

SECTION 16A GENERAL ELECTRICAL REQUIREMENTS:

16A.1 GENERAL INSTALLATIONS

16A.1-1 GENERAL REQUIREMENTS

ALL REQUIREMENTS UNDER DIVISION 1 AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION 1. WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF DIVISION 1, THIS SECTION AND DIVISION TAKE PRECEDENCE. BECOME THOROUGHLY FAMILIAR WITH ALL THEIR CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION OR BOTH. WORK REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE ELECTRICAL SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INTERFERED TO BE NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTIONING AS IMPLIED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.

THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.

DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACTOR SHALL BE INTERFERED WITH OTHER PARTS OF THE WORK. FIGURED DIMENSIONS TAKE PRECEDENCE TO SCALED DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. CORRECT ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION, AT NO ADDITIONAL COST TO THE OWNER.

SPECIFICATIONS DEFINE THE QUALITATIVE REQUIREMENTS FOR PRODUCTS, MATERIALS, AND WORKMANSHIP UPON WHICH THE CONTRACT IS BASED.

16A.1-2 DEFINITIONS

WHENEVER USED IN THESE SPECIFICATIONS OR DRAWINGS, THE FOLLOWING TERMS SHALL HAVE THE INDICATED MEANINGS:

- 1. FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLING, INSTALLING, AND SIMILAR OPERATIONS.
2. INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO, AND AS REQUIRED: UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.
3. PROVIDE: TO FURNISH AND INSTALL COMPLETE, AND READY FOR THE INTENDED USE.
4. FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION, INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.
5. ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY, AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND OBLIGATIONS TO, THE "ARCHITECT".
6. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK.
7. NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.
8. THE TERMS "APPROVED EQUAL," "EQUIVALENT," OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED". THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, CERTIFIED, OR ALL THREE, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

16A.1-3 PRE-BID SITE VISIT

PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED OF CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

16A.1-4 MATERIAL AND WORKMANSHIP

PROVIDE ALL MATERIAL AND EQUIPMENT NEW AND IN FIRST CLASS CONDITION. PROVIDE MARKINGS OR A NAMEPLATE FOR ALL MATERIAL AND EQUIPMENT IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE, AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST AVAILABLE. GENERAL EXPERIENCED MECHANICS OF THE PROPER TRADES SHALL BE PROVIDED THE COMMERCIAL GRADE FOR ALL MATERIALS. EQUIPMENT LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE.

PROVIDE ALL HOISTS, SCAFFOLDS, STAGING, RAMPWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE PERFORMANCE OF THE ELECTRICAL WORK. STORE AND MAINTAIN ALL MATERIAL AND EQUIPMENT IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.

FURNISH ONLY MATERIAL AND EQUIPMENT THAT ARE LISTED, LABELED, CERTIFIED, OR ALL THREE, BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), WHENEVER ANY LISTING OR LABELING EXISTS FOR THE TYPES OF MATERIAL AND EQUIPMENT SPECIFIED. AT A MINIMUM, GENERAL WORK PRACTICES FOR ELECTRICAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NECA 1 (LATEST EDITION), "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

16A.1-5 MANUFACTURERS

IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.

WHERE A LIST IS PROVIDED, MANUFACTURERS ARE LISTED ALPHABETICALLY AND NOT IN ACCORDANCE WITH ANY RANKING OR PREFERENCE.

WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

16A.1-6 COORDINATION

COORDINATE ALL WORK WITH OTHER DIVISIONS AND TRADES SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS ARE INSTALLED AT THE PROPER TIME, FIT THE AVAILABLE SPACE, AND ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. REFER TO ALL DRAWINGS, INCLUDING, BUT NOT LIMITED TO, CIVIL, ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND LIGHTING, AND TO RELEVANT EQUIPMENT SUBMITTALS AND SHOP DRAWINGS TO DETERMINE THE EXTENT OF CLEAR SPACES. MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS, AND TO FACILITATE CONCEALING RACEWAYS IN THE MANNER ANTICIPATED IN THE DESIGN. PROVIDE MATERIALS WITH TRIM THAT WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

16A.1-7 ORDINANCES, CODES, AND STANDARDS

COMPLY, AT A MINIMUM, WITH NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS, STATE AND LOCAL BUILDING CODES, AND ALL APPLICABLE CODES AND ORDINANCES FOR PERFORMANCE, WORKMANSHIP, EQUIPMENT, AND MATERIALS. ADDITIONALLY, COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES.

WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT WHEREVER REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, EXCEED THOSE OF THE ABOVE ITEMS, THE REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, SHALL GOVERN. NOTHING IN THESE CONSTRUCTION DOCUMENTS AS PERMITTING WORK NOT IN COMPLIANCE, AT A MINIMUM, WITH THESE CODES.

BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE ENGINEER'S ATTENTION FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW.

PROVIDE AND MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC. OBTAIN AND PAY FOR ALL PERMITS FOR WORK IN THIS DIVISION.

16A.1-8 PROTECTION OF EQUIPMENT AND MATERIALS

STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE, IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMPNESS, OR TEMPERATURE VARIATIONS, STORE INSIDE IN CONDITION SPACES. FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO THESE CONDITIONS, COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND.

PLUG OR CAP OPEN ENDS OF CONDUITS WHILE STORED AND INSTALLED DURING CONSTRUCTION WHEN NOT IN USE TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.

16A.1-9 SUBSTITUTIONS

INCLUDE IN THE BASE BID THE PRODUCTS SPECIFICALLY NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS. SUBMIT, IN THE FORM OF ALTERNATES, WITH BID, PRODUCTS OF ANY OTHER MANUFACTURERS FOR SIMILAR USE, PROVIDED THE DIFFERENCES IN COST, IF ANY, ARE INCLUDED FOR EACH PROPOSED ALTERNATE.

PRIOR TO THE BID DATE, SUBSTITUTIONS WILL NOT BE CONSIDERED UNLESS SUBMITTED [TO THE ARCHITECT.] FOR ENGINEER'S REVIEW, AT LEAST TEN CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH IT IS TO BE SUBSTITUTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING CUTSHEETS, PHOTOMETRIC DATA, AND ALL OTHER INFORMATION NECESSARY FOR AN EVALUATION FOR EACH SUCH REQUEST. PROVIDE FACTORY GENERATED POINT-BY-POINT CALCULATIONS FOR ALL EXTERIOR LIGHT FIXTURES (PHOTOMETRIC FILES SUPPLIED SO THE ENGINEER CAN GENERATE A POINT-BY-POINT POINT DO NOT SUFFICE FOR THE POINT-BY-POINT CALCULATIONS). PROVIDE INTERIOR POINT-BY-POINT CALCULATIONS AT THE DISCRETION OF THE ENGINEER. SUBMIT A \$100.00 REVIEW FEE TO THE ENGINEER WITH EACH SUCH POINT-BY-POINT CALCULATION FOR USE OF ELECTRONIC BASE FILES.

AFTER THE BID DATE, PROPOSALS TO SUBSTITUTE LIGHT FIXTURES FOR THOSE SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN, ONLY BE CONSIDERED AS A QUALIFIED SUBSTITUTE. ALL SUBSTITUTIONS SEPARATELY, IN SUBMITTAL FORM, WITH A LIST OF PROPOSED SUBSTITUTIONS TOGETHER WITH A DETAILED PRICE FOR EACH SUBSTITUTION. THE [ARCHITECT] [ENGINEER], IF BOTH, WILL THEN REVIEW PROPOSED SUBSTITUTIONS.

