

# DIVISION 16000 - ELECTRICAL SPECIFICATIONS

## GENERAL

### I. GENERAL

PROVIDE ALL MATERIAL, LABOR & EQUIP. NECESSARY TO COMPLETELY INSTALL ELECTRICAL & RELATED WORK INDICATED ON THE DRAWINGS AND IN THESE SPECIFICATIONS FOR A SAFE AND FULLY OPERATING SYSTEM.

### II. CODE

ALL EQUIPMENT, WIRING AND THE ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE NATIONAL ELECTRICAL CODE (N.E.C.), (NFPA 70), O.S.H.A. REQUIREMENTS, LIFE SAFETY CODE AND ALL LAWS AND ORDINANCES APPLICABLE TO WORK AT THIS SITE.

### III. LOCATION OF EQUIPMENT

A. NOTE THAT THE ELECTRICAL DRAWINGS ARE INTENDED TO INDICATE ONLY THE EXTENT DIAGRAMMATICALLY, GENERAL CHARACTER AND LOCATION OF THE WORK. WORK INTENDED, BUT HAVING MINOR DETAILS OBVIOUSLY OMITTED, SHALL BE PROVIDED COMPLETE AS A REQUIREMENT OF THIS CONTRACT.

### IV. ROUGH-IN

A. VERIFY FINAL LOCATIONS FOR ROUGH-INS WITH SHOP DRAWINGS, FIELD MEASUREMENTS AND WITH THE REQUIREMENTS OF THE ACTUAL EQUIPMENT TO BE CONNECTED PRIOR TO ROUGH-IN.

### V. INSTALLATION

A. PROVIDE ALL EQUIPMENT AND MATERIALS FOR THIS CONTRACT NEATLY AND WITH WORKMANSHIP AS DEFINED BY N.E.C.A. "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION", LEVEL AND PLUMB, AND SECURELY SUPPORTED. THE ENTIRE INSTALLATION, AND MANNER OF INSTALLATION SHALL MEET THE COMPLETE SATISFACTION OF THE OWNER'S REPRESENTATIVE OR IT SHALL BE REMOVED AND REWORKED AS DIRECTED BY THE OWNER'S REPRESENTATIVE AS INCLUDED IN THE CONTRACT AMOUNT.

B. ALL WIRING SHALL BE IN CONDUIT. THE USE OF E.N.T., BX, NM, ETC. OR PRE-MANUFACTURED CABLE ASSEMBLIES OR ALUMINUM WIRE WILL NOT BE PERMITTED. CO-ORDINATE CONNECTION OF ELECTRICAL SYSTEMS WITH UTILITIES AS INDICATED ON THE DRAWINGS.

D. VERIFY TRANSFORMER LOCATION AND METERING SCHEME WITH LOCAL UTILITY COMPANY. EQUAL AND EQUIPMENT: SHALL BE UNDERSTOOD TO MEAN OF THE SAME QUALITY, SIZE, NUMBER, VALUE, DEGREE, INTENSITY AND THE ITEMS ARE SIMILAR IN ALL RESPECTS. THE FINAL DECISION OF ACCEPTANCE OF THESE ITEMS WILL BE MADE BY THE ENGINEER. IT SHALL BE UNDERSTOOD THAT FOR ANY SPECIFIED ITEM ON THE DRAWINGS AND/OR IN THE SPECIFICATION, THIS TERM SHALL APPLY.

F. DEFINITION OF SPECIAL TERMS SHALL BE INTERPRETED AS DESCRIBED HEREIN:

- 1. "PROVIDE" MEANS: FURNISH/SUPPLY ALL LABOR, MATERIALS, EQUIPMENT AND SUPPLIES, INCLUDING TESTS AND INSPECTIONS, NECESSARY TO INSTALL AND PLACE COMPONENTS AND/OR SYSTEMS IN A SAFE AND COMPLETE OPERATING CONDITION THAT IS FULLY FUNCTIONING.
- 2. "FURNISH" MEANS: SUPPLY AND/OR MAKE AVAILABLE AN ITEM, TO THE CONTRACTOR WHO WILL RECEIVE THE ITEM AND DO SOMETHING WITH IT. EXAMPLES INCLUDES OWNER FURNISHED ITEM OR ITEMS FURNISHED BY ANOTHER TRADE.
- 3. "INSTALL" MEANS: PLACE, SET OR FIX AND CONNECT AN ITEM INTO A POSITION READY FOR USE. RECEIVE AN INDICATED ITEM FROM A SUPPLIER (INCLUDING OFF LOADING AND MOVING INTO PLACE WHEN REQUIRED) AND PROCEED TO INSTALL THE ITEM COMPLETE WITH ALL REQUIRED PARAMETERS TO MAKE COMPLETE, SAFE AND OPERATIONAL SYSTEM INCORPORATING THE ITEM FURNISHED.

