

## **DIVISION 16 ELECTRICAL**

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### SECTIONS:

#### 16.1 ELECTRICAL

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#### 16.1 A. General:

1. The Electrical installation shall meet the requirements of the National Electrical Code of the National Fire Protection Association, most recent edition.
2. An Underwriter's Inspection Certificate shall be issued at completion of the project.
3. Underwriter's Labels: All materials and equipment shall bear the label of approval of the National Board of Fire Underwriters' Laboratories.

#### 16.1 B. Materials:

1. Service – The service supplied to the structure shall be 200 amp for single family dwellings and appropriately sized for multi-family dwellings. The contractor shall install the meter box at location approved by Peco Energy and the owner.
2. Wiring –
  - a. Conductors shall be copper. Wire and cable utilizing aluminum conductors shall not be used in any part of the work, except service entrance cable.
  - b. Wire for each circuit shall maintain the same size throughout the circuit. All sizes specified are American Wire Gauge sizes.
3. Duplex Receptacles – Duplex receptacles in the kitchen and laundry area shall be rated at 20 amps and installed on 20-amp circuits.
5. Switches –
  - a. Install switches where shown on the drawings, where specified, or as required for the work, in accordance with all applicable codes. Where more than 1 switch occurs at a given point, the switches shall be installed under a common gang plate.
  - b. Switches shall be quiet type, high capacity flush type, rated not less than 15 amps.
6. Switch and Receptacle Plates – Install a suitable plate for each switch, combined switches and receptacle. Metal wall plates for flush type outlets shall be Ivory color.
7. Panelboard – Lighting and appliance branch circuit panelboard shall be circuit-breaker equipped, type 1, class 1. Panelboard shall be rated at 120/240 volts, single phase, 3 wire

150-amp bus and have a 150-amp 2-pole main circuit breaker with single pole branch circuit breakers. There shall be a minimum of 12 branch circuits; number of breakers shall suit circuit requirements. Single pole breakers shall be full module size. Two pole breakers shall not be installed in a single module. Multipole circuit breakers shall be of the common-trip type having a single operating handle. Panelboard shall have space for a minimum of 20 circuit breakers.

8. Lighting Fixtures –

***[THE FOLLOWING FIXTURE LIST WILL BE UPDATED TO SHOW CURRENTLY AVAILABLE MODELS OF INOFFENSIVE DESIGN]***

- a. Kitchen under 100 sq. ft.: Progress P33-50-15
- b. Kitchen over 100 sq. ft.: Simkar Sy-9-30-240-RS (*change to fluorescent 2-tube fixture, F38T8 tubes, 85 CRI*)
- c. Bathroom Ceiling: Progress P-3605-30 (1-60W)  
Bathroom Wall: Progress P-3015 (2-60W)  
  
NOTE: Bathroom wall fixture may be omitted if furnished integrally with medicine cabinet.
- d. Dining Room: \_\_\_\_\_.
- e. Hall: Progress P3605-30 (1-60W)
- f. Basement and Garage: Pass & Seymour Keyless (1-60W)
- g. Exterior Rear: Progress P-5600-31 (1-60W)  
or Progress P-5735-31 (1-60W)
- h. Exterior Front: choice among four –  
Progress P-5602 (1-60W)  
Progress P-5589 (1-60W)  
Progress P-5875 (1-60W)  
Progress P-5966 (1-60W)
- i. Bedroom Ceilings: Progress P-4693 (2-60W)

9. Door Bell System – In single-family, two family and multiple unit occupancies, install a complete and operable door bell system. For each unit the system shall consist of push-button, bell or chime, 120/24 volt transformer and 24 volt wire. The equipment shall be manufactured by one manufacturer. Chime to be located on wall adjacent to main stairs of a multi-story unit, or otherwise in a location providing audibility throughout the unit.

Acceptable manufacturer: Nutone

10. Smoke Detectors – On each floor of structure (including basement) provide one direct-wired smoke detector with battery back-up. All smoke detectors shall sound if any unit is activated.

