

ELECTRICAL SPECIFICATION

INTRODUCTION

THE CONTRACTING FOR INSTALLATION OF THE ELECTRICAL SYSTEM WILL BE ACCOMPLISHED IN THE FIELD AT THE DIVISION LEVEL. THESE SPECIFICATIONS ARE TO AID IN PREPARATION OF DIVISION LEVEL STORE PLANS AND CONTRACT DOCUMENTS. IN CASE OF A CONFLICT BETWEEN THIS SPECIFICATION AND THE CONTRACT DOCUMENTS PROVIDED BY THE DIVISION CONSTRUCTION MANAGER, THE DIVISION'S PLANS AND SPECIFICATIONS SHALL PREVAIL.

1. SCOPE

- 1.1 PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED TO EXECUTE WORK.
1.2 THIS WORK INCLUDES, BUT IS NOT LIMITED TO: ELECTRICAL SERVICE AND DISTRIBUTION SYSTEMS, PANELBOARDS, DISCONNECT SWITCHES, LIGHTING FIXTURES, POWER AND CONTROL WIRING WITH FINAL CONNECTIONS TO ALL EQUIPMENT REQUIRED FOR A COMPLETE SYSTEM.
1.3 ELECTRICAL CONTRACTOR TO VERIFY TYPE OF POWER SERVICE AVAILABLE (UNDERGROUND OR OVERHEAD) AND MAXIMUM SHORT CIRCUIT CURRENT PRIOR TO SUBMITTING A PROPOSAL.
1.4 ELECTRICAL CONTRACTOR TO VERIFY TYPE OF TELEPHONE SERVICE AVAILABLE (UNDERGROUND OR OVERHEAD) PRIOR TO SUBMITTING A PROPOSAL.
1.5 ELECTRICAL CONTRACTOR VERIFY METERING, IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS, FOR GENERAL SERVICE SCHEDULE.
1.6 ELECTRICAL CONTRACTOR SHALL PROVIDE 3-PHASE 4-WIRE 120/208V WYE SERVICE. IF FOR ANY REASON, THIS IS NOT AVAILABLE, THE ELECTRICAL CONTRACTOR SHALL NOTIFY 7-ELEVEN, IN WRITING PRIOR TO SUBMITTING A PROPOSAL.
1.7 ELECTRICAL CONTRACTOR SHALL PROVIDE LABELS 3/16 INCH HIGH, FOR DESCRIPTION OF MAIN SWITCHBOARD, PANELBOARD AND ALL BRANCH CIRCUITS.