### VI. CUTTING AND PATCHING

A. PROVIDE ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF ELECTRICAL WORK.

B. NO ADDITIONAL COMPENSATION WILL BE AUTHORIZED FOR CUTTING AND PATCHING WORK THAT IS NECESSITATED BY ILL-TIMED, DEFECTIVE OR NON-COMPLYING INSTALLATION.

### VII. ELECTRICAL SUBMITTALS

A. REFER TO THE CONDITIONS OF THE CONTRACT (GENERAL AND SUPPLEMENTARY) AND DIVISION 1 SECTION SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES FOR SUBMITTAL DEFINITIONS, REQUIREMENTS AND PROCEDURES.

B. IN ADDITION TO THE REQUIREMENTS OF DIVISION 1:  
1. THE FOLLOWING TABLES SUBMITTALS OF THIS DIVISION: 1. DO NOT INSTALL ELECTRICAL EQUIPMENT REQUIRING SUBMITTALS IN THE PROJECT UNTIL SUBMITTALS HAVE BEEN ACCEPTABLY REVIEWED BY THE OWNERS REPRESENTATIVE AND STAMPED APPROVED.  
2. MAKE ALL ELECTRICAL SUBMITTALS AT ONE TIME AND WITHIN FOURTEEN (14) CALENDAR DAYS FROM THE DATE OF "NOTICE TO PROCEED".  
3. SUBMIT A MINIMUM OF SIX (6) COMPLETE SETS TO OWNERS REPRESENTATIVE. ONE SET SHALL REMAIN WITH THE OWNER'S REPRESENTATIVE, ONE SET SHALL BE DELIVERED TO THE OWNER AND THE OTHERS WILL BE RETURNED TO DISTRIBUTE AS REQUIRED.  
IF ANY ITEM IN THE SUBMITTAL IS "NOT ACCEPTABLE" FOR ANY REASON, IT AUTOMATICALLY VOIDS THE ENTIRE SET, AND A RE-SUBMIT OF ALL IS REQUIRED TO OBTAIN ACCEPTANCE OF ALL ITEMS.  
5. EACH SET SHALL BE BOUND AND INDEXED INTO GROUPS SUCH AS FIXTURES, PANELS, WIRING DEVICES, DISCONNECT SWITCHES, ETC.  
6. MAKE EACH SET IDENTICAL.  
7. SUBMIT CUT SHEETS AND TECHNICAL DATA ON THE FOLLOWING ITEMS: LIGHTING EQUIPMENT, PANELS, WIRING DEVICES, DISCONNECT SWITCHES, MOTOR STARTERS, TRANSFORMERS. ALL SUBMITTALS SHALL BE ONLY ORIGINALS, COPIES OF CUT SHEETS ARE NOT ACCEPTABLE.  
8. IN CASE OF DISCREPANCIES BETWEEN SETS OF SUBMITTALS, THE SET RETAINED BY THE OWNER'S REPRESENTATIVE SHALL HAVE PRECEDENCE.

### VIII. IDENTIFICATION NAMEPLATES

A. PROVIDE NAMEPLATES ON ALL ITEMS OF ELECTRICAL EQUIPMENT THAT HAS A CONTROL PANEL AND ALL ITEMS WHERE A SUBMITTAL WAS MADE, EXCEPT FOR WIRING DEVICES. MAKE NAMEPLATES FROM WHITE ENGRAVING STOCK WITH BLACK LETTERS AND BLACK FOUR EDGE BEVEL. WORDING SHALL SUITABLY DESCRIBE ITEMS AND NAMEPLATES SHALL BE ATTACHED USING PROPER SIZE AND TYPE STAINLESS STEEL BOLTS, LOCK WASHERS AND NUTS. GLUE ON, TAPE ON OR TAPE TYPE NAMEPLATES ARE NOT ACCEPTABLE.

