ELECTRICAL SPECIFICATIONS

BASIC ELECTRICAL REQUIREMENTS

SCOPE

1. THIS SPECIFICATIONS AND THE CONTRACT DRAWINGS ARE INTENDED TO BE UTILIZED BY THE CONTRACTOR TO INSTALL CERTAIN ELECTRICAL AND COMMUNICATIONS EQUIPMENT, BUT ARE NOT TO BE INTERPRETED TO CONTAIN CERTAIN BASIC SYSTEM INSTALLATION KNOWLEDGE ESSENTIAL FOR A COMPLETE AND QUALITY INSTALLATION.
2. THE CONTRACTOR IS TO FURNISH LABOR, MATERIALS AND EQUIPMENT REQUIRED TO COMPLETELY INSTALL EACH SYSTEM INDICATED ON THE PLANS AND AS HERE WITHIN SPECIFIED.
3. THE CONTRACTOR IS TO CAREFULLY EXAMINE THE SITE, PLANS AND SPECIFICATIONS AND INCLUDE LABOR AND EQUIPMENT NECESSARY TO PERFORM, BUT NOT NECESSARILY LIMITED TO, THE FOLLOWING WORK:

A. DEMOLITION AS REQUIRED.

B. THE FURNISHING AND INSTALLING OF POWER WIRING, CIRCUIT BREAKERS, AND DISCONNECTS FOR ELECTRICALLY OPERATED EQUIPMENT SET UNDER THIS OR OTHER CONTRACTS.

GENERAL

1. THE CONTRACTOR IS TO FURNISH EQUIPMENT, LABOR, MATERIAL TOOLS, SERVICES, FACILITIES AND SUPERVISION NECESSARY FOR INSTALLATION OF THE ELECTRICAL SYSTEMS, IN GENERAL, AS NOTED UNDER THE SCOPE AND MORE FULLY SPECIFIED AND SHOWN ON THE DRAWINGS. THE CONTRACTOR IS TO CAREFULLY EXAMINE THE SITE, EXISTING CONDITIONS. PLANS AND SPECIFICATIONS BEFORE SUBMITTING THEIR PROPOSAL AS THEY WILL BE HELD RESPONSIBLE FOR A COMPLETE INSTALLATION IN EVERY DETAIL.
2. EQUIPMENT IS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS FOR THE TYPE AND CAPACITIES OF EACH PIECE OF EQUIPMENT. THE CONTRACTOR IS TO OBTAIN THESE INSTRUCTIONS FROM THE MANUFACTURER AND INCLUDE SAME WITH THE SUBMISSION OF THE EQUIPMENT. THE TYPE, CAPACITY AND APPLICATION OF EQUIPMENT ARE TO BE SUITABLE AND CAPABLE OF SATISFACTORY OPERATION FOR THE PURPOSE INTENDED.

INSTRUCTION TO BIDDERS/CONTRACTORS

1. MATERIALS AND EQUIPMENT FURNISHED UNDER THE CONTRACT ARE TO BE "COMMERCIAL QUALITY" NEW AND BEAR THE UNDERWRITER'S LABORATORIES, INC., LABEL WHEREVER A STANDARD HAS BEEN ESTABLISHED BY THE AGENCY. CONSTRUCTION IS TO BE EXECUTED WITH THE MAXIMUM SPEED CONSISTENT WITH GOOD WORKMANSHIP. THE COMPLETE INSTALLATION IS SUBJECT TO THE APPROVAL OF THE ARCHITECT.
2. THE COMPLETE ELECTRICAL INSTALLATION IS TO BE SUBJECT TO REGULATIONS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS AND APPLICABLE FEDERAL (INCLUDING OSHA), STATE AND LOCAL CODES, ORDINANCES AND REGULATIONS AND IS HEREBY MADE A PORTION OF THESE SPECIFICATIONS AND IS TO HAVE THE SAME FORCE AS IF PRINTED IN FULL HEREIN.
3. ANYTHING DRAWN OR SPECIFIED IS NOT TO CONFLICT WITH ANY LOCAL, MUNICIPAL STATE OR FEDERAL LAW, REGULATION OR ORDINANCE WHICH GOVERNS THE INSTALLATION OF ANY ELECTRICAL OR RELATED WORK. ITEMS ARE NOT TO BE INSTALLED IN CONFLICT WITH ANY CODE OR REGULATION. ANY CONFLICTS ARE TO BE RESOLVED BEFORE INSTALLATION BY THE CONTRACTOR AT NO ADDITIONAL COSTS.
4. THE CONTRACTOR IS TO BE SOLELY RESPONSIBLE FOR CONSTRUCTION, MATERIAL AND EQUIPMENT FURNISHED FOR THE CONTRACT UNTIL COMPLETION OF THE PROJECT AND FINAL ACCEPTANCE. DAMAGED WORK OR MATERIALS ARE TO BE REPLACED BY THIS CONTRACTOR AT HIS OWN EXPENSE.
5. THE ACTUAL LOCATION OF WIRING, OUTLETS, AND EQUIPMENT IS TO BE DETERMINED AT THE SITE.
6. CHANGES NECESSARY DUE TO LACK OF COORDINATION OR BECAUSE OF POOR WORKMANSHIP, AS DETERMINED BY THE ENGINEER ARE TO BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COSTS.
7. INSPECTION FEES, BACKCHARGES AND PERMITS AND CERTIFICATES REQUIRED FOR THE INSTALLATION, TESTS AND INSPECTIONS OF WORK PROVIDED UNDER THIS CONTRACT ARE TO BE PAID FOR BY THE CONTRACTOR. PRIOR TO BIDDING, THE CONTRACTOR MUST CONTACT EACH UTILITY AND/OR SERVICE COMPANY TO OBTAIN THEIR EXACT REQUIREMENTS.

