

ELECTRICAL INSPECTION INFORMATIONAL SHEET

This information is a guide to the most common questions and problems. It is not intended, nor shall it be considered a complete set of requirements.

Your Building Permit does not include the inspection of electrical work. A separate Electrical Permit is required to be submitted and paid for before commencement of any electrical installation that is required by law to be inspected.

Electrical Inspections in West St Paul are made by Steve Kletchka
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Who can perform electrical work?

Minnesota Law required all electrical work to be performed by licensed, bonded and insured electrical contractors and their employees.

Homeowners, with strict limitations, are exempt from electrical licensing. [Minnesota Statute 326B.31.23](#) ‘An “owner” is an individual who physically performs electrical work on premises the individual owns and actually occupies as a residence or owns and will occupy as a residence upon completion of its construction.’

When an owner files an electrical application with the electrical inspection authority, that person is signing an affidavit that they personally and physically will perform all the electrical work, including the laying out of such work. That person further certifies that they own and occupy the residence, or own and will occupy the residence upon completion of construction. Generally, this is limited to one-family dwellings and their detached accessory buildings.

It is illegal for an owner to install electrical wiring in a mobile home or recreational vehicle parks, or on property that is rented, leased, or occupied by others. Additional information and knowledge will be needed to properly install electrical wiring that is essentially free from fire and electric shock hazard. Should you have questions, please reference authoritative publications based on the [2023 National Electrical Code \(NEC\)](#).

Rough-In Inspection

A rough-in inspection shall be made before any wiring is covered by insulation, sheetrock, paneling, or other materials. Underground wiring shall be inspected before the trench is backfilled. Except for the final connection to switches, receptacles, and lighting fixtures, all ground wires and other wires in boxes shall be spliced and pigtailed for the rough-in inspection.

[Minnesota Administrative Rules 3801.3770](#) ‘Where wiring is to be concealed, the inspector must be notified sufficiently in advance to permit completion of a rough-in inspection before concealment, exclusive of Saturdays, Sundays, and holidays. In the event wiring is concealed before rough-in inspection without adequate notice having been given to the inspector, the person responsible for having enclosed the wiring shall be responsible for all costs resulting from uncovering and replacing the cover material.’

Final Inspection

A final inspection is required when all wiring has been completed and all devices, lighting fixtures, and appliances have been installed and tested.

Minimum Requirements

In addition to those branch circuits installed to supply general illumination and receptacle outlets in dwelling units, the following minimum requirements apply:

- Two 20-amp circuits for kitchen receptacles
- One 20-amp circuit for laundry receptacles
- One 20-amp circuit for bathroom receptacles
- A separate, individual branch circuit for central heating equipment

- Generally, receptable outlets in habitable rooms shall be install so that no point along the floor line (measured horizontally) in any wall space is more than 6 feet from an outlet in that space. An outlet must be installed in each wall space 2 feet or more in width.

- Generally, receptacle outlets at kitchen countertops shall be installed so that no point along the floor line (measured horizontally) in any wall space is more than 24 inches from a receptacle outlet in that space. A receptacle must be installed at each counter space 12 inches or wider and at each island counter or peninsular space larger than 12 inches by 24 inches. Receptables shall not be installed in a 'face up' position on work surfaces or countertops.

- Outdoor receptacles, accessible at grade level and no more than 6 ½ feet above grade, shall be installed at the front and back of a dwelling shall be waterproof.

- Bedrooms require Arc-fault circuit breakers for all outlets

- At dwellings, ground-fault circuit interrupter (GFCI) protection shall be provided for all receptable outlets installed in bathrooms, garages, grade level portions of unfinished accessory buildings, crawl spaces, unfinished basements, at kitchen countertops, at wet-bar sinks, and outdoors.

- Hydromassage Bathtubs: A ground-fault circuit interrupter must protect hydromassage bathtubs and their associated components. Additionally, 125-volt receptacles installed within 5 feet of the inside walls of the hydromassage bathtub shall also be GFCI protected. All equipment associated with a hydromassage bathtub shall be accessible without damaging the building structure or finish.

- Spas, Hot Tubs: Spas and hot tubs installed outdoors must comply with the specific grounding and bonding requirements of a permanently installed swimming pool.

- Permanently Installed Fountain: The receptacle supplying electrical equipment for a permanently installed fountain shall have ground-fault circuit interrupter protection.

- Metal boxes, cover plates, and plaster rings shall be grounded.

- Do not conceal junction boxes in walls, ceilings, or non-accessible attics and under-floor areas. Only one wire is permitted to be installed under a terminal screw, therefore, in boxes with more than one ground wire the ground wires shall be spliced with a 'wire tail' or 'pig tail' attached to the grounding terminal screw.