### IX. WARRANTIES

A. GUARANTEE ALL ELECTRICAL SYSTEM MATERIALS AND WORKMANSHIP TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE AND PROPERLY CORRECT LATENT DEFECTS ARISING WITHIN THIS PERIOD UPON NOTIFICATION BY THE OWNER'S REPRESENTATIVE WITHOUT ADDITIONAL COMPENSATION.

### X. CLEANING

A. REGULARLY DURING EACH WORKING DAY, REMOVE REFUSE AND DEBRIS ACCUMULATING FROM ELECTRICAL CONSTRUCTION AND PRIOR TO ACCEPTANCE OF THIS WORK, LEAVE THE PREMISES "BROOM CLEAN" INsofar AS AFFECTED BY ELECTRICAL WORK.

### XI. TEST AND ADJUSTMENT

A. PROVIDE ALL LABOR, INSTRUMENTS, AND OTHER SERVICES REQUIRED FOR COMPLETE AND SATISFACTORY TEST AND ADJUSTMENT OF ELECTRICAL SYSTEMS AND RELATED WORK.  
1. CHECK ALL MOTORS AND ROTATING EQUIPMENT FOR PROPER ROTATION.  
2. TEST ALL FEEDERS WITH MEGGER PRIOR TO ENERGIZING TO ASSURE CODE RESISTANCE IS MET, (AND WITHOUT "SHORTS" OR "OPEN CIRCUITS").

## RACEWAYS

### I. RACEWAYS

A. EXTENT OF RACEWAY WORK IS INDICATED DIAGRAMMATICALLY ON THE DRAWINGS AND IN THE SCHEDULES. (PROVIDE ONLY TYPE REQUIRED FOR APPLICATION).  
1. WHEN SIZE IS NOT INDICATED ON PLANS, CONDUIT SHALL BE SIZED FOR CONDUCTORS IN ACCORDANCE WITH TABLES 3(A)(B)(C), CHAPTER 9 OF THE N.E.C.  
2. THE ROUTING AND METHOD OF INSTALLATION OF ALL CONDUITS SHALL BE CO-ORDINATED SO AS NOT TO INTERFERE WITH OTHER EQUIPMENT INSTALLATIONS AND SHALL MEET WITH THE COMPLETE SATISFACTION OF THE OWNER'S REPRESENTATIVE.  
3. THE USE OF INTERMEDIATE METAL CONDUIT (IMC), ELECTRICAL NON-METALLIC TUBING (ENT), ARMORED CABLE (AC), OR MANUFACTURED CABLE ASSEMBLIES SHALL NOT BE INCORPORATED INTO THE WORK.  
4. USE ONLY THE TYPES OF RACEWAYS SPECIFIED HEREIN.

### II. INSTALLATION OF RACEWAYS

A. PROVIDE ALL CONDUITS CONCEALED, EXCEPT IN EQUIPMENT ROOM, CHASES OR AS INDICATED ON THE DRAWINGS. ALL CONDUITS, EXPOSED AND CONCEALED SHALL BE RUN PARALLEL AND PERPENDICULAR TO BUILDING LINES AND GROUPED TOGETHER AS MUCH AS POSSIBLE, EVEN ABOVE LAY-IN CEILINGS.  
B. PROVIDE A SEPARATE GROUNDING CONDUCTOR IN ALL RUNS. THE CONDUCTOR SHALL BE SIZED AS INDICATED IN THE N.E.C. ALL GROUNDING CONDUCTORS SHALL HAVE A GREEN OUTER COVERING, OR GREEN MARKING TAPE OVER THEIR ENTIRE EXPOSED LENGTHS.  
C. MECHANICALLY FASTEN TOGETHER METAL CONDUITS, ENCLOSURES AND RACEWAYS FOR CONDUCTORS TO FORM A CONTINUOUS ELECTRICAL CONNECTION. CONNECT BONDS TO ELECTRICAL BOXES, FITTINGS AND CABINETS TO MAINTAIN ELECTRICAL CONTINUITY AND FIRM MECHANICAL ASSEMBLY.  
D. AVOID USE OF DISSIPATIVE METHODS THROUGH SYSTEMS TO MINIMIZE POSSIBILITY OF ELECTROLYSIS.  
E. PROVIDE EXPANSION FITTINGS IN RACEWAYS EVERY 100' LINEARLY AND WHEREVER STRUCTURAL EXPANSION JOINTS ARE CROSSED.  
F. PROVIDE NYLON PULL CORD IN ALL EMPTY CONDUITS WITH A MINIMUM 90# TENSILE STRENGTH.