COORDINATION

1. CHANGES NECESSARY DUE TO LACK OF COORDINATION OR BECAUSE OF POOR WORKMANSHIP ARE TO BE MADE AT NO ADDITIONAL COST TO THE OWNER, I.E., SHOULD ANY CONTRACTOR PROCEED WITH THE INSTALLATION OF EQUIPMENT, PIPE, ETC., PRIOR TO COORDINATING WITH THE OTHER CONTRACTORS AND THAT EQUIPMENT, PIPE, ETC., PREVENTS PROPER INSTALLATION OF WORK OF OTHER TRADES, THE OFFENDING CONTRACTOR IS TO REMOVE AND REPLACE HIS WORK AT HIS OWN COST.
2. THE ACTUAL LOCATION OF CONDUIT AND EQUIPMENT IS TO BE DETERMINED AT THE SITE. THE CONTRACTOR IS TO CONFER WITH THE VARIOUS OTHER PROJECT CONTRACTORS AS TO THE LOCATION OF THE DIFFERENT LINES OF PIPES, DUCTS AND EQUIPMENT INSTALLED UNDER THEIR CONTRACTS BEFORE ERECTING ANY WORK IN ORDER TO AVOID INTERFERENCE. THE CONTRACTOR IS TO COOPERATE WITH OTHER CONTRACTORS FOR THE PROPER SECURING AND ANCHORING OF WORK.
3. THE CONTRACTOR IS TO VERIFY THE ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT WITH THE HEATING, PLUMBING AND GENERAL CONTRACTORS BEFORE PURCHASING ANY ELECTRICAL EQUIPMENT (SWITCHBOARD, PANELBOARDS, CIRCUIT BREAKERS, ETC.) AND WIRING.
4. VERIFY ALL APPLIANCES AND EQUIPMENT WITH OWNER PRIOR TO CONSTRUCTION TO VERIFY CORRECT RECEPTACLES, WIRING, BREAKERS, ETC. REQUIRED FOR DEDICATED OUTLETS.

CUTTING AND PATCHING – EXISTING CONSTRUCTION

1. CUTTING AND PATCHING IN THE EXISTING BUILDING NECESSARY FOR THE INSTALLATION OF THE ELECTRICAL WORK IS TO BE DONE BY THE ELECTRICAL CONTRACTOR. PATCHING IS TO MATCH THE EXISTING MATERIALS AND FINISHES. WHERE PAINTED SURFACES ARE PATCHED, THE ELECTRICAL CONTRACTOR IS TO PAINT PATCHING TO MATCH THE EXISTING COLOR FINISHED WITH A MINIMUM OF A PRIME COAT AND TWO (2) FINISH COATS OF SHERWIN WILLIAMS OR APPROVED PAINTED COLOR AS SELECTED BY THE OWNER.
2. PATCHING SHALL BE DONE AS PER APPROVED METHODS AND MATERIALS BY THE ARCHITECT

DUST, DIRT AND NOISE

1. THE CONTRACTOR IS TO DO CUTTING AND PATCHING IN A MANNER TO CAUSE THE LEAST DUST, DIRT AND NOISE. WALLS, FLOORS FURNITURE ETC. ARE TO BE PROPERLY PROTECTED BY THE USE OF COVERINGS, DROP CLOTHES OR BARRIERS AS REQUIRED.
2. THE INTERIOR PREMISES OF THE BUILDING IS TO BE KEPT AS CLEAN AS POSSIBLE DURING THE ENTIRE CONSTRUCTION.
3. AT NO TIME IS THE CONTRACTOR TO INTERFERE WITH THE NORMAL OPERATION OF THE BUILDING BY ALLOWING DEBRIS, EXCESS MATERIALS, ETC., TO REMAIN ON THE PREMISES. DAILY CLEANUP IS REQUIRED.
4. DUST AND DIRT ARE TO BE REMOVED IN THE BUILDING AREAS BY THE USE OF AN INDUSTRIAL TYPE VACUUM CLEANER.

CONTINUITY OF SERVICE

1. UNINTERRUPTED ELECTRICAL SERVICE IS TO BE MAINTAINED DURING THE ENTIRE TIME REQUIRED FOR THE COMPLETE INSTALLATION OF THE WORK CONTEMPLATED UNDER THESE SPECIFICATIONS AND DRAWINGS.
2. THE CONTRACTOR IS TO ARRANGE HIS WORK AND PROCEED IN SUCH A MANNER AS WILL LEAST INTERFERE WITH THE NORMAL USE OF THE BUILDING AND FACILITIES. TEMPORARY EQUIPMENT, CABLE AND WHATEVER ELSE IS NECESSARY ARE TO BE PROVIDED AS REQUIRED TO MAINTAIN ELECTRICAL SERVICE. TEMPORARY SERVICE FACILITIES, IF REQUIRED AT ANY TIME, ARE NOT TO BE DISCONNECTED OR REMOVED UNTIL NEW SERVICES ARE PLACED IN PROPER OPERATION.
3. IF ANY SERVICE OR SYSTEM MUST BE INTERRUPTED, THE CONTRACTOR IS TO REQUEST PERMISSION IN WRITING STATING THE DATE, TIME, ETC., THAT SYSTEM OR SERVICE IS TO BE INTERRUPTED AND THE AREAS AFFECTED. THIS REQUEST IS TO BE MADE IN SUFFICIENT TIME FOR PROPER ARRANGEMENTS TO BE MADE. WRITTEN PERMISSION IS TO BE OBTAINED FROM THE OWNER BEFORE INTERRUPTING THE ELECTRICAL SERVICE.
4. INTERRUPTIONS OF ELECTRICAL SERVICE AND WORK ARE TO BE DONE AT THE TIME DESIGNATED BY THE ARCHITECT AND OWNER.

INSTRUCTIONS AND MAINTENANCE MANUALS

1. THIS CONTRACTOR IS TO FURNISH THE SERVICES OF COMPETENT PERSONNEL TO INSTRUCT EMPLOYEES DESIGNATED BY THE ARCHITECT IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT AND SYSTEMS INSTALLED UNDER THE CONTRACT.
2. A LETTER OF CERTIFICATION ITEMIZING THE EQUIPMENT, SYSTEM, INSTRUCTOR AND BEARING THE SIGNATURE OF THE INSTRUCTORS AND EMPLOYEES INSTRUCTED IS TO BE DELIVERED TO THE ARCHITECT UPON FINAL COMPLETION OF THE PROJECT.
3. THE CONTRACTOR IS TO FURNISH THE OWNER WITH THREE (3) COPIES OF A BOUND "MAINTENANCE MANUALS" CONTAINING COMPLETE OPERATING INSTRUCTIONS, PREVENTIVE MAINTENANCE PROCEDURES, MANUFACTURERS' CATALOG NUMBERS AND COMPLETE DESCRIPTION AND PARTS LIST OF EACH PIECE OF EQUIPMENT FURNISHED UNDER THE CONTRACT.

BALANCING

1. THE SYSTEM OF FEEDER AND BRANCH CIRCUITS FOR POWER AND LIGHTING IS TO BE CONNECTED TO PANELBOARD BUSSES IN SUCH A MANNER THAT LOADS CONNECTED THERETO WILL BE BALANCED ON EACH PHASE AS CLOSELY AS PRACTICAL. SHOULD THERE BE ANY UNFAVORABLE CONDITION OF BALANCE ON ANY PART OF THE ELECTRIC SYSTEMS, THE ELECTRICAL CONTRACTOR IS TO MAKE SUCH CHANGES THAT MAY BE SUGGESTED BY THE ENGINEER TO REMEDY THE UNBALANCED CONDITION AT NO ADDITIONAL COST.