- In a completed installation, all outlet boxes shall have a cover, canopy for a lighting fixture, or device with an appropriate plate. The volume of electrical boxes shall be sufficient for the number of conductors, devices, and cable clamps contained within the box. Nonmetallic boxes are marked with their cubic inch capacity.

REQUIRED BOX VOLUME		
Conductor Size	4-gauge	12-gauge
For each separate insulated wire	2 cubic inches	2.25 cubic inches
All ground wires (combined)	2 cubic inches	2.25 cubic inches
For each device (switch/receptacle)	4 cubic inches	4.5 cubic inches
All internal cable clamps (combined)	2 cubic inches	2.25 cubic inches

Sample Calculation	
<i>Four "#14/2 w/ground" cables:</i>	
8 insulated wires	16 cubic inches
All ground wires	2 cubic inches
Two switches	8 cubic inches
All clamps	2 cubic inches
Box volume required	28 cubic inches

- All splices, including ground wires, shall be made with an approved splice cap or 'wire nut' and shall be made in approved electrical boxes or enclosures.
- Type NM (nonmetallic) cable shall be secured at intervals not exceeding 4 ½ feet and within 12 inches of each box. However, if a single gang device box without a clamp is used, the cable must be secured within 8 inches. The outer jacket of NM cable shall extend into the box a minimum of ¼ inch. At all boxes there shall be a minimum wire length of 6 inches, with at least 3 inches outside of the box. Nonmetallic cable shall not be installed closer than 1 ¼ inches from the edge of framing members. Cables that are closer than 1 ¼ inches shall be protected with metal plates or metal sleeves at least 1/16-inch thick.
- All electrical equipment, including light fixtures, devices, and appliances shall be listed and labeled by a nationally recognized tested laboratory (such as Underwriter's Laboratories, Canadian Standards Association, etc.) as having been tested and found suitable for a specific purpose. All electrical equipment shall be installed and used in accordance with the listed requirements and manufacturer's instructions.
- Lighting fixtures installed in a clothes closet shall have the following clearances from the defined storage area (refer to the NEC):
 - o 12 inches for surface incandescent fixtures
 - o 6 inches for recessed incandescent fixtures
 - o 6 inches for florescent fixtures

Incandescent fixtures with open or partially enclosed lamps and pendant fixtures or lamp holders are not permitted in clothes closets. Recessed lighting fixtures install in insulated

ceilings or installed within ½ inch of combustible materials shall be labeled as Type IC (insulated contact).

In addition, the Minnesota Energy Code requires recessed lighting fixtures in insulated ceilings to be sealed to prevent leakage of airborne moisture.

- Conductors:

CONDUCTOR SIZES FOR 120/240 VOLT SINGLE-PHASE DWELLING SERVICES		
Copper	Aluminum	Service Rating
4 AWG	2	100 amps
1 AWG	2/0	150 amps
2/0	4/0	200 amps

- o Conductors emerging from underground must be installed in rigid metal conduit, intermediate metal conduit, or Schedule 80 rigid nonmetallic conduit to provide protection from physical damage. This protection must extend from a point at least 18 inches below grade to point of termination above ground.
- The electrical service disconnecting means shall be installed at a readily accessible location either outside a building or structure or inside nearest the point of entrance of the service entrance conductors. All panels shall be readily accessible and shall not be located in bathrooms, or in the vicinity of the easily ignitable materials such as in a clothes closet.
- The rating of the fuse or circuit breaker generally determines the minimum size of the circuit conductor per the following table:

FUSE OR MINIMUM WIRE SIZE		
Circuit Breaker	Copper	Aluminum
15 amp	14	n/a
20 amp	12	n/a
30 amp	10	8
40 amp	8	6
50 amp	6	4

Note: Conductors that supply motors, air conditioning units, or other special equipment may have overcurrent protection that exceeds the general limitations in the above chart.

- All circuit overcurrent devices shall be legibly identified as to purpose or use on a directory located on the face or inside of the panel doors.
- An electrical service must be connected to a grounding electrode system consisting of:

- A metal underground water pipe in direct contact with earth for 10 feet or more, if available on the premises, and
 - A supplemental electrode (either a rod, pipe, or plate electrode)
 - An additional electrode must supplement a buried water pipe
- The size of the unspliced grounding electrode conductor is determined by the equivalent size of the service-entrance conductors. A main bonding jumper (or the green bonding screw provided by the panel manufacturer) shall be installed in the service panel to electrically bond grounded service conductor and the equipment grounding conductors to the service enclosure.