THE ENGINEER WILL HAVE THE FINAL AUTHORITY AS TO WHETHER THE LIGHT FIXTURE IS AN ACCEPTABLE REPLACEMENT OF THE SPECIFIED ITEM. THE PROPOSED SUBSTITUTION MAY BE REJECTED [BY THE ARCHITECT] FOR AESTHETIC REASONS, FELT NECESSARY OR DESIRABLE. IN THE EVENT THE PROPOSED SUBSTITUTIONS HEREIN DESCRIBED ARE REJECTED, FURNISH THE SPECIFIED ITEM.

16A.1-10 SUBMITTALS

ASSEMBLE AND SUBMIT TO THE ARCHITECT, FOR ENGINEER'S REVIEW, MANUFACTURERS' PRODUCT LITERATURE FOR MATERIAL AND EQUIPMENT TO BE FURNISHED, INSTALLED, OR BOTH, UNDER THIS DIVISION, INCLUDING SHOP DRAWINGS, MANUFACTURERS' PRODUCT DATA AND PERFORMANCE SHEETS, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. PROVIDE THE NUMBER OF SUBMITTALS REQUIRED BY DIVISION 1; HOWEVER, AT A MINIMUM, SUBMIT SEVEN (7) SETS. SUBMIT MORE SUBMITTALS TO COVER A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS. MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS, RELATES ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD, IS SHOWN IN THE GENERAL CONDITIONS AND DIVISION 1.

- 1. THE PROJECT NAME.
2. THE APPLICABLE SPECIFICATION SECTION AND PARAGRAPH.
3. THE SUBMITTAL DATE.
4. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.

TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW FOR TWO WEEKS ENGINEER REVIEW TIME, PLUS MAILING TIME, PLUS A DUPLICATION OF THIS TIME FOR RESUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES; OR FOR OMITTING COMPONENTS OR FITTINGS; OR FOR NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

16A.2-4 ROUGH-IN
16A.2-4-1 ELECTRONIC DRAWING FILES

IN PREPARATION OF SHOP DRAWINGS, CONTRACTOR MAY, AS AN OPTION, OBTAIN ELECTRONIC DRAWING FILES IN AUTOCAD DXF FORMAT FROM THE ENGINEER FOR A SHIPPING AND HANDLING FEE OF \$200 FOR A DRAWING SET UP TO 12 SHEETS AND \$15 PER SHEET FOR EACH ADDITIONAL SHEET. CONTACT THE ARCHITECT FOR WRITTEN AUTHORIZATION; AND, CONTACT THE ENGINEER TO OBTAIN THE NECESSARY RELEASE AGREEMENT FORM AND TO INDICATE THE DESIRED SHIPPING METHOD AND DRAWING FORMAT. IF A 100 MB ZIP DISK OR CD-ROM IS DESIRED, ADD THE APPROPRIATE CHARGE INDICATED. IN ADDITION TO PAYMENT, ARCHITECT'S WRITTEN AUTHORIZATION AND ENGINEER'S RELEASE AGREEMENT FORM MUST BE RECEIVED BEFORE ELECTRONIC DRAWING FILES WILL BE SENT.

16A.2-12 OPERATION AND MAINTENANCE INSTRUCTIONS

SUBMIT TO THE ARCHITECT, FOR ENGINEER'S REVIEW, COPIES EACH OF OPERATIONS AND MAINTENANCE INSTRUCTION MANUALS, APPROPRIATELY BOUND INTO MANUAL FORM INCLUDING APPROVED COPIES OF THE FOLLOWING, REVISED IF NECESSARY TO SHOW SYSTEM AND EQUIPMENT AS ACTUALLY INSTALLED. PROVIDE THE NUMBER OF SUBMITTALS REQUIRED BY DIVISION 1; HOWEVER, AT A MINIMUM, SUBMIT THREE (3) SETS, AND INCLUDE, AT A MINIMUM, THE FOLLOWING INFORMATION:

- 1. MANUFACTURERS' CATALOGS AND PRODUCT DATA SHEETS
2. WIRING DIAGRAMS
3. MAINTENANCE INSTRUCTIONS
4. OPERATING INSTRUCTIONS
5. PARTS LISTS
6. TEST REPORTS AS DEFINED IN NETA ATS FOR THE SYSTEMS AND EQUIPMENT PROVIDED OR FURNISHED OR INSTALLED UNDER THIS CONTRACT.
7. NAMES, ADDRESSES, TELEPHONE NUMBERS, AND E-MAIL ADDRESSES OF LOCAL CONTACTS FOR WARRANTEE SERVICES AND SPARE PARTS.