A. USE RIGID METAL CONDUIT (RMC) FOR ALL WEATHER EXPOSED WORK, FOR ALL STUB-UPS IN ROOF AREA, FOR ALL ROOF PENETRATIONS THROUGH PATE PENETRATIONS AND FOR THROUGH ROOF/COOLER PENETRATIONS.  
2. USE FLEXIBLE METAL CONDUIT (FMC) FOR ALL INTERIOR CONCEALED AND FOR INTERIOR EXPOSED WORK NOT SUBJECT TO MECHANICAL INJURY.  
3. USE PVC FOR ALL UNDERGROUND WORK OR WORK INSTALLED IN CONCRETE AND USE RIGID METAL CONDUIT (RMC) FOR ALL STUB-UP LOCATIONS.  
4. USE FLEXIBLE METAL CONDUIT FROM OUTLET BOXES TO RECESSED LIGHTING FIXTURE AND FINAL 24" OF CONNECTION TO ITEMS SUBJECT TO MOVEMENT OR VIBRATION.  
5. USE LIQUID-TIGHT FLEXIBLE CONDUIT FOR FINAL 24" CONNECTION TO ITEMS WHERE SUBJECT TO ONE OR MORE OF THE FOLLOWING CONDITIONS:  
a. EXTERIOR LOCATION.  
b. MOIST OR HUMID ATMOSPHERE WHERE CONDENSATE CAN BE EXPECTED TO ACCUMULATE.  
c. CORROSIVE ATMOSPHERE.  
d. SUBJECTED TO WATER SPRAY OR DRIPPING OIL, WATER OR GREASE.  
e. FINAL CONNECTION TO ROTATING OR VIBRATING EQUIPMENT.  
6. CUT CONDUITS STRAIGHT, PROPERLY REAM AND CUT THREADS FOR HEAVY WALL CONDUIT DEEP AND CLEAN.  
7. FIELD BEND CONDUIT WITH BENDERS DESIGNED FOR THE PURPOSE SO AS NOT TO DISTORT NOR VARY INTERNAL DIAMETER.

### III. CONDUCTORS

A. ALL WIRE SHALL BE COPPER WITH THIN, THIN-2, OR INDICATED INSULATION.  
B. THE USE OF ARMORED, MC, BX, NM, OR ANY MANUFACTURED CABLE ASSEMBLY.  
C. ALL CIRCUITS 30 AMPS AND ABOVE AND ALL 288 VOLTS SHALL BE IN RACEWAY.  
D. ALL WIRING SHALL BE IN CONDUIT.  
E. COLOR CODING OF CONDUCTORS SHALL BE AS FOLLOWS:(WHERE PRESENT)  
1. 208Y/120V SYSTEMS: PHASE A - BLACK, PHASE B - RED, PHASE C - BLUE, NEUT. - WHITE, GND. - GREEN.  
2. 480Y/277V SYSTEM: PHASE A - YELLOW, PHASE B - BROWN, PHASE C - ORANGE, NEUT. - NATURAL GRAY, GND. - GREEN.  
F. AWG #10 AND SMALLER SHALL BE SOLID. AWG #8 AND LARGER SHALL BE STRANDED.

### IV. WIRE CONNECTIONS

A. ALL FEEDER AND SUB-FEEDER WIRING CONNECTIONS SHALL BE MADE WITH COMPRESSION CONNECTORS BY SQUARE D OR ACCEPTABLE EQUIVALENT.  
B. ALL BRANCH WIRING CONNECTIONS SHALL BE 3M SCOTCH LOCK CONNECTORS OR ACCEPTABLE EQUIVALENT.  
C. WHERE CABLE CONNECTIONS REQUIRE INSULATION, SCOTCH #33, INSULATING TAPE SHALL BE USED FOR WRAPPING.