2. INSTALLATION

- 2.1 THE INSTALLATION SHALL COMPLY WITH ALL LAWS IN EFFECT APPLYING TO ELECTRICAL INSTALLATION, AND WITH THE REGULATIONS OF THE NEC, WHERE SUCH REGULATIONS DO NOT CONFLICT WITH THE LAWS IN EFFECT, AND WITH THE PUBLIC UTILITY COMPANY FURNISHING THE SERVICE.
2.1.1 THE CONTRACTOR SHALL UPGRADE THESE SPECIFICATIONS AS REQUIRED TO MEET COMPLIANCE WITH ALL APPLICABLE CODES IN EFFECT; HOWEVER, WHERE THESE SPECIFICATIONS MAKE STIPULATIONS OVER AND ABOVE THE MINIMUM REQUIREMENTS OF APPLICABLE CODES, THE CONTRACTOR SHALL NOT DOWN-GRADE THESE SPECIFICATIONS TO MINIMUM CODE REQUIREMENTS WITHOUT PRIOR WRITTEN APPROVAL FROM 7-ELEVEN.
2.2 CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED ELECTRICAL CONDUIT AND WIRING FOR ALL MOTORS, STARTERS AND ELECTRICAL CONTROLS. HE SHALL MAKE ALL LINE VOLTAGE ELECTRICAL CONNECTIONS AS REQUIRED FOR HVAC SYSTEMS.
2.3 ELECTRICAL CONTRACTOR SHALL COMPLETE THE CONNECTIONS TO ALL RECEPTACLES, SALES COUNTERS, GONDOLAS AND FINAL CONNECTIONS TO ALL FIXTURES AFTER FIXTURES ARE IN PLACE.
2.4 VERIFY EXACT LOCATION OF ALL SIGNS WITH 7-ELEVEN REPRESENTATIVE. FURNISH AND INSTALL ALL CONDUITS AND WIRES WITH STUB-UPS AS DIRECTED BY THE 7-ELEVEN CORPORATION. MAKE ALL FINAL CONNECTIONS AS REQUIRED.
2.5 WIRING
2.5.1 ALL WORK SHALL BE COMPLETED IN A NEAT AND WORKMAN-LIKE MANNER. THE CONTRACTOR SHALL CONTACT THE 7-ELEVEN CORPORATION REPRESENTATIVE SHOULD THIS PLAN REQUIRE MODIFICATION TO COMPLY WITH LOCAL CODES.
2.5.2 ALL WIRING SHALL BE RUN IN APPROVED METALLIC RACEWAY OR CONDUIT AND SHALL BE UNIFORMLY COLOR CODED THROUGHOUT THE ENTIRE SYSTEM. SPLICES, TAPS, AND TERMINALS SHALL BE MADE ONLY IN J BOXES, OUTLETS AND PANEL BOARDS.
2.5.3 ALL CONDUCTORS SHALL BE COPPER THHN, 90 DEGREE CELSIUS, WITH A MINIMUM WIRE SIZE OF #12 AWG (ALUMINUM CONDUCTORS SHALL NOT BE USED). THE CONTRACTOR SHALL ENSURE THE CONDUCTORS UTILIZED ARE IN KEEPING WITH GOOD PRACTICE FOR THE CIRCUIT/PROTECTIVE DEVICES EMPLOYED. THE NEUTRAL CONDUCTOR (WHERE USED) SHALL HAVE THE SAME AMPACITY AS THE ASSOCIATED PHASE.
2.5.4 THE CONTRACTOR SHALL ENSURE THAT CIRCUIT AMPACITY AND SHORT CIRCUIT/OVERLOAD PROTECTION IS APPROPRIATE FOR THE EQUIPMENT BEING INSTALLED. UL LISTING CONDITIONS SHALL BE OBSERVED.
2.5.5 TO COMPLY WITH NEC/UL LISTING CONDITIONS, CERTAIN ROOFTOP UNITS ARE SHOWN WITH FUSED DISCONNECTS.
2.5.5.1 ALL FUSES SERVING MOTOR LOADS WILL BE OF THE DUAL ELEMENT TYPE.
2.5.5.2 DUE TO DIFFERENT INTERRUPTING CHARACTERISTICS, PANELBOARD CIRCUIT BREAKERS MAY BE RATED HIGHER THAN THE DUAL ELEMENT FUSES THEY SUPPLY TO ENSURE SUFFICIENT STARTING CURRENT.
2.5.6 WIRE SIZES LISTED ARE MINIMUM. CONDUCTORS SHALL BE SELECTED SUCH THAT THE MAXIMUM VOLTAGE DROP BETWEEN THE PANELBOARD AND LOAD (AT FULL LOAD AMPS) SHALL NOT EXCEED THE FOLLOWING GUIDELINES:
2.5.6.1 MOTOR LOADS (AIR CONDITIONING, REFRIGERATION, ETC.) ----- 2% OF CIRCUIT VOLTAGE AT PANELBOARD.
2.5.6.2 ALL OTHER LOADS-----5% OF CIRCUIT VOLTAGE AT PANELBOARD.

2.5.7 SPECIAL NOTES ON SERVICES:

- 2.5.7.1 120/208V, 3-PHASE, WYE THE CONTRACTOR SHALL CHECK THE REQUIREMENTS OF ALL EQUIPMENT AND WILL INSTALL AUTOTRANSFORMERS (BUCK AND BOOST TRANSFORMERS) AS REQUIRED.
2.5.8 THE CONTRACTOR SHALL PROVIDE DEDICATED CIRCUITS WITH ISOLATED GROUND FOR ALL CIRCUITS ORIGINATING FROM PANELS. THE PURITY OF THE ISOLATED GROUND SHALL BE MAINTAINED BY USING ONLY INSULATED GROUNDING CONDUCTORS AND ISOLATED GROUND. THE GROUNDING CONDUCTOR FOR THE ISOLATED GROUND SHALL NOT MAKE ELECTRICAL CONTACT WITH THE COMMON GROUND OR ANY ITEM CONNECTED TO THE COMMON GROUND (I.E. CONDUITS, "J"-BOXES, SWITCH BOXES, ETC.) AT ANY POINT OTHER THAN AT THE SERVICE GROUNDING TERMINAL. SEE 2005 NEC 250-74 EXCEPTION #4.