SUBMIT MANUALS PRIOR TO REQUESTING THE FINAL PUNCH LIST AND BEFORE ANY REQUESTS FOR SUBSTANTIAL COMPLETION. ALSO PROVIDE ADEQUATE VERBAL INSTRUCTIONS OF SYSTEM OPERATIONS TO OWNER'S REPRESENTATIVE AT THE COMPLETION OF, AND BEFORE FINAL ACCEPTANCE OF, THE WORK.

16A.2-13 TRAINING

AT A TIME MUTUALLY AGREED UPON BETWEEN THE OWNER AND CONTRACTOR, PROVIDE THE SERVICES OF A FACTORY TRAINED AND AUTHORIZED REPRESENTATIVE TO TRAIN OWNER'S DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE EQUIPMENT PROVIDED FOR THIS PROJECT.

PROVIDE TRAINING TO INCLUDE BUT NOT BE LIMITED TO AN OVERVIEW OF THE SYSTEM AND/OR EQUIPMENT AS IT RELATES TO THE FACILITY AS A WHOLE; OPERATION AND MAINTENANCE PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN.

PROVIDE TROUBLESHOOTING, SERVICING, PREVENTIVE MAINTENANCE AND APPROPRIATE OPERATOR INTERVENTION; AND REVIEW OF DATA INCLUDED IN THE OPERATION AND MAINTENANCE INSTRUCTIONS.

SUBMIT A CERTIFICATION LETTER TO THE ARCHITECT STATING THAT THE OWNER'S DESIGNATED REPRESENTATIVE HAS BEEN TRAINED AS SPECIFIED HEREIN. LETTER SHALL INCLUDE DATE, TIME, ATTENDEE AND SUBJECT OF TRAINING. THE CONTRACTOR AND THE OWNER'S REPRESENTATIVE SHALL SIGN THE CERTIFICATION LETTER INDICATING AGREEMENT THAT THE TRAINING HAS BEEN PROVIDED.

SCHEDULE TRAINING WITH OWNER WITH AT LEAST 15 DAYS' ADVANCE NOTICE.

16A.2-14 WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS. MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS, RELATES ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD, IS SHOWN IN THE GENERAL CONDITIONS AND DIVISION 1.

ALSO WARRANT THE FOLLOWING ADDITIONAL ITEMS:

- 1. ALL RACEWAYS ARE FREE FROM OBSTRUCTIONS, HOLES, CRUSHING, OR BREAKS OF ANY NATURE.
2. RAILWAY SEALS ARE EFFECTIVE.
3. THE ELECTRICAL SYSTEM IS FREE FROM ALL SHORT CIRCUITS AND UNWARRANTED OPEN CIRCUITS AND GROUNDS.

THE ABOVE WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.

PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

16A.2-15 MISCELLANEOUS REMODELING WORK

PROVIDE ALL DEMOLITION OF EXISTING ELECTRICAL SYSTEMS AND NEW ELECTRICAL SYSTEM MODIFICATIONS REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS, OR NECESSARY FOR PROPER OPERATION AND NEW CONSTRUCTION. REMOVE ALL ABANDONED CABLES AND WIRING ABOVE ACCESSIBLE CEILINGS AND VENTILATION SHAFTS.

16A.2 ELECTRICAL WORK

16A.2-1 BUILDING OPERATION

COMPLY WITH THE SCHEDULE OF OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. BUILDING SHALL BE IN CONTINUOUS OPERATION. ACCOMPLISH WORK THAT REQUIRES INTERRUPTION OF BUILDING OPERATION AT A TIME WHEN THE BUILDING IS NOT IN OPERATION, AND ONLY WITH WRITTEN APPROVAL OF BUILDING OWNER AND/OR TENANT. COORDINATE INTERRUPTION OF BUILDING OPERATION WITH THE OWNER AND/OR TENANT A MINIMUM OF 7 DAYS IN ADVANCE OF WORK.