### V. BOXES AND FITTINGS

A. EXTENT OF ELECTRICAL BOX AND ASSOCIATED FITTING WORK IS INDICATED BY DRAWINGS AND SCHEDULES.  
B. CEILING: 4" SQUARE, 2-1/8" DEEP FOR EXPOSED OR FURRED WORK; 3" DEEP FOR BOXES POURED IN CONCRETE. PROVIDE CONCRETE POUR BOXES OF THE TYPE SPECIALLY DESIGNED FOR THE APPLICATION. PROVIDE PLASTER RINGS WHERE REQUIRED.  
C. WALL: 4" SQUARE, 2-1/8" DEEP BOXES: PROVIDE EXTENSION RINGS OR COVERS OF SUFFICIENT DEPTH TO BRING COVERS FLUSH WITH THE FINISHED SURFACE.  
D. MASONRY: FOR FLUSH MOUNTED BOXES IN EXPOSED MASONRY OR TILE, PROVIDE COVERS WITH SQUARE CORNERS ON THE RAISED PORTION AND WITH SUFFICIENT DEPTH TO TRIM OUT FLUSH WITH FINISHED SURFACE.  
E. EXPOSED AND KITCHEN EQUIPMENT: PROVIDE FS OR FD BOXES WITH SUITABLE WEATHERPROOF COVERS.

### VI. PULL AND JUNCTION BOXES

A. PROVIDE BOXES WHERE REQUIRED TO FACILITATE THE PULLING OF WIRES OR CABLES. BOXES SHALL BE IN ACCORDANCE WITH ARTICLE 378 OF N.E.C.

## ACCESSORIES

A. PROVIDE CORROSION-RESISTANT KNOCKOUT CLOSURES, CONDUIT LOCKNUTS AND MALLEABLE IRON CONDUIT BUSHINGS, OFFSET CONNECTORS, OF TYPES AND SIZES, TO SUIT RESPECTIVE INSTALLATION REQUIREMENTS AND APPLICATIONS.

## INSTALLATION OF BOXES AND FITTINGS

A. POSITION RECESSED OUTLET BOXES ACCURATELY TO ALLOW FOR SURFACE FINISH THICKNESS.  
B. FASTEN ELECTRICAL BOXES FIRMLY AND RIGIDLY TO SUBSTRATES OR STRUCTURAL SURFACES TO WHICH ATTACHED OR SOLIDLY EMBED ELECTRICAL BOXES IN CONCRETE OR MASONRY.

## LOCATIONS OF OUTLETS

A. IN GENERAL THE VARIOUS OUTLETS ARE TO BE LOCATED AT THE FOLLOWING HEIGHTS ABOVE FINISHED FLOOR TO THE CENTER LINE OF BOX, UNLESS NOTED OTHERWISE AT AN INDIVIDUAL OUTLET ON THE DRAWINGS:  
1. WALL SWITCHES (VERT. MTD.) 48"  
2. RECEPTACLES (VERT. MTD.) 18"  
3. PHONE OUTLETS (VERT. MTD.) 18"  
4. OUTLETS ABOVE COUNTERS (HORIZ. MTD.) 6" ABOVE BACKSPASH.  
B. OUTLET MOUNTING HEIGHTS INDICATED ON THE DRAWINGS AT OUTLETS TAKE PRECEDENCE. REFER TO DRAWINGS FOR DETAILS OF OTHER EQUIPMENT MOUNTING HEIGHTS. MOUNTING HEIGHTS FOR FLUSH OUTLETS IN BLOCK WALLS MAY BE CHANGED FOR INSTALLATION. CONSULT OWNER'S REPRESENTATIVE IN FIELD PRIOR TO ANY SUCH INSTALLATION.

## CONNECTIONS FOR EQUIPMENT

### I. CONNECTIONS FOR EQUIPMENT

A. GENERAL: FOR EACH ELECTRICAL CONNECTION INDICATED PROVIDE COMPLETE ASSEMBLY OF MATERIALS, INCLUDING BUT NOT LIMITED TO, PRESSURE CONNECTORS, TERMINALS (LUGS), ELECTRICAL INSULATING TAPE, HEAT-SHRINKABLE INSULATING TUBING, CABLE TIES, SOLDERLESS WIRING DEVICES, AND OTHER ITEMS AND ACCESSORIES AS NEEDED TO COMPLETE CONNECTIONS OF TYPES INDICATED.