3. MATERIALS:

- ALL MATERIALS AND DEVICES SHALL BE U.L. APPROVED AND SHALL CONFORM TO THE STANDARDS OF N.E.M.A., N.E.C., AND I.E.E.E.
3.1 LIGHT FIXTURES: SEE SCHEDULE ON ELECTRICAL PLAN.
3.2 RACEWAYS: ALL CONDUIT SHALL BE PVC.
3.3 FITTINGS AND BUSHINGS-ALL REQUIRED BENDS, FITTINGS, JUNCTION BOXES, ETC., WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS, SHALL BE INSTALLED TO SATISFY ALL CODES AND STANDARDS OF GOOD PRACTICE. ALL CONDUCTORS ENTERING/LEAVING A CONDUIT OR RACEWAY SHALL BE AFFORDED ABRASION PROTECTION BY AN ADEQUATE BUSHING OR OTHER APPROVED MEANS.
3.4 OUTLET BOXES: SHALL BE STANDARD, STAMPED GALVANIZED STEEL BOXES, "J"-BOXES AND OUTLET BOXES USED AS A PULL BOX SHALL BE PROVIDED WITH A SUITABLE COVER OF SAME MATERIAL AS BOX.
3.5 WIRING DEVICES:
INSTALL ON EACH AND EVERY OUTLET BOX, A WIRING DEVICE AND/OR COVERPLATE, ALL AS INDICATED BY SYMBOL ON THE DRAWINGS.
3.5.1 WALL SWITCHES:
3.5.1.1 SINGLE POLE SWITCHES:
SINGLE POLE WALL SWITCHES SHALL BE SIMILAR AND EQUAL TO "BRYANT" #4501-I 20A, 120-277VAC TOGGLE SWITCH (WHITE) WITH COVERPLATE. FOR SINGLE GANG OR (WHITE) COVERPLATE FOR DOUBLE GANG.
3.5.1.2 3-WAY SWITCHES:
3-WAY SWITCHES SHALL BE SIMILAR AND EQUAL TO "BRYANT" #4503-I 20A, 120-277VAC 3-WAY SWITCH (WHITE HANDLE) AND WHITE COVERPLATE FOR SINGLE GANG OR WHITE COVERPLATE FOR DOUBLE GANG.
3.5.3 CONVENIENCE OUTLET (20A):
20A CONVENIENCE OUTLETS SHALL AND EQUAL TO "BRYANT" #6342-I 2 POLE, 3 WIRE, 20 A 125V, DUPLEX GROUNDING RECEPTACLE WITH (WHITE) COVERPLATE.
3.5.4 OUTLET, ISOLATED GROUND (20A):
ISOLATED GROUND OUTLETS SHALL BE EQUAL TO "BRYANT" #5261-IG 2 POLE, 3 WIRE, 20A, 125V, SINGLE ISOLATED GROUND RECEPTACLE (ORANGE) WITH (WHITE) COVERPLATE.
3.5.5 GFCI CONVENIENCE OUTLETS (INDOOR & OUTDOOR):
OUTDOOR GFCI OUTLETS SHALL BE WEATHER RESISTANT (WR) LABELED, EQUAL TO THE "BRYANT" #6F1R20W 20A OUTLET WITH OUTDOOR COVERPLATE #4500B AND BACK PLATE #63101. INDOOR GFCI OUTLETS SHALL BE EQUAL TO "BRYANT" #6F35WL, 20A WITH WHITE COVERPLATE.
3.5.6 FLOOR BOXES:
ALL FLOOR OUTLETS SHALL BE MOUNTED IN AN APPROVED FLOOR BOX SIMILAR AND EQUAL TO "HUBBEL" ECONOMY TYPE II FLOOR BOX WITH BRASS COVER.
3.5.7 SAFETY SWITCHES:
SAFETY SWITCHES SHALL BE UL APPROVED GENERAL DUTY SAFETY SWITCHES SIMILAR AND EQUAL TO THOSE MANUFACTURED BY "SQUARE-D". SWITCHES WILL BE FUSIBLE OR FUSIBLE AS DICTATED BY PLANS/LOCAL CODES AND WILL BE INDOOR (DRY) INSTALLATION IN A NEMA TYPE 3R ENCLOSURE FOR OUTDOOR INSTALLATION.
3.5.8 NOT USED
3.5.9 PHOTO CELL (OUTDOOR):
ELECTRONIC LIGHT SENSOR IS THE TORK EPC-1, ENCLOSED IN A LEXAN HOUSING WITH A 1/2" CONDUIT MOUNTING AND 180 DEGREE SWIVEL LIGHTING CONTROL. FUSER HAS A 2" TO 100 FOOT-CANDLE LIGHT ADJUSTMENT. INSTALL IN A WEATHER TIGHT JUNCTION BOX ON THE ROOF AT RTU-2. SET SENSOR TO 100 FOOT-CANDLE LEVEL.
3.5.9.1 LIGHTING CONTROLLER (OUTDOOR LIGHTING CONTROL):
THE LIGHTING CONTROLLER SHALL BE TORK LC-200 IN A NEMA 1 ENCLOSURE. THE LC-200 IS USED IN CONJUNCTION WITH THE TORK EPC-1.