16A.2-2 COINCIDENTAL DAMAGE

REPAIR ALL STREETS, SIDEWALKS, DRIVES, PAVING, WALLS, FINISHES, AND OTHER FACILITIES DAMAGED IN THE COURSE OF THIS WORK. REPAIR MATERIALS SHALL MATCH EXISTING CONSTRUCTION. REPAIR MATERIALS SHALL GENERALLY MATCH EXISTING CONSTRUCTION. ALL BACKFILLING AND REPAIRING SHALL MEET ALL REQUIREMENTS OF THE OWNER, CITY AND OTHERS HAVING JURISDICTION. REPAIR WORK SHALL BE THOROUGHLY FIRST CLASS. CONFORM TO ALL REQUIREMENTS OF DIVISION 2 OF THESE SPECIFICATIONS.

16A.2-3 CUTTING AND PATCHING

FOLLOWING THE REQUIREMENTS IN DIVISION 1, CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO PERFORM WORK UNDER THIS DIVISION. OBTAIN PERMISSION OF THE ENGINEER, OWNER, OR BOTH, BEFORE DOING ANY CUTTING. CUT ALL HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. ALL PATCHING SHALL BE THOROUGHLY FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS IF APPLICABLE.

COORDINATE WITHOUT DELAY ALL ROUGH-IN WITH OTHER DIVISIONS. CONICAL ALL RACEWAYS EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE INDICATED ON THE DRAWINGS.

16A.2-5 SUPPORT SYSTEMS

STEEL SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3, FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY; 12-GAUGE, 1-5/8-INCH BY 1-5/8-INCH; COOPER B-LINE, ERICO INTERNATIONAL CORPORATION, HILTI, INC., POWER-STRUT, THOMAS & BETTS CORPORATION, UNISTRUT.

FINISHES:

- 1. RETAIN ONE OR MORE COATING SYSTEMS IN FIRST THREE SUB-PARAGRAPHS BELOW (USUALLY GALVANIZED IS ACCEPTABLE FOR MOST USES). STAINLESS STEEL SHOULD NOT REQUIRE ANY ADDITIONAL FINISHES. IF RETAINING MORE THAN ONE, SPECIFY WHERE EACH COATING SYSTEM IS REQUIRED. USE STAINLESS STEEL OUTDOORS OR INDOORS WHERE ADDED CORROSION PROTECTION IS DESIRED (TYPE 316 STAINLESS STEEL IS AVAILABLE FOR USE IN VERY CORROSIVE LOCATIONS). CONSULT WITH MANUFACTURER BEFORE SPECIFYING EITHER STAINLESS TYPES, DUE TO USAGE LIMITATIONS AND COSTS.
2. METALLIC COATINGS: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED ACCORDING TO MFMA-3.
3. NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE, OR POLYESTER COATING APPLIED ACCORDING TO MFMA-3.
4. PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED ACCORDING TO MFMA-3.
5. STAINLESS STEEL: TYPE 304, PER ASTM A240.
ALUMINUM SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3, TYPE 6063-T6, PER ASTM B221; FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY; 12-GAUGE, 1-5/8-INCH BY 1-5/8-INCH; COOPER B-LINE, ERICO INTERNATIONAL CORPORATION, HILTI, INC., POWER-STRUT, THOMAS & BETTS CORPORATION, UNISTRUT.

