

# GENERAL ELECTRICAL REQUIREMENTS FOR SINGLE FAMILY DWELLINGS

**This is a list of basic requirements, but not all,  
confirm with Code Enforcement Director or your electrical contractor.  
Code is taken from the 2002 NEC and the 2003 International Residential Code**

## Service

1. A minimum of 100 Amp 3-wire service for a single-family dwelling unit. 2002 NEC 230.79
2. Only one service per dwelling, except for multiple occupancy buildings. 2002 NEC 230.2
3. Service disconnecting means shall be located at the point of entrance of the service conductors. 2003 IRC E3501.6.2

## Grounding

1. A grounding electrode system shall bond to one of the following items if they are available 2003 IRC E3508.1:
  - a. Metal underground water pipe, unless it is further than five feet from the building
  - b. Concrete encased electrode/footing rebar
  - c. Grounding rod/ring
2. Continuity of the grounding path to interior piping shall not rely on water meters, filters, or similar equipment. 2003 IRC E3508.1.1
3. Interior metal water piping shall be bonded to the service equipment enclosure or the grounded conductor at the service or the grounding electrode when of sufficient size. 2003 IRC E3508.1.1
4. Grounding clamps must be listed for the materials of the grounding electrode and for direct soil burial. 2003 IRC E3511.4

## Circuits

1. Circuits to ranges and dryers and similar appliances shall be four-wire and the bonding jumper shall NOT be connected between the neutral terminal and the frame of the appliance. 2003 IRC E3603
2. Range circuits shall be a minimum 40 amp using #8 wire. 2002 NEC 210.19 (3)
3. Dryer circuit shall be 5000 watts or the nameplate rating, which ever is larger. 2002 NEC 220.18
4. A general lighting circuit shall be provided for each 3 volt-amperes for every square foot. 2002 NEC 220.3
5. Kitchen exhaust hoods shall not be on the same circuit as either of the two required small appliance branch circuits. 2002 NEC 210
6. Garbage disposals, dishwashers, trash compactors and other motor loads are not permitted on the small appliance branch circuits. 2002 NEC 210
7. The two 20 amp small appliance circuits serving the kitchen, pantry, breakfast room, and dining room shall have no other outlets. 2002 NEC 210.52 (B)(1)
8. Bathroom receptacles shall be supplied by at least one 20-amp circuit that shall have no other outlets. If the circuit serves a single bathroom, the lights in that bathroom may be on the same circuit. 2002 NEC 210.52

## Receptacle Outlets Required 2002 NEC 210.52

1. Where. Every kitchen, family room, dining room, living room, parlor, library, den, sunroom, bedroom, recreation room, or similar room or area of dwelling units.
2. Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than 6 feet from a receptacle outlet.
3. Wall Space.
  - a. Any space 2 feet or more in width
  - b. The space occupied by fixed panels in exteriors, excluding sliding panels.
  - c. The space afforded by fixed room dividers such as freestanding bar-type counters or railings.
4. Floor Receptacles. If receptacle is located with in 18 inches of wall it will be counted as part of the number of required outlets in the wall.

5. Wall Counter Spaces. A receptacle outlet shall be installed at each wall counter space that is 12 inches or wider. Receptacle outlets shall be installed so that no point along the wall line more than 24 inches measured horizontally from a receptacle outlet.
6. Island Counter Spaces. At least one receptacle outlet shall be installed at each island counter space with a dimensions greater than 12" x 24".
7. Peninsular Counter Spaces. At least one receptacle outlet shall be installed at each island peninsular counter space with dimensions greater than 12" x 24".
8. Receptacle Outlet Location For Counter Tops. Receptacle outlet shall be located above, but not more than 20 inches above, the counter top.
9. Bathrooms. At least one wall receptacle outlet shall be installed within 3 feet of the outside edge of each basin (sink).
10. Outdoor Outlets. At least one receptacle outlet accessible at grade level and not more that 6½ feet above grade shall be installed at the front and back of the dwelling.
11. Laundry Areas. At least one receptacle outlet shall be installed for general purpose.
12. Basements and Garages. At least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each basement and in each attached and detached garage, where electric power is supplied. Where basement is unfinished than only one receptacle outlet needs to be installed.
13. Hallways. Hallways of 10 feet or more in length shall have at least one receptacle outlet.
14. Outlets in wet locations must be waterproof, the integrity of which is not affected when a cord is plugged in. 2002 NEC 406.8
15. Outlets shall not be installed in bathtub and shower spaces even if installed in a waterproof enclosure. 2002 NEC 406.8