3.5.10 CONTACTOR (OUTDOOR LIGHTING CONTROL):

THE LIGHTING CONTACTORS FOR USE WITH THE OUTDOOR PHOTO CELLS SHALL BE SIMILAR AND EQUAL TO "SQUARE-D" ELECTRICALLY HELD LIGHTING CONTACTOR CLASS 8903 TYPE LG-80 FORM F WITH 120V CONTROL COIL, NORMALLY OPEN CONTACTS RATED AT 30 AMPS CONTINUOUS, IN NEMA TYPE 1 ENCLOSURE WITH FUSED CONTROL CIRCUIT. REF WIRING DIAGRAM DETAIL 2/E3.

3.5.11 PHOTO CELL BYPASS SWITCH:

THE PHOTOCELL BYPASS SWITCH SHALL BE A "BRYANT" #4801-L SINGLE POLE LOCK TYPE 15A 120-277 VOLT SWITCH WITH KEY #6006 AND COVERPLATE (WHITE).

NOTE: NO SUBSTITUTION SHALL BE PERMITTED UNLESS THE CONTRACTOR CAN PROVE TO THE 7-ELEVEN CORPORATION REPRESENTATIVE THAT THE PROPOSED SUBSTITUTE WILL OPERATE WITH "BRYANT" KEY #6006. THE KEY SHALL BE TURNED OVER TO THE 7-ELEVEN CORPORATION REPRESENTATIVE AT ACCEPTANCE (NOT LEFT IN SWITCH, CASH REGISTER, ETC.).

3.6 SERVICE/DISTRIBUTION EQUIPMENT:

PANEL AND DISTRIBUTION PANEL SHALL BE SQUARE D. ALL SWITCH GEAR TO BE PURCHASED FROM GRAYBAR, FOR PRICING AND PLACING ORDERS, CONTACT "7-ELEVEN" FOR THE APPROPRIATE SALES DEPARTMENT.

3.6.1 MAIN POWER SWITCHES

THE MAIN PANEL POWER SWITCHES SHALL BE SQUARE 'D' TYPE I LINE, RATED AT 65,000 A.I.C. (MIN.) CIRCUIT BREAKERS SHALL BE LISTED AS FOLLOWS: 225A 3 POLE, SQUARE 'D' TYPE QD (25,000 A.I.C.) 100A 3 POLE, SQUARE 'D' TYPE FH (25,000 A.I.C.)

NOTE: PANEL RATINGS REQUIRED FOR HIGHER AIC REQUIREMENTS SHALL BE PRESENTED TO THE DISTRIBUTOR FOR MODIFICATIONS TO THE GEAR SUBMITTAL.

3.6.2 PANELBOARDS:

SQUARE 'D' PANELBOARDS USED IN SERIES WITH I-LINE CIRCUIT BREAKERS AND FITTED WITH SQUARE 'D' BRANCH CIRCUIT BREAKERS ARE LISTED FOR USE WITH UP TO 10,000 RMS SYMMETRICAL AMPS OF FAULT CURRENT. USE AN APPROPRIATE SQUARE 'D' CIRCUIT BREAKER WITH EACH PANEL. PANELS SHALL BE RATED AT 22K AIC. CIRCUIT BREAKERS SHALL BE TYPE QOXXX-QO-FRAME

3.6.2.1 PANELBOARDS:

PANEL 'F', IF REQUIRED, SHALL BE FED BY A SQUARE D NO. 183506-002 CONTACTOR SHALL BE WIRED FOR EMERGENCY SHUTDOWN.

3.6.3 WIREWAY:

THE WIREWAY SHALL BE SIMILAR AND EQUAL TO "SQUARE-D" COMPANET WIREWAY WITH APPROPRIATE FITTING FOR THE PARTICULAR INSTALLATION. CONTRACTOR SHALL SIZE TO INSTALLATION IN ACCORDANCE WITH GOOD PRACTICE AND TYPES IN EFFECT.

3.7 OVERCURRENT/SHORT CIRCUIT PROTECTIVE DEVICES:

3.7.1 PANELBOARD BRANCH FEEDER CIRCUIT BREAKERS:

ALL DOWNSTREAM BREAKERS MUST BE SQUARE 'D' TO MAINTAIN SERIES LISTING. IF FUSIBLE DISCONNECTS ARE USED, SQUARE 'D' PANEL BOARDS AND CIRCUIT BREAKERS MUST BE USED.

