PROVIDE DISCONNECT MEANS, HEAVY DUTY TYPE, FOR ALL MOTORS, ELECTRIC HEATERS, AND ROOFTOP UNITS IN NEMA ENCLOSURE, TYPE AS SHOWN OR SPECIFIED ON THE DRAWINGS OR AS REQUIRED BY APPLICABLE CODES. ALL DISCONNECT MEANS EXPOSED TO THE WEATHER SHALL BE NEMA 3R.

44. MEASUREMENTS

- A. ALL WORK SHALL BE LAID OUT AT THE BUILDING BEFORE WORK IS INSTALLED, SO AS TO ELIMINATE ANY CONFLICTS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, MEASUREMENTS, GRADES, LEVELS, AND CONDITIONS AT THE JOB SITE. ALL MEASUREMENTS MUST BE TAKEN ON THE JOB SITE FOR THE FINAL INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF ALL QUANTITIES AND MEASUREMENTS.

45. RECEPTACLES

- A. PROVIDE DUPLEX RECEPTACLES, 15A/125V RATED, "SAFETY-GROUND", GROUNDING TYPE, LEVITON DECORA TO MATCH PHASE 1 FED. SPEC. LISTED. (WHITE COLOR EXCEPT GRAY IN WIREMOLD OR WHEN IN STAINLESS STEEL COVERPLATE.)
- B. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, ALL RECEPTACLES SHALL BE MOUNTED 16" ABOVE FINISHED FLOOR AS MEASURED FROM CENTER OF DEVICE.
- C. GROUND FAULT INTERRUPTER (GFI) TYPE RECEPTACLES 15A/125V, HUBBELL #GF5262 SHALL BE INSTALLED WITHIN SIX (6) FEET OF ANY SINK; FOR ALL EXTERIOR OUTLETS; AND DAMP OR WET AREAS, AND AS SHOWN AND SPECIFIED ON THE DRAWINGS.
- D. FULL GANG SIZE, HEAVY-DUTY, POLARIZED, DUPLEX, PARALLEL BLADE, U-GROUNDING SLOT WITH GREEN HEXAGONAL EQUIPMENT GROUND SCREW, GROUND TERMINALS AND POLES INTERNALLY CONNECTED TO MOUNTING YOKE.
- E. IN ALL TOILET ROOMS AND BATHROOMS, PROVIDE RECEPTACLES WITH 15 AMP - 125 VOLT GROUND FAULT CIRCUIT INTERRUPTER.

46. WALL SWITCHES

- A. EXCEPT AS NOTED ON THE DRAWINGS, ALL SWITCHES SHALL BE INTELLIGENT LIGHTING CONTROLS DECORA SERIES HEAVY DUTY SINGLE POLE DOUBLE THROW (SPDT) MOMENTARY ROCKER SWITCH CENTER OFF. (WHITE COLOR).

47. WALL PLATES

- A. ALL WALL PLATES IN ALL FINISHED AREAS SHALL BE METAL. COLOR TO MATCH WIRING DEVICE.
- B. IN UNFINISHED AREAS, PLATES SHALL BE PRIMED PAINTED OF TYPE DESIGNED FOR THE PARTICULAR BOXES THEY ARE TO BE USED WITH.

- 48. PROVIDE TEMPORARY POWER AND LIGHTING SERVICE. PROVIDE LIGHTING AT .5W/.50 FT. PROVIDE RECEPTACLE CIRCUITS FOR ALL BUILDING TRADES. WHERE A CONTRACTOR REQUESTS TEMPORARY SERVICE GREATER THAN 20 AMPERES, PROVIDE SERVICE WITH ALL COSTS CHARGED TO EACH RESPECTIVE CONTRACTOR. PROVIDE GFI PROTECTION AS REQUIRED BY APPLICABLE CODES.

49. COMPLETE SYSTEMS

- A. FURNISH ALL MATERIALS AND ALL EQUIPMENT FOR A COMPLETE AND READY-TO-OPERATE SYSTEM. ANY ITEM OF MATERIAL AND/OR EQUIPMENT NOT SHOWN ON DRAWINGS OR SPECIFIED, BUT REQUIRED FOR SATISFACTORY OPERATING SYSTEMS, SHALL BE FURNISHED AND INSTALLED AS THOUGH COMPLETELY SPECIFIED AND SHOWN ON THE PLANS.

50. HOLES IN STRUCTURAL MEMBERS

- A. NO HOLES FOR CONDUIT OR EQUIPMENT SHALL BE ALLOWED IN ANY STRUCTURAL MEMBER.

51. CLEANING

- A. ALL FINISHED METAL SURFACES SHALL BE CLEANED AND POLISHED. ALL EXPOSED MATERIALS, EQUIPMENT, AND APPARATUS SHALL BE THOROUGHLY CLEANED OF DIRT, RUST, CEMENT, PLASTER, ETC., ALL CRACKS AND CORNERS SCRAPPED OUT CLEAN AND ALL SURFACES CAREFULLY CLEANED OF GREASE

- AND OIL SPOTS AND LEFT SMOOTH AND CLEAN, WITH ALL UNFINISHED SURFACES READY FOR PAINTING.

52. CABLE SUPPORTS

- A. VERTICAL CABLE IN CONDUIT RISERS SHALL BE PROVIDED WITH CABLE SUPPORTS IN CONFORMANCE WITH ALL APPLICABLE CODES.