FIELD FABRICATION:

- 1. WHERE FIELD CUTTING OF STANDARD LENGTHS OF CHANNEL ARE REQUIRED, MAKE CUTS STRAIGHT AND PERPENDICULAR TO MANUFACTURED SURFACES.
2. FOR FIELD-CUT OR DAMAGED SURFACES OF COATED CHANNELS, DRESS CUT ENDS, DAMAGED SURFACES, AND BOTH WITH AN ABRASIVE MATERIAL (E.G., FILE, GRINDING STONE, OR SIMILAR) AND CLEANER TO REMOVE OILS, RUST, SHARP EDGES AND BURRS.
3. FOR CHANNEL WITH A FACTORY-APPLIED COATING, REFINISH CUT EDGES WITH A COATING COMPATIBLE WITH THE FACTORY FINISH AND AS RECOMMENDED BY THE MANUFACTURER (E.G., MANUFACTURER'S TOUCH-UP PAINT OR ZINC-RICH COLD GALVANIZING COMPOUND, AS APPLICABLE).

16A.2-6 OPERATIONS

COORDINATE SLEEVES SELECTION AND APPLICATION WITH SELECTION AND APPLICATION OF FIRE-STOPPING SPECIFIED IN DIVISION 7 SECTION THROUGH-PENETRATION FIRESTOP SYSTEMS.

ROOFS:

- 1. COORDINATE ALL ROOF PENETRATIONS WITH ENGINEER, OWNER, AND AS APPLICABLE, THE ROOFING CONTRACTOR PROVIDING A ROOF WARRANTY.
2. KEEP ALL RACEWAY PENETRATIONS WITH MECHANICAL EQUIPMENT CURBS WHEREVER POSSIBLE. COORDINATE WITH DIVISION 15 WORK. FLASH AND COUNTERFLASH ALL OPENINGS THROUGH ROOF, AND/OR PROVIDE PRE-FABRICATED MOLDED SEALS COMPATIBLE WITH THE ROOF CONSTRUCTION INSTALLED, OR AS REQUIRED BY THE ENGINEER, OWNER, OR ROOFING CONTRACTOR. ALL ROOF PENETRATIONS SHALL BE LEAKTIGHT AT THE TERMINATION OF THE WORK AND SHALL NOT VOID ANY NEW OR EXISTING ROOF WARRANTIES.

WALLS AND FLOORS:

- 1. SLEEVES FOR RACEWAYS AND CABLES
A. STEEL PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS AND DRIP RINGS.
B. CAST-IRON PIPE SLEEVES: CAST OR FABRICATED "WALL PIPE," EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.
2. SLEEVES FOR RECTANGULAR OPENINGS: GALVANIZED SHEET STEEL WITH MINIMUM 0.052-INCH THICKNESS AS INDICATED AND OF LENGTH TO SUIT APPLICATION.

16B.2-7 FIRE-STOPPING THROUGH PENETRATIONS

FIRE-RESISTANT THROUGH PENETRATION SEALANTS: TWO-PART, FOAMED-IN-PLACE, SILICONE SEALANT FORMULATED FOR USE IN THROUGH-PENETRATION FIRE-STOPPING ABOVE CABLES, RACEWAYS, AND CABLE TRAY PENETRATIONS THROUGH FIRE-RATED WALLS AND FLOORS. SEALANTS AND ACCESSORIES SHALL HAVE FIRE-RESISTANCE RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH ASTM E 814, BY UNDERWRITERS' LABORATORIES, INC., OR OTHER NRTL ACCEPTABLE TO AHJ.

1. ACCEPTABLE MANUFACTURERS:

- A. HILTI, INC.
B. 3M CORP.
C. RECTORSEAL
D. SPECIFY TECHNOLOGY INC.
E. UNITED STATES GYPSUM COMPANY.