EQUIPMENT TESTS

CONTRACT.

2. THE CONTRACTOR IS TO IMMEDIATELY REMEDY DEFECTS AND SHORTCOMINGS. ADDITIONAL TESTS ARE TO BE PERFORMED AT NO ADDITIONAL CONTRACT COST.
3. EQUIPMENT FURNISHED TO THE ELECTRICAL CONTRACTOR BY ANOTHER CONTRACTOR IS TO BE TESTED IN THE PRESENCE OF THAT CONTRACTOR TO DETERMINE SATISFACTORY OPERATION AND PERFORMANCE OF FUNCTION INTENDED.
4. DO TESTING WHEN SO DIRECTED BY THE ARCHITECT BEFORE FINAL ACCEPTANCE.

ELECTRICAL TESTS

1. THE CONTRACTOR IS TO MAKE VOLTAGE AND MEGGER TESTS OF CIRCUITS AS REQUESTED BY THE ARCHITECT AND/OR ANY INSPECTION DEPARTMENT HAVING JURISDICTION. THE ELECTRICAL CONTRACTOR IS TO FURNISH AND INSTALL EQUIPMENT AND LABOR REQUIRED FOR THESE TESTS.

GUARANTEE

1. THE CONTRACTOR IS TO GUARANTEE FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE IN WRITING BY THE ENGINEER THAT MATERIAL, EQUIPMENT AND WORKMANSHIP, FURNISHED UNDER THE CONTRACT, ARE FREE FROM DEFECTS. THE CONTRACTOR IS TO REPLACE ANY EQUIPMENT OR MATERIAL FOUND DEFECTIVE WITHIN THE GUARANTEE PERIOD AT NO COST TO THE OWNER.

SPECIAL ENGINEERING SERVICES

1. IN THE INSTANCE OF COMPLEX OR SPECIALIZED ELECTRICAL SYSTEMS, THE INSTALLATION, FINAL CONNECTIONS AND THE TESTING OF SUCH SYSTEMS ARE TO BE MADE UNDER THE DIRECT SUPERVISION OF COMPETENT AUTHORIZED SERVICE ENGINEERS WHO ARE TO BE IN THE EMPLOY OF THE RESPECTIVE EQUIPMENT MANUFACTURER.
2. ANY EXPENSES INCURRED BY THESE EQUIPMENT MANUFACTURER'S REPRESENTATIVES ARE TO BE BORNE BY THE CONTRACTOR.

ACCESS PANELS

1. THE CONTRACTOR IS TO FURNISH ACCESS PANELS NO LESS THAN 12" BY 16" UNLESS OTHERWISE NOTED ON THE DRAWINGS FOR ACCESS TO CONCEALED PULL BOXES, JUNCTION BOXES OR SIMILAR ITEMS WHERE NO OTHER MEANS OF ACCESS IS PROVIDED. THE ELECTRICAL CONTRACTOR IS TO DELIVER ACCESS PANELS TO THE GENERAL CONTRACTOR FOR INSTALLATION.
2. ACCESS PANELS ARE TO BE STEEL CONSTRUCTED WITH NO. 16 GAUGE WALL OR CEILING FRAME AND NO. 14 GAUGE PANEL DOOR. DOORS ARE TO BE PROVIDED WITH CONCEALED HINGES SECURED WITH SUITABLE CLIPS AND COUNTER SUNK SCREWS.
3. OUTSIDE OF ACCESS PANEL IS TO FINISH FLUSH WITH FINISHED WALL OR CEILING SURFACES AND HAVE A SHOP COAT OF PAINT TO MATCH THE ADJACENT AREAS.
4. ACCESS PANELS INSTALLED IN FIRE RATED CEILINGS OR WALLS ARE TO BE SIMILAR RATED.

MISCELLANEOUS STEEL

1. FURNISH AND INSTALL NECESSARY STEEL ANGLES, BEAMS, CHANNELS, HANGER RODS AND OTHER SUPPORTS FOR EQUIPMENT AND PIPING FURNISHED UNDER THIS CONTRACT REQUIRING SUPPORT OR SUSPENSION FROM BUILDING STRUCTURE EXCEPT SUPPORT STEEL WHERE OTHERWISE NOTED ON THE PLANS.

SLEEVES AND LINTELS

1. THE CONTRACTOR IS TO FURNISH AND SET SLEEVES FOR CONDUITS PASSING THROUGH EXTERIOR MASONRY WALLS ABOVE GRADE, WATERPROOF WALLS AND THROUGH ROOFS. SLEEVES ARE TO BE CONSTRUCTED OF 20 GAUGE GALVANIZED STEEL AND BE FINISHED FLUSH ON BOTH SIDES OF THE WALL.
2. THE CONTRACTOR IS TO BE RESPONSIBLE FOR LOCATING SLEEVES AND LINTELS FOR CONDUITS PASSING THROUGH EXTERIOR MASONRY WALLS ABOVE GRADE, WATERPROOF WALLS AND THROUGH ROOFS.
3. SLEEVES TO BE FURNISHED AND PROPERLY INSTALLED AND SECURELY CEMENTED IN PLACE BY THE CONTRACTOR.

FIREPROOFING

1. WHERE CONDUITS, BOXES OR EQUIPMENT OF ANY TYPE PASS THROUGH FIRE RATED CEILINGS, FLOORS AND WALLS, THE CONTRACTOR IS TO THOROUGHLY SEAL SUCH OPENINGS WITH HIGH TEMPERATURE FIRE RESISTING MATERIALS. O.Z./GEDNEY FIRE-SEAL FITTINGS OR APPROVED EQUAL, IS TO BE USED AT OPENINGS. THE CONTRACTOR IS TO BE RESPONSIBLE FOR PROVIDING NECESSARY FIRE RESISTANT MATERIALS AND COVERS, WHERE FIRE RATED PORTIONS OF THE BUILDING STRUCTURE ARE PENETRATED UNDER THIS CONTRACT, IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA, AND OTHER APPLICABLE CODES.
2. HOLES, VOIDS AND SLEEVES CREATED OR INSTALLED TO EXTEND ELECTRICAL SYSTEMS THROUGH WALLS OR CEILINGS TO BE SEALED BY THE CONTRACTOR WITH AN INTRUMESCENT MATERIAL CAPABLE OF EXPANDING UP TO 8 TO 10 TIMES WHEN EXPOSED TO TEMPERATURES BEGINNING AT 250°F. IT IS TO BE U.L. CLASSIFIED AND HAVE APPROPRIATE CODE APPROVED RATINGS FOR THREE (3) HOURS PER A.S.T.M. E–814.
3. ACCEPTABLE MATERIALS ARE TO BE 3M BRAND FIRE BARRIER PENETRATION SEALING SYSTEMS CAULK, PUTTY, STRIP AND SHEET FORMS OR APPROVED EQUAL. METHOD OF APPLICATION IS TO BE IN ACCORDANCE WITH MANUFACTURER'S LATEST RECOMMENDATIONS WHICH ARE TO BE FURNISHED AS PART OF THE "SHOP DRAWINGS".
4. GENERALLY, BLOCKING MATERIALS ARE TO BE METAL; HOWEVER, SHOULD WOOD BLOCKING BE UTILIZED AT ANY LOCATION, THE BLOCKING MUST BE MADE

