



GUIDELINES: Circuits and Wiring

The Spirit Lake Building and Electrical Code provide minimum standards for creating an environment of health and safety for all city residents. This handout contains limited information on circuit installation and wiring. Additional information is needed to properly install wiring. Circuit installation and wiring requires a fair amount of skill and experience. Certain installations are best left to the professional.

Circuits Required for Additions and Remodeled Areas

- Bathroom receptacles:
one separate 20 amp circuit
- Kitchen receptacles:
two separate 20 amp circuits
- Laundry receptacle:
one separate 20 amp circuit
- General lighting:
one 15 amp circuit for every 600 square feet

Most appliances, such as dishwasher, disposal, furnace, air conditioner, electric range, electric dryer, and microwave, require separate circuits.

Switch Controlled Lighting

Most areas, including halls, need switch controlled lighting. Switched or half-switched receptacles are acceptable.

Receptacle Outlet Spacing

- Kitchen: 24 inches from the beginning of a counter space and then every 48 inches
- Habitable rooms: six feet from the beginning of a wall space then every 12 feet
- Room dividers, patio doors, etc., are considered wall space.

Ground Fault Circuit Interrupters (GFCIs)

GFCI protection is required for all receptacles in:

- Bathrooms
- Garages
- Unfinished basements
- All kitchen counter receptacles
- Outdoors

Wire Length, Splicing and Groundings

- All boxes must have a minimum wire length of six inches.
- The outer cable jacket must extend at least 1/4 inch into the box.
- If a receptacle box has more than one ground wire, the ground wires must be spliced with a "wire tail" attached to the receptacle's grounding screw; only one conductor is permitted under a terminal screw.
- All metal boxes and metal plaster rings must be grounded.

- Keep cable routing simple.
- Use pig-tail splices at all splice locations (easier to trace splicing).

Junction Boxes

- Do not install junction boxes in the attic or conceal them in walls.
- Make sure the device box is sized correctly for the device used (i.e. ground fault receptacles).
- Keep J-boxes with multiple splices located at waist level (switch boxes).

Box Volume

	Box Volume In Cubic Inches	
	#14 Wire	#12 Wire
Each conductor	2	2-1/4
Ground wires in box	2	2-1/4
Each switch in box	4	4-1/2
Internal cable clamps in box	2	2-1/4

For example, a 2-gang switchbox with four "14-2 with ground" cable in the box requires:

Eight conductors	16 cu.in.
Ground wires	2 cu.in.
Two switches	8 cu.in.
Internal cable clamps	2 cu.in.
<i>Minimum box size</i>	<i>28 cu.in.</i>

Strapping Cables

- Plastic cables must be strapped within eight inches of boxes and at intervals of no more than 4-1/2 feet.
- Plastic cables must not be installed closer than 1-1/4 inches from face studs and joists.
- Cables closer than 1-1/4 inches must be protected with metal plates.
- Cables to be away from sharp edges (i.e. flues, ducts, pipes, etc.)
- Up to three cables stacked under a single staple. Over three cables require a stack staple.

Underground Wiring

- Direct burial cables (type UF) must be in a trench 24 inches deep.
- Electrical PVC conduit must be in a trench 18 inches deep.

Listed Equipment

- Use listed equipment only (i.e. UL, ETL, AGA).
- Follow instructions provided with equipment.

- Only use the listed brand of circuit breakers for the load center. Don't mix brands.
- Use "tandem" circuit breakers sparingly (many limitations apply).

Miscellaneous

- Clothes closets, electric dryers and ranges, hydro-tubs and subpanel installations have many special code provisions (refer to applicable code articles).
- Smoke detector location is determined by the Uniform Building Code.

Inspections

Rough-In: This inspection must be done before any wiring is covered with insulation, sheet rock, paneling, etc.

Underground wiring must be inspected before the trench is covered. Do not install switches or receptacles before this inspection.

Final: Schedule an Inspection when all devices and fixtures have been installed and the wiring is entirely completed. It is the permit holder's responsibility to call for a final inspection. Remember, have your electrical permit number ready when you call.

Questions?

The electrical inspector is usually available between 7:00-8:00 a.m. and 3:30-4:00 p.m.

The Building and Inspection Division is open 7:30 a.m. - to 4:00 p.m., Monday through Friday.

This handout is written as a guide to common questions and problems. It is not intended nor shall it be considered a complete set of requirements.