SUBMITTALS

- 1. SUBMIT PRODUCT DATA: MANUFACTURER'S SPECIFICATIONS AND TECHNICAL DATA FOR EACH MATERIAL INCLUDING THE COMPOSITION AND LIMITATIONS, DOCUMENTATION OF UL FIRESTOP SYSTEMS TO BE USED AND MANUFACTURER'S INSTALLATION INSTRUCTIONS TO COMPLY WITH DIVISION 1.
2. MANUFACTURER'S ENGINEERING JUDGMENT IDENTIFICATION NUMBER AND DRAWING DETAILS WHEN NO UL SYSTEM IS AVAILABLE FOR AN APPLICATION. ENGINEERING JUDGMENT SHALL INCLUDE BOTH PROJECT NAME AND CONTRACTOR'S NAME WHO WILL INSTALL FIRESTOP SYSTEM AS DESCRIBED IN DRAWINGS.
3. SUBMIT MATERIAL SAFETY DATA SHEETS PROVIDED WITH PRODUCT DELIVERED TO JOB-SITE.

16A.2-8 ACCESS DOORS

PROVIDE ACCESS DOORS IN CEILINGS AND WALLS, WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, AND ANCHOR STRAPS, MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

16A.2-9 EQUIPMENT FURNISHED BY OTHERS

PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF EQUIPMENT FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS, SPECIFIED HEREIN, OR BOTH. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE SUCH ITEMS AS FLEXIBLE CORDS AND PLUGS, AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE SYSTEM, IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS.

BE RESPONSIBLE FOR CORRECT ROUGH-IN DIMENSIONS, AND VERIFY THEM WITH ENGINEER, OWNER'S REPRESENTATIVE, EQUIPMENT SUPPLIER, OR ALL THREE, PRIOR TO ROUGH-IN AND SERVICE INSTALLATIONS.

16A.2-10 CLEANING

IN ADDITION TO THE REQUIREMENTS OF DIVISION 1, REMOVE FROM THE PREMISES DIRT AND REFUSE RESULTING FROM THE PERFORMANCE OF THE ELECTRICAL WORK, AS REQUIRED, TO PREVENT ACCUMULATION. COOPERATE IN MAINTAINING REASONABLY CLEAN PREMISES AT ALL TIMES. IMMEDIATELY PRIOR TO FINAL INSPECTION, MAKE A FINAL CLEANUP OF DIRT AND REFUSE RESULTING FROM THE WORK. CLEAN ALL MATERIAL AND EQUIPMENT INSTALLED UNDER THIS DIVISION. REMOVE DIRT, DUST, PLASTER, STAINS AND FOREIGN MATTER FROM ALL SURFACES. TOUCH UP AND RESTORE ALL DAMAGED FINISHES TO THEIR ORIGINAL CONDITION.

16A.2-11 ADJUSTING, ALIGNING, AND TESTING

ADJUST, ALIGN, AND TEST ALL ELECTRICAL EQUIPMENT ON THIS PROJECT PROVIDED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS FOR INSTALLATION OR WIRING UNDER THIS DIVISION FOR PROPER OPERATION.

TEST ALL SYSTEMS AND EQUIPMENT ACCORDING TO THE REQUIREMENTS IN NECA 1 (LATEST EDITION) AND ALL ADDITIONAL REQUIREMENTS SPECIFIED IN THE FOLLOWING SECTIONS.

MAINTAIN THE FOLLOWING ON THE PROJECT PREMISES AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMPMETER, AND AN INSTRUMENT FOR INSULATION RESISTANCE TESTING. PROVIDE TEST LOGS, RECORDS AS REQUESTED OR AS REQUIRED BY THE ENGINEER.

16A.2-12 EQUIPMENT IDENTIFICATION

PROVIDE EQUIPMENT IDENTIFICATION NAMEPLATES:

- 1. ON ALL PANELBOARDS AND SWITCHES.
NAMEPLATES:
1. ENGRAVED, CONTRASTING COLOR, THREE-LAYER, LAMINATED PLASTIC INDICATING THE NAME OF THE EQUIPMENT, LOAD, OR CIRCUIT AS DESIGNATED ON THE DRAWINGS AND IN THE SPECIFICATIONS:
2. FIELD-APPLIED PERMANENT EPOXY ADHESIVE, COMPATIBLE WITH THE EQUIPMENT FINISH.
3. ATTACHMENT METHOD SHALL BE ACCEPTABLE TO THE MANUFACTURERS OF THE EQUIPMENT TO WHICH THE NAMEPLATES ARE BEING APPLIED.
4. COLOR: BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER. LETTER HEIGHT: 1/2-INCH MINIMUM.