PROJECT RECORD DOCUMENTS

1. DURING THE PROGRESS OF THE WORK, THE CONTRACTOR, ASSIGNED SUB–CONTRACTORS AND MAJOR SUB–CONTRACTORS EMPLOYED BY THEM, ARE TO MAINTAIN A CURRENT (DAILY) RECORD SET OF CONTRACT DWGS. (PRINTS) AND SPECIFICATIONS,INDICATING THEREON WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS, INCLUDING WORK COVERED BY SUPPLEMENTAL CONTRACTS, ADDENDA, CHANGE ORDERS OR OTHER BONA FIDE SOURCES.
2. AT THE COMPLETION OF THE CONSTRUCTION WORK AND PRIOR TO ACCEPTANCE OF THE PROJECT, THE CONTRACTOR IS TO FURNISH THE ARCHITECT A COMPLETE SET OF "AS–BUILT" RED–LINED PRINTS INDICATED THEREON CHANGES AND REVISIONS FROM THE ORIGINAL CONTRACTOR DOCUMENTS AND SUCH ADDITIONAL DETAILS AS TO PROVIDE A COMPLETE REFERENCE DOCUMENT FOR USE BY OWNER. IF VARIATIONS AND DETAILS CANNOT BE SHOWN CLEARLY THEREON, THEN THE CONTRACTOR IS TO PREPARE SUPPLEMENTAL DRAWINGS ADEQUATE TO IMPART THE INFORMATION.
3. INDICATIONS ON "RECORD" DRAWINGS ARE TO BE EXECUTED IN A LEGIBLE MANNER BY A COMPETENT DRAFTSPERSON, PAID BY THE CONTRACTOR, USING METHODS AND LEGEND PRESENTATIONS APPROVED IN CONFERENCE WITH THE ENGINEER AND COMPATIBLE WITH THE OVERALL SCHEME OF THE ORIGINAL DRAWINGS AS RESPECTS SCALE, DRAWING SHEET SIZES AND SEQUENTIAL INDEXING.
4. THE ENGINEER IS TO RECEIVE AND REVIEW "AS–BUILT" DRAWINGS AND GUIDE THE CONTRACTOR IN HIS EXECUTION OF ANY NECESSARY CORRECTIONS.

ELECTRICAL REQUIREMENTS FOR EQUIPMENT INSTALLATION

1. CONDUIT AND POWER WIRING OF REQUIRED SIZE AND VOLTAGE FROM A PANELBOARD OR SIMILAR SOURCE ARE TO BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR, TO THE EQUIPMENT FURNISHED BY THE HEATING CONTRACTOR, PLUMBING CONTRACTOR OR GENERAL CONTRACTOR. A JUNCTION BOX OR MEANS OF DISCONNECT (AS REQUIRED) IS TO BE FURNISHED AND INSTALLED AT THE EQUIPMENT BY THE CONTRACTOR FURNISHING THE EQUIPMENT.
2. UNLESS OTHERWISE SPECIFIED OR NOTED ON THE DRAWINGS, A FULL COMPLEMENT OF CONTROL COMPONENTS, REQUIRED FOR THE INTENDED USE AND/OR OPERATION OF EQUIPMENT, INCLUDING LINE STARTERS, CONTACTORS, MAGNETIC CONTROLLERS, START–STOP SWITCHES, MULTI–SPEED SWITCHES, STEP CONTROLLERS AND/OR OTHER CONTROL DEVICES REQUIRED WHETHER INTEGRAL OR REMOTE, IS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR FURNISHING THE EQUIPMENT. THE POWER WIRING (WHERE REQUIRED) THROUGH THESE DEVICES IS TO BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
3. FURNISHING AND INSTALLING OF CONTROL WIRING FOR CONTROL DEVICES AND PROPER FUNCTIONING OF EQUIPMENT IS TO BE THE RESPONSIBILITY OF THE CONTRACTOR FURNISHING THE EQUIPMENT.
4. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR POWER CONNECTIONS TO EQUIPMENT AND FOR PROPER ROTATION OF MOTORS.
5. THE APPROXIMATE LOCATION OF MOTORS AND CONTROL EQUIPMENT IS INDICATED ON THE DRAWINGS. THE CONTRACTOR IS TO MAKE ALLOWANCE FOR RELOCATIONS THAT MAY DEVELOP AT THE TIME OF INSTALLATION. THE EXACT LOCATION OF THE EQUIPMENT WILL BE DETERMINED AT THE SITE BY THE ARCHITECT, THE CONTRACTOR WHOSE EQUIPMENT IS BEING INSTALLED AND THE ELECTRICAL CONTRACTOR.

RIGID CONDUIT

1. CONDUIT IS TO BE HEAVY WALL, RIGID STEEL, MANUFACTURED OF MILD STEEL TUBE OF UNIFORM THICKNESS AND SMOOTH CIRCULAR BORE APPROVED FOR USE AS AN ELECTRICAL RACEWAY AND CONFORM TO THE FEDERAL SPECIFICATIONS WW–C–581, AND BE ZINC–COATED, GALVANIZED OR SHERADIZED INSIDE AND OUTSIDE. FACTORY THREADED CONDUIT IS TO BE FURNISHED WITH PROTECTIVE COATED THREADS. CONDUIT IS TO BE H.K. PORTER COMPANY, YOUNGSTOWN SHEET AND TUBE COMPANY OR TRIANGLE CONDUIT AND CABLE COMPANY.
2. CONDUITS ARE TO BE ASSEMBLED WITH GALVANIZED HEAVY WALL THREADED COUPLINGS AND FITTINGS.