16.1 C. Installation:

1. Switches –

- a. A single pole switch shall be located at the entrance to each room or area.
- b. All bathroom lighting shall be controlled by wall switch.
- c. A 3-way switch shall be located at the top and bottom of each flight of stairs, controlling required light within stairway.

2. Receptacle Outlets –

- a. Furnish and install for each convenience outlet a duplex grounding type receptacle.
- b. Receptacles shall be installed at locations and frequency required by code.
  - 1) In each dwelling area, receptacles shall be installed so that no point along the floor line in any wall space is more than 6 ft. from a receptacle.
  - 2) Two or more 20-amp small appliance circuits shall be installed to serve the receptacles in the kitchen and dining area.
  - 3) In the kitchen, a receptacle shall be installed above each counter space wider than 12 inches. Receptacles shall be installed so that no point on the wall above a counter space is more than 24 inches from a receptacle.
  - 4) One wall receptacle shall be installed in each powder room and bathroom.
  - 5) One receptacle on a 20-amp dedicated circuit shall be installed under a ground-floor window at a location suitable for a window air conditioner.
  - 6) One receptacle on a 15-amp dedicated circuit shall be installed under a window in each bedroom.
  - 7) Two switched outdoor receptacles accessible at grade level shall be installed: one in the front and one in the rear of the house.
  - 8) One receptacle on a 20 amp dedicated circuit shall be installed in the basement at the laundry area.
  - 9) At least one receptacle, in addition to the laundry receptacle, shall be installed in each basement and in each garage.
  - 10) For hallways of 10 ft. or more in length, at least one receptacle shall be installed.

- c. Ground-fault circuit-interrupter protection –  
The following receptacles shall be GFCI protected:
  - 1) All bathroom and powder room receptacles.
  - 2) All receptacles in garages.
  - 3) All receptacles installed outdoors.
  - 4) All basement receptacles, except dedicated laundry circuit.
  - 5) All counter-height receptacles installed within 6 ft. of the kitchen sink.
- d. Location of Outlets and Equipment: Unless otherwise indicated, outlet boxes in walls shall be located with center line at the following elevations above the finished floor line.
  - 1) Switch outlets: 54 in.
  - 2) Convenience receptacle outlets: 18 in.
  - 3) Receptacle outlets for counter tops and refrigerator: 48 in.
- 3. Special Connections – The contractor shall install the following connections:
  - a. Exhaust fans in kitchen and bathroom.
  - b. Heating system, including shut-off switch.
  - c. Range.
- 4. Panelboards shall be surface mounted so the height of the top operating handle will not exceed 78" from the floor. Breakers shall be clearly marked in panel box as to circuits served. Panel board and meter (if located inside) shall be mounted on squarely cut 3/4-inch plywood, properly secured to foundation walls with anchors and spacers.
- 5. Equip living room, dining room, and all bedrooms for ceiling light. Use metal wiring box adequately supported for subsequent replacement of original fixture with combination ceiling light and fan. Install ceiling light fixture in all rooms except living room.
- 6. Light fixtures shall be hung in place, and secured true and straight. Install appropriate light bulb(s) in each fixture.
- 7. Grounding – Install an 8 ft. copper-clad grounding rod in the basement and a copper grounding wire around water meter with enough length to allow easy removal of the water meter.
- 8. Testing – Check entire system for proper operation, including continuity, polarity, and grounding.
- 9. Insulation and air-sealing requirements –

- a. Where batt insulation is to be used, wiring shall be installed so that insulation does not have to be pieced, slit or wrinkled around it. Wherever possible, wiring on studded exterior walls shall be run behind the studs. Otherwise, such wiring shall be secured along the bottom plate and run through notches in the bottom of the studs, or holes drilled not more than 1/2 inches from the bottom plate.
  - b. After rough wiring, all holes in electrical boxes shall be sealed with caulk or mastic.
10. All wiring above basement shall be concealed. Wiremold shall not be used.
  11. When receptacles must be installed in party walls (plaster applied directly to masonry), shielded wiring shall be recessed in a channel cut in the masonry, secured and patch-plastered over.