53. REMOVAL OF RUBBISH

- A. REMOVE ALL RUBBISH AS FAST AS IT ACCUMULATES. KEEP THE BUILDING AND PREMISES CLEAN DURING PROGRESS OF THE WORK AND LEAVE THE PREMISES AT COMPLETION IN A CLEAN CONDITION.

54. STORING ELECTRICAL EQUIPMENT AND MATERIALS

- A. STORE ALL ELECTRICAL MATERIALS AND EQUIPMENT IN A DRY LOCATION SO THAT CORROSION AND DAMAGE DUE TO MOISTURE WILL NOT AFFECT SAME.

55. MISCELLANEOUS HANGERS AND STEEL

- A. ALL HANGERS, ANGLES, CHANNELS, AND OTHER STRUCTURAL STEEL SUPPORTS REQUIRED BY FIELD CONDITIONS TO INSTALL ANY ELECTRICAL EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR. PERFORATED STRAP IS NOT ACCEPTABLE.

- 56. FURNISH AND INSTALL FIRE STOP FITTINGS AND/OR FIRE SEALS WHEN PENETRATING FIRE RATED FLOORS, WALLS, AND CEILINGS.

57. OUTLET BOXES

- A. OUTLET BOXES SHALL BE 12 GAUGE OR HEAVIER STEEL, GALVANIZED OR SHERARIZED. 4 INCH SQUARE MINIMUM, NOT LESS THAN 2-1/8 INCHES DEEP, WITH FIXTURE STUDS AS REQUIRED. BOXES WITH SWITCH AND CONVENIENCE OUTLETS SHALL BE CASE METAL, WITH STEEL COVERS FOR EXPOSED USE.

- B. FLUSH DEVICE BOXES WITH METAL COVER PLATES SHALL BE FINISHED TO MATCH ADJACENT HARDWARE FOR CONCEALED USE.

58. LAMPS AND BALLASTS

- A. FURNISH AND INSTALL LAMPS IN ALL LIGHTING FIXTURES. FLUORESCENT LAMPS SHALL MATCH EXISTING AS USED IN PREVIOUS PHASE P1. ALL INCANDESCENT LAMPS SHALL BE SOFT WHITE AND RATED AT 130 VOLTS.

- B. PROVIDE SPARE LAMPS INCLUDING BUT NOT NECESSARILY LIMITED TO FLUORESCENT LAMPS AND COMPACT FLUORESCENT LAMPS, IN THE RATIO OF 10% FOR EACH TYPE OF LAMP CHARACTERISTICS INSTALLED BUT NOT LESS THAN SEVEN LAMPS OF EACH TYPE. THE ABOVE SPARE LAMPS INCLUDE BUT ARE NOT NECESSARILY LIMITED TO FLUORESCENTS OF EACH KELVIN RATING OR COLOR SPECIFIED. ALL LAMPS PROVIDED SHALL BE IN THE ORIGINAL CARTONS COMPLETE WITH BILL OF MATERIALS. OBTAIN SIGNED RECEIPT FROM THE OWNER. BILL OF MATERIALS SHALL INCLUDE AS A REFERENCE, QUANTITY OF LAMPS OF EACH TYPE USED TO LAMP THE PERMANENT LIGHT FIXTURES, AND QUANTITY OF SPARE LAMPS DELIVERED TO THE JOBSITE. PROVIDE ALL REQUIRED CARTAGE TO DELIVER SPARE LAMPS TO STORAGE SPACES AS DIRECTED BY THE OWNER AND THE ARCHITECT. LAMP CARTONS SHALL BE IDENTIFIED WITH LAMP TYPE OF THE OUTSIDE OF EACH CARTON.
- C. BALLASTS SHALL BE PROGRAM RAPID START WITH LESS THAN 10% TOTAL HARMONIC DISTORTION AND SHALL NOT CONTAIN PCB'S.

59. DRAWINGS AND SPECIFICATIONS

- A. THE DRAWINGS ACCOMPANYING THIS SPECIFICATION COVER THE DESIGN AND SCOPE OF THE VARIOUS SYSTEMS. HOWEVER, THE EXACT DISPOSITION OF THE EQUIPMENT IS SUBJECT TO THE REQUIREMENTS AND CONSTRUCTION OF THE BUILDING. CHANGES REQUIRED BY JOB CONDITIONS SHALL BE MADE AS APPROVED BY THE ARCHITECT WITHOUT ADDITIONAL COST.

- B. AT THE COMPLETION OF THE JOB AND BEFORE FINAL PAYMENT IS MADE, A COMPLETE SET OF "PROJECT RECORD" DRAWINGS SHALL BE SUBMITTED, INCLUDING REVISED DRAWINGS THAT MAY BE ISSUED, WHICH SHALL SHOW THE LOCATION OF ALL CONDUIT, CIRCUITING, AND EQUIPMENT, ETC., AS FINALLY INSTALLED.

- C. THE DRAWINGS AND SPECIFICATIONS ARE NOT INTENDED TO SHOW ALL DETAILS AND THE ENGINEER WILL NOT BE RESPONSIBLE FOR THE ABSENCE OF ANY DETAIL WHICH THE CONTRACTOR SHALL REQUIRE OR ANY SPECIAL CONSTRUCTION WHICH MAY BE