RIGID NON–METALLIC CONDUIT

1. CONDUIT IS TO BE PVC TYPE 40 CONDUIT FOR APPLICATION IN UNDERGROUND AND ENCLOSED APPLICATIONS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (ARTICLE 347).
2. CONDUIT IS TO BE 90° C UL RATED OR EQUIVALENT. MATERIAL IS TO COMPLY WITH NEMA SPECIFICATION STAMPED OR MOLDED ON EVERY FITTINGS.
4. CONDUIT AND FITTINGS ARE TO BE IDENTIFIED FOR TYPE AND MANUFACTURER AND BE TRACKABLE TO LOCATION OF PLANT AND DATE MANUFACTURED.
5. THE CONDUIT IS TO BE MADE FROM POLYVINYL CHLORIDE C–300 COMPOUND WHICH INCLUDES INERT MODIFIERS TO IMPROVE WEATHERABILITY, HEAT DISTORTION. CLEAN REWORK MATERIAL, GENERATED BY THE MANUFACTURER'S OWN CONDUIT PRODUCTION, MAY BE USED BY THE SAME MANUFACTURER, PROVIDED THE END PRODUCTS MEET THE REQUIREMENTS OF THIS SPECIFICATION.
6. THE CONDUIT AND FITTINGS ARE TO BE HOMOGENEOUS PLASTIC MATERIAL FREE FROM VISIBLE CRACKS, HOLES OR FOREIGN INCLUSIONS. THE CONDUIT BORE IS TO BE SMOOTH AND FREE OF BLISTERS, NICKS OR OTHER IMPERFECTIONS WHICH COULD MAR CONDUCTORS OR CABLES.
7. CONDUIT, FITTINGS AND CEMENT ARE TO BE PRODUCED BY THE SAME MANUFACTURER TO ASSURE SYSTEM INTEGRITY.
8. CONDUIT AND FITTINGS ARE TO BE TESTED IN ACCORDANCE WITH THE TESTING REQUIREMENTS DEFINED IN NEMA TC–2, NEMA TC–3 AND UL–651 AND UL–514 (FITTINGS). THE ACCEPTANCE CRITERIA IS TO BE AS GIVEN IN THE SAME STANDARDS.
9. CONDUIT AND FITTINGS ARE TO BE SOLVENT CEMENTED IN APPLICATIONS IN ACCORDANCE WITH INSTRUCTIONS FROM THE MANUFACTURER.
10. WHERE CONDUIT IS RUN UNDER FLOORS AND EXTERIOR OF BUILDING, CONTRACTOR IS TO CHANGE TO A METAL CONDUIT (AS SPECIFIED) UNDERGROUND AND CONTINUE CONDUIT RUN. WHERE CONDUITS PASS THRU FOOTER, OR BELOW GRADE WALL, CONTRACTOR IS TO SLEEVE CONDUIT WITH A SLEEVE TWICE THE SIZE OF THE CONDUIT.

ELECTRICAL METALLIC TUBING

1. ELECTRICAL METALLIC TUBING IS TO BE MADE OF COLD ROLLED STEEL, OXYACETYLENE WELDED TO FORM A PERFECTLY TRUE TUBE OF UNIFORM THICKNESS. TUBING IS TO BE PICKLED AND CLEANED TO REMOVE SCALE AND FOREIGN SUBSTANCES AND THEN GALVANIZED. ELECTRICAL METALLIC TUBING IS TO CONFORM TO FEDERAL SPECIFICATIONS WW–C–806A. TUBING IS TO BE H.K. PORTER COMPANY, YOUNGSTOWN SHEET AND TUBE CO. OR TRIANGLE CONDUIT AND CABLE COMPANY.
2. ELECTRICAL METALLIC TUBING IS TO BE ASSEMBLED BY USE OF THREADED OR SET–SCREW TYPE CONNECTORS AND COUPLINGS. THREADLESS TYPE FITTINGS ARE TO BE TIGHTENED WITH WRENCHES. SET SCREW TYPE FITTINGS ARE TO HAVE CAPTIVE TYPE SCREWS. COUPLINGS AND FITTINGS ARE TO BE AS MANUFACTURED BY THOMAS AND BETTS CO., ETP DIVISION OF BURGO INDUSTRIES, STEEL CITY OR RACO. SET SCREW FITTINGS ¼" AND LARGER ARE TO HAVE DUAL SET SCREWS.

FLEXIBLE METALLIC CONDUIT

1. FLEXIBLE METALLIC CONDUIT IS TO BE HOT DIPPED, GALVANIZED STEEL CONSTRUCTION WITH INTERLOCKING CONVULSIONS, CONFORMING TO FEDERAL SPECIFICATION WW–C–566.
2. FLEXIBLE CONDUIT IS TO BE ATTACHED TO RIGID CONDUIT, FIXTURES OR BOXES WITH MALLEABLE IRON, GALVANIZED COUPLINGS.

FLEXIBLE LIQUID–TIGHT METALLIC CONDUIT

1. FLEXIBLE CONDUIT IS TO BE CONSTRUCTED WITH GALVANIZED STEEL CORE WHICH HAS EXTRUDED POLYVINYL CHLORIDE COVER. FLEXIBLE CONDUIT IS TO BE ASSEMBLED WITH FITTINGS MANUFACTURED FOR USE WITH FLEXIBLE, LIQUID–TIGHT CONDUIT. CONDUIT IS TO BE ANACONDA "SEALTITE" TYPE UA, WITH BONDING CONDUCTOR, STEEL CITY OR RACO.
2. CONDUIT IS TO BE ASSEMBLED BY USE OF LIQUID–TIGHT INSULATED CONNECTORS MANUFACTURED BY THOMAS AND BETTS COMPANY, RACO OR STEEL CITY.
3. CONDUIT AND FITTINGS ARE TO BE UNDERWRITERS" LABORATORIES, INC. APPROVED.

METAL CLAD, TYPE 'MC' CABLE

1. TYPE 'MC' CABLE IS TO BE CONSTRUCTED OF GALVANIZED STEEL ARMOR JACKET. CONDUCTORS ARE TO BE SOLID COPPER IN SIZES FROM 14 THRU 8 AND STRANDED COPPER IN SIZES FROM 6 THRU 1. CONDUCTORS ARE TO BE INSULATED WITH THHN–90° C INSULATION. EACH CABLE IS TO INCLUDE AN INTERNAL INSULATED COPPER EQUIPMENT GROUND CONDUCTOR MADE OF COPPER. 600 VOLTAGE RATED.
2. CABLE FITTINGS ARE TO BE UNDERWRITERS' LABORATORIES, INC., APPROVED.
3. PROVIDE ANTI–SHORT DEICES AT TERMINATIONS.
4. INSTALLATION OF TYPE 'MC' CABLE IS TO BE IN A WORKMANLIKE MANNER. "SPAGHETTI" TYPE INSTALLATION IS NOT PERMITTED.
5. 'MC' TYPE CABLE CONNECTED TO SURFACE MOUNTED PANELS ARE TO BE ENCLOSED IN SUITABLE METAL ENCLOSURES FROM PANELBOARDS TO CEILING AND FROM PANELBOARDS TO FLOOR. ENCLOSURES ARE TO BE PAINTED TO MATCH PANELBOARD.