## WIRING DEVICES

A. THE EXTENT OF WIRING DEVICES IS INDICATED BY THE DRAWINGS AND SCHEDULES.  
B. PROVIDE WIRING DEVICES WHICH ARE FULLY LISTED AND LABELED.  
C. ACCEPTABLE MANUFACTURERS  
A. HARVEY HUBBELL CO.  
B. PASS & SEYMOUR  
C. LEVITON MFG. CO.  
D. ARROW HBT  
E. FABRICATED WIRING DEVICES

## FABRICATED WIRING DEVICES

A. SWITCHES SHALL BE 20 AMP, 120/277 VOLT RATED, HUBBELL #1221 - IVORY OR BROWN.  
B. RECEPTACLES SHALL BE 20 AMP 125 VOLT RATED, HUBBELL #5362 - IVORY OR BROWN. FOR OTHER APPLICATIONS REFER TO THE DRAWINGS.  
C. PROVIDE SMOOTH FINISH PLATES FOR ALL DEVICES WITH APPROPRIATE MOUNTING ARRANGEMENTS FOR GAUGED DEVICES. FOR TELEPHONE AND COMPUTER/AMX AND MICROPHONE OUTLETS PROVIDE BUSHED HOLE COVER PLATES. PLATES SHALL BE BROWN OR GRAY STAINLESS STEEL.  
1. GRAY STAINLESS STEEL PLATES FOR SERVICE AREAS, KITCHEN STORAGE AND RESTROOMS.  
2. IVORY PLATES FOR ALL OTHER AREAS EXCEPT BROWN PLATES ON WOOD OR DARK SURFACES.  
3. IVORY DEVICES WHERE 302 STAINLESS STEEL OR IVORY PLATES ARE USED.  
4. BROWN DEVICES WHERE BROWN PLATES ARE USED.

## MOTOR DISCONNECTS

### I. DISCONNECT SWITCHES

A. ACCEPTABLE MANUFACTURERS  
1. SQUARE D COMPANY  
2. SIEMENS  
3. EATON/CUTLER-HAMMER  
B. HEAVY-DUTY SAFETY SWITCHES: PROVIDE SURFACE MOUNTED, HEAVY DUTY TYPE, SHEET STEEL ENCLOSED SWITCHES, OF TYPES, SIZES AND WITH ELECTRICAL CHARACTERISTICS INDICATED; INCORPORATING QUICK-MAKE QUICK-BREAK TYPE SWITCHES; SWITCH BLADE SHALL BE VISIBLE IN OFF POSITION WITH THE DOOR OPEN. EQUIP. WITH OPERATING HANDLE WHICH IS INTEGRAL PART OF ENCLOSURE BASE AND WHOSE OPERATING POSITION IS CLEARLY INDICATED AND IS PRACTICABLE IN THE OFF POSITION.  
C. CONSTRUCT CURRENT CARRYING PARTS OF HIGH-CONDUCTIVITY COPPER AND SILVER-TUNGSTEN TYPE SWITCH CONTACTS. PROVIDE NEMA TYPE 3R OR FOR EXTERIOR AND FOR INTERIOR APPLICATIONS PROVIDE ENCLOSURES THAT HAVE BEEN PRIME COATED AND FINISHED WITH GRAY ENAMEL.

## PANELBOARDS

### I. DESCRIPTION OF WORK

A. TYPES OF PANELBOARDS FOR THIS PROJECT ARE AS FOLLOWS:  
1. 120/208Y-3 PHASE 4W-SK-SQ, D "N000" AS SCHEDULED.  
B. ACCEPTABLE MANUFACTURERS  
1. SQUARE D CO. (BOLT ON BREAKERS)  
2. SIEMENS (BOLT ON BREAKERS)  
3. EATON/CUTLER-HAMMER (BOLT ON BREAKERS)

### II. PANELBOARDS

A. PROVIDE DEAD-FRONT SAFETY CONSTRUCTED FACTORY-ASSEMBLED CIRCUIT BREAKER TYPE PANELBOARDS IN SIZES AND RATINGS AS INDICATED. EQUIP. WITH PANELBOARD UNIT DEVICES, OF TYPES, RATINGS AND CHARACTERISTICS INDICATED. BUS STRUCTURE AND MAIN LUGS OR MAIN BREAKER SHALL HAVE CURRENT RATINGS AS SHOWN ON THE PANELBOARD SCHEDULE, SUCH RATINGS SHALL BE ESTABLISHED BY TEST CONDUCTED IN ACCORDANCE WITH UNDERWRITERS LABORATORIES STANDARD UL 87. THE USE OF CONDUCTOR DIMENSIONS WILL NOT BE ACCEPTED IN LIEU OF ACTUAL HEAT TEST. BUS BAR CONNECTIONS TO THE BRANCH CIRCUIT BREAKERS SHALL BE "PHASE-SEQUENCE" TYPE. THREE-PHASE, FOUR WIRE BUSSING SHALL BE SUCH THAT ANY THREE ADJACENT SINGLE-POLE BREAKERS ARE INDIVIDUALLY CONNECTED TO EACH OF THE THREE DIFFERENT PHASES IN SUCH A MANNER THAT TWO OR THREE-POLE BREAKERS CAN BE INSTALLED AT ANY LOCATION. ALL CURRENT CARRYING PARTS OF THE BUSS ASSEMBLY SHALL BE PLATED COPPER WITH CONDUCTIVITY OF NOT LESS THAN 98%.

