

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_

## **Engineering Technology Department**

### **Basic Residential Electrical Wiring Codes Guide (excerpts from the National Electric Code)**

#### **Branch Circuits Guidelines**

1. Do NOT mix different wire sizes on the same branch circuit.
2. Type NM cable must be stapled within 12" of metal boxes, 8" of plastic boxes and every 4½ feet thereafter. Proper connectors must be used where NM cable enters metal cabinets, boxes or panel boards.

#### **Required Receptacles - Code Summary**

1. For most areas of a house, receptacles must be no more than 12 feet apart and no more than 6 feet from a door or entryway.
2. Every hallway over 10 feet long must have at least one receptacle. If less than 10 feet, hallways are exempt from the 6 foot rule.
3. Plugs, which are located behind a stationary appliance, such as a refrigerator or washing machine, do not count when considering plug spacing.
4. Every basement and garage must have at least one receptacle, and all must be GFI protected. At least one receptacle must be installed in the each unfinished portion of a basement. This receptacle is in addition to any receptacles that may be installed for laundry or other specific purposes.
5. One 20-amp branch circuit must be provided for the laundry. This circuit is limited to receptacles within the laundry room. No other outlets are permitted on this circuit.

6. There must be at least two GFI plugs on the outside of the house located near the front and back doors, and all exterior plugs must be GFI protected. Note: Outdoor outlets installed in wet locations shall have an enclosure that is weatherproof.
7. As a general rule you may have up to 10 receptacles on a single circuit, but this is a gray area which is subject to the discretion of the codes official.
8. Dining room plugs must be on a separate circuit,
9. At least one 20-amp circuit for bathroom receptacles must be supplied. Each bathroom must have its own GFI plug circuit with a plug near the wash basin, and no lights or other plugs or appliances on these circuits. This circuit shall NOT be used to supply a major fixture such as a whirlpool or hot tub!
10. At least one 15 or 20 amp, 120 volt GFCI protected receptacle must be installed at an indoor spa or hot tub location - not closer than five feet from the inside wall of the unit and not more than ten feet away from it.
11. Outdoors spa or hot tubs have the same requirements as a swimming pool

## **Kitchen Receptacles - Code Summary**

1. In the kitchen and eating areas every counter space wider than 12 inches must have a GFI protected plug, in general all kitchen counter top plugs should be GFI protected. Countertop receptacles shall be installed so that no point along the wall is more than 24" measured horizontally from a receptacle outlet in that space.
2. At least two 20-ampere branch circuits are required to feed receptacle outlets for small appliance loads, including refrigeration equipment in the kitchen, pantry, breakfast room, and dining room.
3. Kitchen counter top receptacles must be supplied by at least two small appliance branch circuits.

4. Kitchen appliance and convenience receptacles must be on 20 amp breakers, and wired with 12 gauge wire.

## **Required Ground Fault Protection**

1. A ground fault circuit interrupter must protect ALL receptacles listed below:
2. Bathroom receptacles.
3. Outdoor receptacles.
4. Garage receptacles.
5. Kitchen receptacles that serve counter top surfaces
6. Counter top receptacles within 6 feet of a wet bar sink.
7. All receptacles in an unfinished basement:
8. Sump pumps.
9. Crawl spaces at or below grade.
10. Spas, Hydro massage, Hot tubs and associated electrical components.
11. Pretty much any location where water and electricity might mix.

## **Appliance Branch Circuits - Code Summary**

1. The following Appliances must be on a separate 20-amp circuit: Dishwasher, Garbage disposal, Washing machine.
2. As a general rule All 240-volt appliances must be on their own circuit.
3. Hot tubs, garden tubs, Jacuzzis and the like must be GFI protected and wired as required for the particular model and local codes.
4. The service areas of all appliances must be accessible after the final finish is complete.

## **Required Light Fixtures - Code Summary**

1. General Lighting Branch Circuits shall be computed on a three watts per square foot basis. You may wire up to 600 square feet of living area on a 15 ampere branch circuit or up to 800 square feet on a 20-ampere circuit.

2. "Every room, hallway, stair way, attached garage, and outdoor entrance must have at least one light fixture controlled by a wall switch.
3. There must be at least one wall switch controlled light in a utility room, attic, basement or under floor space used for storage or which contains equipment such as heat and air, water heaters, sump pumps, etc. which may ever require service. The switch must be located at the entry point to these areas.
4. Hallways and stairs with more than six steps require the lights to be controlled by a switch at each end.
- 5. In summary, put a light in every room or large closet, outside of every exterior door, and under the floor and in the attic if there is electrical equipment in these spaces or if they are suitable for storage.**
6. Switch the room lights at every door entering the room, switch a hall or stairway at both ends, and switch exterior lights at the doors, which they service.
7. As a rule of thumb you can put up to ten average light fixtures on a single circuit, unless this will add up to excessive wattage for the circuit (note, a ceiling fan and light kit qualify as one fixture).
8. Notable exceptions would be floodlights, which are high wattage fixtures. Four double bulb floodlights would pretty well fill up a circuit by themselves.
9. The actual rule for this is to not exceed 80% of the calculated wattage capacity of the circuit.
10. Wattage capacity of the circuit equals the amp rating of the breaker times the voltage (120), so for a typical 15 amp light circuit add up all of the maximum wattage's and make sure that they are less than 80% of 15x120 (1440 watts max).
11. Keep in mind that the inspectors may be looking for no more than 10 fixtures per circuit, your calculations notwithstanding.