CONDUIT SUPPORTS

1. EXPOSED CONDUITS ARE TO BE SECURELY FASTENED IN PLACE ON A MAXIMUM FIVE (5) FOOT INTERVALS. HANGERS, SUPPORTS OR FASTENINGS ARE TO BE PROVIDED AT EACH ELBOW AND AT THE END OF EACH STRAIGHT RUN TERMINATING AT A BOX OR CABINET.
2. HORIZONTAL AND VERTICAL RUNS ARE TO BE SUPPORTED BY ONE HOLE MALLEABLE STRAPS, CLAMP–BACKS OR OTHER APPROVED DEVICES WITH SUITABLE BOLTS, EXPANSION SHIELDS (WHERE NEEDED BEAM CLAMPS FOR MOUNTING TO BUILDING STRUCTURE OF SPECIAL BRACKETS.
3. ADJUSTABLE HANGERS MAY BE USED TO SUSPEND CONDUITS TWO (2) INCHES AND LARGER WHEN SEPARATELY LOCATED.
4. IF ADJUSTABLE TRAPEZE HANGERS ARE USED TO SUPPORT GROUPS OF PARALLEL CONDUITS, U–BOLTS OR SIMILAR TYPE CLAMPS ARE TO BE USED AT THE END OF EACH ELBOW J–BOLT OR APPROVED CLAMPS ARE TO BE INSTALLED ON EACH THIRD INTERMEDIATE TRAPEZE HANGER TO FASTEN EACH CONDUIT.
5. HANGERS ARE TO BE MADE OF DURABLE METALLIC MATERIALS SUITABLE FOR APPLICATION AND BE CORROSION PROTECTED SUITABLE FOR THIS AREA.
6. THE USE OF PERFORATED IRON STRAPS FOR SUPPORT WILL NOT BE PERMITTED REGARDLESS OF CONDUIT SIZE.
7. STRENGTH OF THE SUPPORTING EQUIPMENT IS TO BE OF SIZE AND TYPE TO SUPPORT TWO AND ONE HALF (2–1/2) TIMES THE COMBINED WEIGHT OF THE CONDUIT HANGER, CABLES, ETC., BEING SUPPORTED.

BUSHINGS AND LOCKNUTS

1. BUSHINGS FOR CONDUITS 1" AND SMALLER MAY BE TYPE A. THOSE FOR CONDUITS 1¼" AND LARGER ARE TO BE INSULATING MALLEABLE IRON, TYPE B. USE O.Z., STEEL CITY OR EQUAL.
2. LOCKNUTS UP TO AND INCLUDING 2" SIZE ARE TO BE THE GALVANIZED STANDARD WEIGHT TYPE. LOCKNUTS 2½" AND LARGER ARE TO BE THE HEAVY DUTY CAST TYPE. USE STEEL CITY, RACO OR EQUAL.
3. CONNECTORS ARE TO INSURE POSITIVE GROUND CONTINUITY.

WIRE AND CABLE

1. WIRE AND CABLE FOR FEEDERS, BRANCH CIRCUIT, CONTROL, ETC., ARE TO BE SOFT DRAWN COPPER CONDUCTORS, 600 VOLT, HEAT RESISTANT THERMOPLASTIC INSULATED, TYPE "THW", "THWN" OR "THHN" CONFORMING TO THE LATEST REQUIREMENTS O THE HEREIN SPECIFIED CODES.

A. ALUMINUM CONDUCTORS OR COPPER–CLAD ALUMINUM CONDUCTORS WILL NOT BE PERMITTED.

2. EVERY COIL OR REEL OF WIRE IS TO BEAR THE MANUFACTURER'S NAME, UNDERWRITERS" LABEL, TYPE, VOLTAGE, SIZE LENGTH AND MANUFACTURING DATE AND BE DELIVERED TO THE JOB IN ORIGINAL CONTAINERS FOR INSPECTION.
3. WIRE AND CABLE ARE TO BE AS MANUFACTURED BY NARRAGNSETT, CIRCLE, GENERAL WIRE AND CABLE, PARANITE, ROME OR EQUAL.
4. THE MINIMUM WIRE SIZE FOR FEEDERS IS NOT TO BE LESS THAN INDICATED ON THE DRAWINGS.
5. UNLESS NOTED OTHERWISE ON THE DRAWINGS, THE MINIMUM WIRE SIZE FOR BRANCH CIRCUITS IS TO BE NO. 12 AWG, EXCEPT NO. 10 AWG MINIMUM SIZE IS TO BE USED IN RUNS WHERE DISTANCE FROM THE PANELBOARD TO FIRST OUTLET EXCEEDS 75 FEET DUE TO CONDUIT ROUTING.
6. NEUTRAL CONDUCTORS ARE TO BE INSTALLED FOR SINGLE PHASE AND 3–PHASE CIRCUITS AS REQUIRED FOR SINGLE PHASE ELEMENTS AND CONTROL CIRCUITS.
7. SPLICES AND CONNECTIONS ON NO. 8 AWG OR LARGER ARE TO BE MADE WITH APPROVED SOLDERLESS TYPE CONNECTORS.
8. WIRE NO. 8 AWG AND LARGER IS TO BE STRANDED. WIRE NO. 10 AND SMALLER MAY BE SOLID.
9. BRANCH CIRCUIT CONDUCTORS ARE TO BE COLOR–CODED WITH A SEPARATE COLOR FOR EACH PHASE AND NEUTRAL USED CONSISTENTLY THROUGHOUT THE ENTIRE INSTALLATION.
10. NO CONDUCTORS ARE TO BE PULLED IN CONDUIT OR EMT SYSTEM UNTIL WORK WHICH MAY CAUSE DAMAGE TO THE CABLE HAS BEEN COMPLETED.
11. WIRE AND CABLE ARE TO BE INSTALLED IN CONDUIT IN A MANNER NOT TO DAMAGE THE INSULATION. ONLY U.L. APPROVED WIRE PULLING COMPOUNDS ARE TO BE USED TO DECREASE THE FRICTION WHEN PULLING IN WIRES, SUCH AS "WIRE LUBE" BY IDEAL.
12. THE INSTALLATION OF WIRE AND CABLE IS TO BE DONE IN SUCH A MANNER TO PROVIDE A MINIMUM INSULATION RESISTANCE BETWEEN CONDUCTORS AND BETWEEN CONDUCTORS AND GROUND AS REQUIRED BY THE NATIONAL ELECTRICAL CODE.
13. WHERE OPEN CABLE IS INSTALLED IN RETURN AIR PLENUM ABOVE CEILINGS, FIRE RATED CABLE IS TO BE USED.