### III. PANELBOARD ENCLOSURE

PROVIDE GALVANIZED SHEET STEEL CABINET TYPE ENCLOSURES, IN SIZES AND NEMA TYPES AS INDICATED. CODE GAUGE: MINIMUM 16-GAUGE THICKNESS. CONSTRUCT WITH MULTIPLE KNOCKOUTS AND WIRING GUTTERS. PROVIDE FRONTS WITH ADJUSTABLE TRIM CLAMPS, AND DOORS WITH FLUSH LOCKS AND KEYS, ALL PANELBOARD ENCLOSURES KEYS ALIKE, WITH CONCEALED PIANO DOOR HINGES. EQUIP WITH INTERIOR CIRCUIT DIRECTORY FRAME, AND CARD WITH CLEAR PLASTIC COVERING. PROVIDE BAKED GRAY ENAMEL FINISH OVER A RUST INHIBITOR COATING. PROVIDE ENCLOSURES FABRICATED BY SAME MANUFACTURER AS

PANELBOARDS. MINIMUM DEPTH OF 5-3/4" & MINIMUM WIDTH OF 20" FOR PANELS. SEE PANEL SCHEDULES.  
C. BALANCE AMPERES OF CIRCUITS AFTER ACTIVE LOADS ARE ENERGIZED TO WITHIN 10% MAXIMUM AND PROVIDE TYPEWRITTEN PANELBOARD SCHEDULE WITH CORRECTED LOADS.

## LIGHTING FIXTURES

A. HANDLE LIGHTING FIXTURES CAREFULLY TO PREVENT DAMAGE, BREAKING AND SCORING. DO NOT INSTALL DAMAGED FIXTURES OR COMPONENTS. REPLACE WITH NEW STORE LIGHTING FIXTURES IN A CLEAN DRY PLACE. PROTECT FROM HEAVENLY DIRT, FLAMES, WATER CONSTRUCTION DEBRIS AND PHYSICAL DAMAGE.  
B. SHIP FIXTURES FACTORY ASSEMBLED, WITH PARTS REQUIRED FOR A COMPLETE INSTALLATION.  
C. FLUORESCENT BALLAST SHALL BE CLASS P, LOW-ENERGY START SOLELY RATED.  
D. PROVIDE LAMPS IN WATTAGES AND TYPES AS INDICATED.  
E. PROVIDE FIXTURES AND/OR FIXTURE OUTLET BOXES WITH STUDS TO PROPERLY SUPPORT FIXTURE WEIGHT.  
F. INSTALL FLUSH MOUNTED FIXTURES TO MINIMIZE LIGHT LEAKAGE BETWEEN FRAME AND FINISHED SURFACE.  
G. AT DATE OF SUBstantial COMPLETION REFER TO DRAWINGS FOR ALL FIXTURES WHICH ARE OBSERVED TO BE THE SAME TYPE OR NOTICEABLY DIFFER AFTER CONSTRUCTION USE AS INDICATED ON THE DRAWINGS.