#### **Lighting Outlets Required**

1. In habitable rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom. 2002 NEC 220.70
2. Additional Locations. 2002 NEC 220.70
  - d. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power.
  - e. For dwelling units, for garages with electric power, at least one wall switch shall control an exterior light for the exit of a garage.
  - f. Where an interior stairway has more than six risers than a wall switch is required at each floor level.
3. Storage or Equipment Spaces. For attics, underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed. 2002 NEC 220.70
4. Lighting above the bathtub cannot be cord connected, hanging fixtures, lighting track pendants or ceiling fans. This zone is measured 3' out from the outside edge of the tub and 8' vertically above the edge of the tub. 2002 NEC 410.4(D)
5. Lighting fixtures in closets must comply with 2002 NEC 410.8. Incandescent fixtures must be completely enclosed or recessed. Permitted incandescent fixtures must have 12" of clearance from the fixture to the lip of the shelf. Fluorescent fixtures must have 6" of clearance. 2002 NEC 410.8

#### **Wiring Methods**

1. Cable and wires installed in grooves or holes in studs or joists that are less than 1-¼" from the face of the stud or joist shall be protected by 1/16" thick steel plates, sleeves, or equivalent. 2002 NEC 300.4
2. Nonmetallic sheathed cable shall be supported every 4.5' and within 12" of every box. 2003 IRC E3702.1
3. Wiring is only permitted to travel through the cold-air return and through no other ducts, plenums, or other air handling spaces. 2002 NEC 300.22
4. Switches or circuit breakers shall not disconnect the grounded conductor of a circuit. 2002 NEC 404.2 (B)
5. Maximum bends of conduit shall not exceed 360 degrees total. 2002 NEC 352.26

6. Bends in Romex cable shall be made so the radius of the curve of the inner edge of the bend is not less than 5 times the diameter of the cable. 2002 NEC 334.24
7. Each wire entering a box and terminating or splicing therein is counted as one wire. Interior box clamps all count as one conductor. Each device shall count as two conductors based on the largest conductor connected to it. 2002 NEC 314.16
8. Cord connected, built-in kitchen appliances are allowed, but the receptacle must be accessible without removing the appliance. 2002 NEC 422.33
9. Ceiling fans shall be supported from outlet boxes identified for such use. Fans that exceed 50 pounds shall be supported independently of the box. 2002 NEC 314.27

#### **Disconnects**

1. Exterior air units must have a disconnect within sight. 2002 NEC 440.14
2. Minimum disconnect rating for one circuit is 15 amps, for two circuits is 30 amps and for all others it is 60 amps. (detached garages with more than two circuits must have 60 amp wire) 2002 NEC 230.79
3. Electric water heaters shall have a disconnecting means within sight of the appliance or have a circuit breaker capable of being locked in the open position. 2002 NEC 430.113

#### **GFCI Protection**

1. GFCI protection is required for all 125 volt, 15 or 20 amp receptacles used for temporary power during construction. 2002 NEC 527.6
2. Fixed electric heating equipment for pipelines and vessels shall have ground fault protection (outlets under trailers, etc). 2002 NEC 427.22
3. All receptacles in bathrooms, garages, outdoors, crawls spaces, unfinished basements, and basement rooms not intended for habitation shall have GFCI Protection. 2002 NEC 210.8
4. All receptacles serving kitchen counter tops or within 6 feet of any sink shall have GFCI Protection. 2002 NEC 210.8

#### **Boxes: Junction, outlet, and lighting**

1. Unused openings in boxes and conduit bodies shall be closed. 2003 IRC E3806.4
2. All boxes shall be accessible. 2002 NEC 314.29
3. Boxes shall be installed at each conductor splice point, outlet, switch point, junction point, or pull point. 2002 NEC 314
4. Non-metallic boxes of rectangular shape (2 1/4" x 4") can be used in both walls and ceilings. No clamps necessary if wire is fastened within 8" of the box. 2002 NEC 314.17

#### **General Information**

1. Working space around electrical equipment shall be minimum: 30" wide and 36" deep and 6'-6" high. If the equipment is higher than 6'-6", the minimum height shall be to the top of the equipment. It also must be illuminated. 2003 IRC E3503

#### **Smoke Alarms**

1. Where installed.
  - a. In each sleeping room.
  - b. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
  - c. On each story of the dwelling, including basements but not including crawl spaces and uninhabitable attics.
2. When more than one smoke alarm is installed within a dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarm in the dwelling unit. The alarm shall be clearly auditable in all bedrooms over background noise with all intervening doors closed.
3. Smoke alarms shall receive primary power from the building wiring and should have battery back up when primary power is interrupted.