SAFETY SWITCHES

1. SAFETY SWITCHES ARE TO BE 240 OR 600 VOLT, AS REQUIRED, SINGLE THROW, FUSIBLE HEAVY DUTY WITH COVER INTERLOCK, QUICK–MAKE, QUICK–BREAK, INDEPENDENT OF HANDLE, TYPE HD IN NEMA TYPE I ENCLOSURE, AS MANUFACTURED BY SQUARE D, CUTLER HAMMER OR GENERAL ELECTRIC COMPANY OR APPROVED EQUIVALENT.
2. FUSES FOR SAFETY SWITCHES ARE TO BE AS SPECIFIED UNDER "FUSES".

IDENTIFICATION OF SWITCHES, PANELBOARDS AND CONTROLS

1. FURNISH AND INSTALL NAME TAGS AS OUTLINED HEREWITHIN THESE SPECIFICATIONS.

A. SWITCHES (FURNISHED UNDER THIS CONTRACT MOUNTED REMOTE FROM EQUIPMENT)

1. EQUIPMENT NAME
2. VOLTAGE (EX. 1ø–3W–120/240 VOLTS)

B. PANELBOARDS

1. PANELBOARD DESIGNATION
2. VOLTAGE (EX. 1ø–3W–120/240 VOLTS)

2. NAME TAGS ARE TO BE MADE OF RIGID BLACK PLASTIC LAMINATE WITH ¼" HIGH WHITE LETTERS. NAME TAGS ARE TO BE FASTENED TO EQUIPMENT BY HEAVY DUTY DOUBLE FACE TAPE.

CHARGES, PERMITS AND INSPECTIONS

1. THE CONTRACTOR IS TO PAY CHARGES, SECURE PERMITS AND OBTAIN INSPECTIONS AND APPROVALS REQUIRED FOR THE COMPLETE ELECTRICAL SYSTEM INSTALLATION. CERTIFICATION OF INSPECTION IS TO BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF CONTRACT.

FUSES

1. FUSES ARE TO BE OF THE AMPERE RATINGS INDICATED ON THE DRAWINGS AND HAVE A VOLTAGE RATING EQUAL TO OR GREATER THAN THE VOLTAGE AT THEIR POINT OF APPLICATION.
2. FUSES, FOR USE IN SYSTEMS RATED 600 VOLTS OR LESS ARE TO BE OF THE SAME MANUFACTURER TO FACILITATE POSITIVE SELECTIVE COORDINATION OF THE PROTECTIVE DEVICES.
3. FUSES, AS SPECIFIED ABOVE, ARE TO BE STORED IN A MOISTURE FREE LOCATION AND BE INSTALLED IN THE FUSE HOLDERS IMMEDIATELY PRIOR TO ENERGIZATION OF THE CIRCUIT IN WHICH THE FUSE IS APPLIED. IN NO CASE ARE FUSES TO BE INSTALLED AND SHIPPED WITH EQUIPMENT TO ASSURE COMPLIANCE WITH THE REQUIREMENT FOR MOISTURE–FREE STORAGE.
4. FURNISH ONE (1) SPARE SET OF THREE (3) FUSES FOR EACH SPECIFIED SIZE OF FUSES INSTALLED. THESE SPARE FUSES ARE TO BE DELIVERED TO THE OWNER AT THE TIME OF ACCEPTANCE OF THE PROJECT, NEATLY ENCASED IN SUITABLE CONTAINERS OR CABINETS AS APPROVED BY THE ARCHITECT, FOR LOCATION NEAR POINTS OF USE.
5. FUSES FOR SAFETY SWITCHES AND DISTRIBUTION SWITCHES IN DISTRIBUTION SWITCHBOARD WILL BE CLASS R WITH AMPERE RATINGS OF 1/10 AMPERE TO 600 AMPERES AND BE OF A DUAL–ELEMENT CONSTRUCTION, INCORPORATING A SPRING ASSISTED THERMAL OVERLOAD ELEMENT USING A 280°F MELTING POINT ALLOY TO PROVIDE THERMAL PROTECTION FOR THE FUSE AND FUSEHOLDER, AND A SEPARATE SHORT–CIRCUIT ELEMENT. THE DESIGN IS TO PROVIDE TIME–DELAY OF NOT LESS THAN 10 SECONDS AT 500 PERCENT OF AMPERE RATING. THE INTERRUPTING RATING IS TO BE ALUMINUM OF 200,000 AMPERES RMS SYMMETRICAL AS LISTED BY UNDERWRITERS' LABORATORIES. PEAK LET–THRU CURRENT (LP) AND ENERGY LET–THRU VALVES (12T) ARE NOT TO EXCEED THE VALUES ESTABLISHED BY UNDERWRITERS' LABORATORIES STANDARD FOR CLASS K–5 FUSES. FUSES ARE TO BE BUSSMAN MANUFACTURING DIVISION OF MCGRAW EDISON COMPANY "LOW PEAK", CLASS K–5, TYPE "LPN–RKSP" 250 VOLT.

GROUNDING

1. THE CONTRACTOR IS TO FURNISH AND INSTALL THE ELECTRICAL GROUNDING SYSTEM AS REQUIRED AND IN COMPLIANCE WITH THE MOST RECENT ISSUE OF THE NATIONAL ELECTRICAL CODE, POWER COMPANY POLICY AND RECOMMENDATIONS, APPLICABLE REGULATIONS, AND IN ACCORDANCE WITH THE SPECIFICATIONS AND CONTRACT DRAWINGS.
2. GROUND WIRING IS NOT NECESSARILY SHOWN ON THE DRAWINGS AND IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. IT IS ESSENTIAL AND EXTREMELY IMPORTANT THAT THE CONTRACTOR THOROUGHLY FAMILIARIZE HIM/HERSELF WITH THE APPLICABLE CODES AND REGULATIONS PRIOR TO INSTALLATION OF THE GROUNDING SYSTEM.
3. FURNISH AND INSTALL NECESSARY MATERIALS AND ACCESSORIES TO SOLIDLY GROUND NON–CURRENT CARRYING METAL PARTS OF THE ELECTRICAL SYSTEM, INCLUDING WHERE APPLICABLE, BUT NOT LIMITED TO:

TRANSFORMER CASES, ENCLOSURES AND STRUCTURES
PANELBOARDS AND SWITCHBOARDS, ENCLOSURES AND STRUCTURE
CONDUIT SYSTEMS, PULLBOXES, ETC.
MOTOR FRAMES
DISCONNECT SWITCH ENCLOSURES
LIGHTING SYSTEM FIXTURES

A. LIGHTING AND POWER PANELS ARE TO BE COMPLETE WITH ADEQUATE SIZE GROUND BUS WITH SUFFICIENT CLAMPS FOR TERMINATING CIRCUITS WITHIN THE CAPACITY OF THE PANEL.