## FIRE ALARM SYSTEMS

A. THE CONTRACTOR SHALL INSTALL COMPLETE, A FULLY SUPERVISED, TESTABLE, AUDIBLE/VISUAL/VOICE FIRE ALARM SYSTEM.  
B. THE OPERATION OF ANY MANUAL STATION, SMOKE DETECTOR, DUCT-MOUNTED SMOKE DETECTOR, HEAT DETECTOR, TAMPER SWITCH, WATERFLOW SWITCH ACTIVE DEVICE OR OTHER FIRE SUPPRESSION ACTIVE DEVICE SHALL:  
1. SOUND ALL AUDIBLE APPLIANCE UNTIL MANUALLY RESET.  
2. FLASH AND SYNCHRONIZE ALL VISUAL APPLIANCES CONTINUOUSLY.  
3. RELEASE ALL SMOKE BARRIER DOORS.  
4. IDENTIFY THE DEVICE INITIATING THE ALARM CONDITION VIA LCD DISPLAY.  
5. RECORD IN NON-VOLATILE HISTORICAL MEMORY THE CONDITION CAUSING THE OCCURRENCE AND THE TIME AND DATE OF THE OCCURRENCE  
6. ACTIVATE ALARM CONTACTS REQUIRED FOR CENTRAL STATION MONITORING  
7. DUCT-MOUNTED SMOKE DETECTORS SHALL SHUT DOWN THE ASSOCIATED UNIT AND DAMPERS

## TROUBLE SEQUENCE OF OPERATION

ANY OPEN, GROUND, POWER LOSS, LOW BATTERY OR DISARRANGEMENT OF THE SYSTEM WIRING SHALL:  
1. SOUND AN AUDIBLE TONE WITHIN THE FIRE ALARM CONTROL PANEL.  
2. DISPLAY A VISUAL INDICATION WITHIN THE FIRE ALARM CONTROL PANEL UNTIL CONDITION IS CLEARED  
3. ACTIVATE TROUBLE CONTACTS REQUIRED FOR CENTRAL STATION MONITORING

## EQUIPMENT MANUFACTURER

EQUIPMENT SHALL BE MANUFACTURED BY FIRELITE AND SHALL INCLUDE THE FOLLOWING:  
FIRE ALARM CONTROL PANEL WITH DIGITAL DIALER  
MANUAL PULL STATIONS  
SMOKE DETECTORS  
DUCT SMOKE DETECTORS  
CEILING SPEAKER/STROBES  
WALL SPEAKER/STROBES  
WALL STROBES  
ANNUNCIATOR PANEL  
VERIFY COLOR OF DEVICES WITH THE OWNER.  
ALL WIRING SHALL BE INSTALLED IN MIN. 3/4" CONDUIT PER N.E.C. REQUIREMENTS. FOLLOW MANUFACTURER INSTALLATION INSTRUCTIONS.  
EQUIPMENT SUBMITTALS AND SHOP DRAWINGS SHALL BE PROVIDED TO THE A/E FOR REVIEW PRIOR TO START OF ROUGH-IN. PROVIDE EQUIPMENT DATA SHEETS, RISER DIAGRAM INDICATING ALL DEVICES & THEIR LOCATION, AND BATTERY CALCULATIONS. AS-BUILT DRAWINGS SHALL BE PROVIDED TO THE A/E UPON COMPLETION AND FINAL CERTIFICATION.  
PLANS SHALL BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION FOR COMPLETE REVIEW WITHIN TWO WEEKS OF CONTRACT AWARD. ALL ASSOCIATED PERMIT & PLAN REVIEW FEES SHALL BE INCLUDED IN SUBCONTRACTOR BID.  
FINAL INSPECTION: UPON COMPLETION OF SYSTEM CONSTRUCTION, A COMPLETE INSPECTION OF THE SYSTEM SHALL BE CONDUCTED PER NFPA 72 REQUIREMENTS. VERIFICATION & RESULTS OF THE INSPECTION SHALL BE FORWARDED TO THE A/E IN WRITING FOR REVIEW.

## INTERPLANS

ARCHITECTURE  
ENGINEERING  
INTERIOR DESIGN  
PROJECT MANAGEMENT  
AA 003420  
CA 8660  
604 COURTLAND STREET  
SUITE 100  
ORLANDO, FLORIDA 32804  
PH 407.645.5008  
FX 407.629.9124

SEAL:  
THIS DOCUMENT IS NOT FOR CONSTRUCTION UNLESS THE ARCHITECT OR ENGINEER'S SIGNATURE AND SEAL APPEAR BELOW.

NOT FOR CONSTRUCTION

BID SET  
04-10-18

1. 03.07.18 FIRE DEPT. COMMENTS  
NO DATE REMARKS

REVISIONS



RAINBOW CHILD CARE CENTER

C - PROTOTYPE  
2609 W. LAKE MARY BLVD.  
LAKE MARY, FL 32746

PROJECT NO: 2017.0250  
DATE: 12.22.17

E.204  
ELECTRICAL SPECIFICATIONS

CHECKED: AG DRAWN: DMS

Order Plans

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