16A.2-13 SYSTEM START UP

PRIOR TO STARTING UP THE ELECTRICAL SYSTEMS:

- 1. CHECK ALL COMPONENTS AND DEVICES.
2. LUBRICATE ITEMS ACCORDINGLY.
3. TIGHTEN SCREWS AND BOLTS FOR CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A.
4. ADJUST TAPS ON EACH TRANSFORMER FOR RATED SECONDARY VOLTAGE.
5. CHECK AND RECORD BUILDING'S SERVICE ENTRANCE VOLTAGE, GROUNDING CONDITIONS, GROUNDING RESISTANCE, AND PROPER PHASING.
6. IF ANY CHANGES ARE MADE TO PANEL SCHEDULES ON DRAWINGS, RE-BALANCE ALL SINGLE-PHASE LOADS AT EACH PANELBOARD, REDISTRIBUTING BRANCH CIRCUIT CONNECTIONS UNTIL BALANCE IS ACHIEVED. DO NOT TYPE UP FINAL PANELBOARD DIRECTORIES UNTIL ALL RE-BALANCING AND REDISTRIBUTION OF CIRCUITS ARE COMPLETE.
7. REPLACE ALL BURNED-OUT LAMPS AND LAMPS USED FOR TEMPORARY CONSTRUCTION LIGHTING IN PERMANENT LIGHT FIXTURES.
8. AFTER ALL SYSTEMS HAVE BEEN INSPECTED AND ADJUSTED, CONFIRM ALL OPERATING FEATURES REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND MAKE FINAL ADJUSTMENTS AS NECESSARY.

16A.3 EXISTING EQUIPMENT REUSE AND REMOVAL

REMOVE ALL EXISTING WIRING, LIGHT FIXTURES, EXPOSED CONDUITS AND OTHER ELECTRICAL INSTALLATIONS NOT REUSED PRIOR TO SUBSTANTIAL COMPLETION OF THE WORK.

EXISTING RACEWAYS MAY BE REUSED IF THEIR POINTS OF TERMINATIONS ARE SUITABLE; IF THEY ARE CLEAN INSIDE WITH NO EVIDENCE OF RUST OR BURRS; IF FREE FROM CRACKS, FLATTENED SECTIONS OR SHARP BENDS; AND, IF SUITABLY LOCATED TO AVOID CONFLICTS WITH OTHER TRADES OR INSTALLATIONS. CAREFULLY "FISH" ALL EXISTING CONDUITS REUSED UNDER THIS CONTRACT TO REMOVE ALL DEBRIS AND OBSTRUCTIONS, AND SWAB UNTIL ALL MOISTURE IS REMOVED.

CUT, PATCH, AND REPAIR WHERE REQUIRED FOR NEW ELECTRICAL INSTALLATIONS, AND PATCH AND REPAIR ALL SURFACE DAMAGE RESULTING FROM THIS WORK. CUT FLUSH WITH THE FLOOR AND PLUG AT BOTH ENDS, RACEWAYS, STUBBED ABOVE THE FLOOR AND NOT USED AT SUBSTANTIAL COMPLETION OF THE WORK.

RELOCATE ALL EXISTING ELECTRICAL SYSTEMS REQUIRED TO BE IN OPERATION AT SUBSTANTIAL COMPLETION OF THE CONTRACT, IF REQUIRED, AS A RESULT OF WORK INCLUDED UNDER THIS CONTRACT, EVEN IF NOT SPECIFICALLY INDICATED IN THE DRAWINGS OR SPECIFICATIONS.



FAMILY VET GROUP

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ELECTRICAL SPECIFICATIONS

1 NORTH CAROLINA REGISTERED ENGINEER SEAL 022419 09/28/2020

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E5.0 ELECTRICAL SPECIFICATIONS