B. THE LIGHTING SYSTEM MAY BE GROUNDED THROUGH THE BRANCH CIRCUIT CONDUITS, EXCEPT AS OTHERWISE PROHIBITED BY THE NATIONAL ELECTRICAL CODE.

C. RECEPTACLES ARE TO BE GROUNDED BY CONNECTING AN INSULATED GROUND CONDUCTOR FROM THE RECEPTACLE GROUNDING TERMINAL TO A CLAMP ON THE PANELBOARD EQUIPMENT GROUND BUS. THE GROUND CONDUCTOR IS TO BE RUN IN THE SAME CONDUIT AS THE CIRCUIT CONDUCTORS.

D. THE ENCLOSURES OF MOTOR STARTERS AND CONTROLLERS, WIREWAYS, LIGHTING AND POWER DISTRIBUTION PANELS, AND DRY TYPE TRANSFORMERS MAY UTILIZE THE CONNECTING CONDUIT AS THE EQUIPMENT GROUNDING CONDUCTOR, UNLESS A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IS FURNISHED WITH THE MAIN FEEDER (UNLESS SHOWN OTHERWISE ON THE DRAWINGS). PROVIDE DOUBLE LOCK NUTS WITH GROUNDING BUSHINGS AND BONDING JUMPERS AT METAL ENCLOSURES.

E. THE FRAMES OF MOTORS ARE TO BE GROUNDED WITH A SEPARATE EQUIPMENT GROUNDING CONDUCTOR RUN IN THE SAME CONDUIT AS THE PHASE CONDUCTORS AND CONNECTED TO THE EQUIPMENT GROUND BUS OR GROUND STUD IN CASE OF SMALL MOTOR STARTERS.

4. FURNISH AND INSTALL GROUND CONDUCTORS AND CONNECTIONS AS FOLLOWS:

A. GROUND CONDUCTORS ARE TO BE COPPER AND SIZED BY THE ELECTRICAL CONTRACTOR UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

B. USE APPROVED PRESSURE TYPE BOLT–ON CLAMP FITTINGS THROUGHOUT, EXCEPT UNDERGROUND AND WHERE IT IS NOT PRACTICAL, IN WHICH CASE THERMITE WELDING IS TO BE USED.

C. THE WATER PIPE CONNECTION IS TO BE MADE WITH A CLAMP TYPE GROUND FITTING THAT BONDS BOTH THE CONDUIT AND CABLE TO THE WATER PIPE AND A BONDING JUMPER IS TO BE INSTALLED AROUND THE WATER METER.

D. GROUND CONDUCTORS ARE TO BE CONTINUOUS IN THEIR LENGTH WITH A MINIMUM OF JOINTS OR SPLICES INSTALLED IN EXPOSED RIGID STEEL CONDUIT AND SECURELY CLAMPED AT EACH END WHERE THE CONDUCTOR ENTERS AND LEAVES THE CONDUIT.

E. CONNECTIONS ARE TO BE TIGHT AND SOLID, SECURELY BOLTED TO THE EQUIPMENT. CONTACT SURFACES ARE TO BE THOROUGHLY CLEANED AND BRIGHT BEFORE CONNECTIONS ARE MADE TO INSURE GOOD METAL–TO–METAL CONTACT.

F. CONNECTIONS ARE TO BE MADE ACCESSIBLE FOR VISUAL INSPECTION; PARTICULARLY UNDERGROUND CONNECTIONS SHOULD NOT BE COVERED UNTIL THEY HAVE BEEN INSPECTED BY THE OWNER'S REPRESENTATIVES.

G. USE COPPER CABLE AND CLAMPS AT UNDERGROUND MECHANICAL JOINTS OF THE CAST IRON WATER SERVICE LINE.

H. GROUND CONDUCTORS FROM PROTECTIVE DEVICES SUCH AS LIGHTING ARRESTORS AND GRADING RINGS ARE TO BE KEPT AS STRAIGHT AND SHORT AS POSSIBLE. WHERE BENDS ARE NECESSARY, THEY ARE TO BE OF LARGE RADII TO MINIMIZE SURGE IMPEDANCE. THE ENTIRE DISTRIBUTION SYSTEM IS TO BE EFFECTIVELY AND SOLIDLY GROUNDED.

I. COPPER GROUND BUS BAR IS TO BE PROVIDED WHERE SHOWN OR REQUIRED.

J. PROVIDE BONDING JUMPERS ACROSS CONDUIT WHERE THE GROUNDING CONTINUITY MAY OTHERWISE BE BROKEN, SUCH AS FLEXIBLE AND EXPANSION JOINTS.

K. EQUIPMENT GROUNDING CONDUCTORS INSTALLED IN CONDUIT WITH OTHER INSULATED PHASE CONDUCTORS ARE ALSO TO BE INSULATED.

L. GROUNDING CONDUCTORS ARE TO BE LOCATED AND INSTALLED IN SUCH A MANNER TO PROVIDE THE SHORTEST AND MOST DIRECT PATH BETWEEN EQUIPMENT AND GROUND.

BRETT N. YONISH
50053

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 50053, EXPIRATION DATE: 10-13-2026

BRETT NICHOLAS YONISH DATE 02-04-2025

ELECTRICAL SPECIFICATIONS

CHILLER REPLACEMENT
COLLEGE CENTER
FOR
ALLEGANY COMMUNITY COLLEGE
WILLOWBROOK ROAD, CUMBERLAND, MD 21502

East Hills
Engineering
Associates
A LIMITED LIABILITY COMPANY

BRETT N. YONISH, P.E.
CHRISTOPHER G. ALBRIGHT, P.E.

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REVISIONS		
MARK	BY	DATE

DATE: 10–17–2025
DRAWN BY: J.L.L.
CHECKED BY: B.N.Y.
PROJECT NO. 25–015
DRAWING NO. E3.0

ORIGINAL DRAWING SIZE = 24"x36"

NOTE: DO NOT SCALE DRAWING - EACH CONTRACTOR IS TO VERIFY ALL EXISTING CONDITIONS AND ALL DIMENSIONS BEFORE BEGINNING ANY WORK. EACH CONTRACTOR IS TO FULLY COORDINATE THEIR WORK WITH THAT OF OTHERS. REFER TO THE CONTRACT AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

October 17, 2025 – 3:21pm T:\Projects\2025\25–015 – ACM College Center Chiller\Drawings\25–015 – E3.0.dwg