3.7.2 GROUND FAULT CIRCUIT INTERRUPTER (GFCI) BREAKERS:

GROUND FAULT CIRCUIT INTERRUPTER (GFCI) TYPE CIRCUIT BREAKERS SHALL BE SIMILAR TO THE PANELBOARD CIRCUIT BREAKERS BUT WITH GROUND FAULT PROTECTION. GFCI BREAKERS SHALL BE UL APPROVED AS CLASS A DEVICES IN ACCORDANCE WITH UL STANDARD #943.

3.7.3 FUSES, MAIN SWITCHBOARD:

MAIN SWITCHBOARD FUSES, IF REQUIRED, SHALL BE CLASS J CURRENT LIMITING FUSES SIMILAR AND EQUAL TO "GOULD (AST200)" LOW PEAK (LPN-RK200) FUSES.

3.7.4 FUSES, EQUIPMENT:

EQUIPMENT FUSES, IF REQUIRED, SHALL BE OF THE DUAL ELEMENT, TIME DELAY VARIETY SIMILAR AND EQUAL TO "GOULD" TRIONIC TR-T FUSES.

3.8 SPD SHALL BE PROVIDED BY GRAYBAR.

3.9 CONDUCTORS:

ALL CONDUCTORS SHALL BE COPPER THHN, 90 DEGREES CELSIUS, MINIMUM WIRE SIZE SHALL BE #12AWG. WIRE #6AWG AND LARGER SHALL BE STRANDED. INSULATION SHALL BE TYPE THHN OR THW, OR AS SHOWN ON THE PLANS AND SHALL CONFORM WITH NEC FOR THE PARTICULAR APPLICATION. RHW INSULATION SHALL BE USED IN CONDUIT ON THE ROOF. USE THHN INSULATION IN FLUORESCENT LUMINARIES USED AS RACEWAYS.

NOTE: ALUMINUM CONDUCTORS SHALL NOT BE USED.

4. TESTING AND INSPECTION

4.1 TESTING:

4.1.1 THE CONTRACTOR SHALL TEST, PRIOR TO ENERGIZING FOR THE FIRST TIME, ALL PIECES OF ELECTRICAL EQUIPMENT TO ASSURE THEM TO HAVE THE PROPER PHASE TO PHASE AND PHASE TO GROUND INSULATION AND TO BE FREE OF SHORTS. AFTER ENERGIZING, EACH LUMINAIRE SHALL BE LIGHTED AND TESTED.
4.1.2 THE VARIOUS CIRCUITS SERVED FROM THE PANELBOARDS VARY IN LOADING. THE CONTRACTOR SHALL CAREFULLY BALANCE THE LOAD ON EACH LEG OF THE SERVICE. WHEN ALL LOAD IS TURNED ON AND THE SYSTEM IS OPERATING AT 100%, THE INITIAL UNBALANCE SHALL NOT EXCEED 3%.

NOTE: WITH 3 PHASE DELTA, PHASES A AND C SHALL BE BALANCED WITH 10% PHASE B SHALL BE BALANCED AS CLOSELY AS POSSIBLE.

4.2 INSPECTION:

ELECTRICAL CONTRACTOR SHALL FURNISH, AT THE COMPLETION OF THE PROJECT OR EACH INSPECTION POINT OF THE PROJECT, AN INTERIM OR FINAL INSPECTION CERTIFICATE FROM THE LOCAL INSPECTING AUTHORITY.

4.3 PERFORMANCE REQUIRED:

4.3.1 ALL EQUIPMENT AND FIXTURES SHALL BE PROPERLY CONNECTED WITH ADEQUATE POWER AND CHECKED THOROUGHLY FOR PROPER OPERATION.
4.3.2 ALL EXPOSED EQUIPMENT SHALL BE INSTALLED AS PER DRAWINGS AND IS SUBJECT TO INSPECTION FOR WORKMAN-LIKE APPEARANCE.

5. ABBREVIATIONS:

5.1 THE FOLLOWING IS A LIST OF ABBREVIATIONS USED IN THE ELECTRICAL SPECIFICATIONS.

NEC.....NATIONAL ELECTRIC CODE
NEMA.....NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
UL.....UNDERWRITERS LABORATORIES, INC.
HVAC.....HEATING, VENTILATING AND AIR CONDITIONING
IEEE.....INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
GFCI.....GROUND FAULT CIRCUIT INTERRUPTER
AIC.....AMPERES INTERRUPTING CAPACITY

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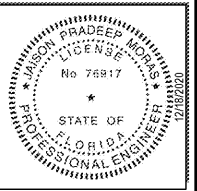


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