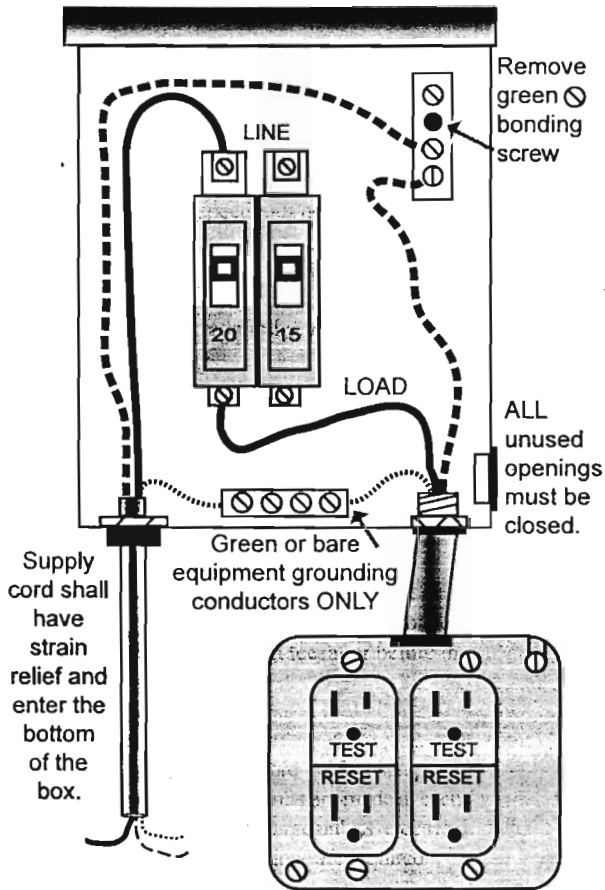


This diagram is one example of an acceptable disconnecting switch for a typical small concession.



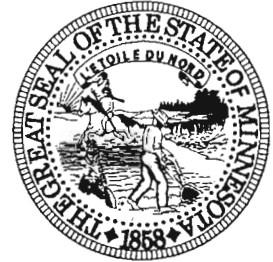
The above installation may be permanently installed within a concession stand or mounted to a portable backboard.

The fused disconnect switch must be mounted in the upright position and shall be rainproof if exposed to weather.

The 120 volt, 15 and 20 amp receptacles must have ground-fault circuit-interrupter protection for personnel.

12-05

Notice to exhibitors and concessionaires concerning electrical wiring



An overview of electrical licensing, electrical inspection and the 2005 National Electrical Code requirements for portable electrical systems used at carnivals, circuses, fairs, festivals, celebrations and similar events.

Department of Labor and Industry
 Electrical Licensing and Inspection
 443 Lafayette Road N.
 St. Paul, MN 55155-4342
 Phone: (651) 284-5064
 1-800-DIAL-DLI
 (1-800-342-5354)
 Fax: (651) 284-5743
 TTY: (651) 297-4198
www.electricity.state.mn.us

General Electrical Code requirements

Article 525 of the National Electrical Code covers the installation of portable wiring and equipment for carnivals, circuses, exhibitions, fairs, traveling attractions, and similar functions, including wiring in or on all structures.

Note: It is the responsibility of each exhibitor or user of electrical equipment to make arrangements for an electrical inspection. Your county fair board or event sponsor often knows when the electrical inspector is on the grounds or in the area making electrical inspections for the event.

110.3 Electrical equipment. All electrical equipment shall be listed and labeled and used in accordance with that listing. Damaged or defective electrical equipment shall be repaired or replaced.

525.21 Disconnecting means. Every concession unit, game or similar attraction shall be provided with a fused disconnect switch or circuit breaker located within sight of and within 6 feet of the operator's station. The required disconnect shall consist of no less than six enclosed, fusible switches or circuit breakers. Fuse-holders with switches mounted on box covers and switch controlled multi-outlet strips are not acceptable. Enclosures for disconnect switches and circuit breakers installed outdoors must be rainproof unless otherwise protected from the weather by location.

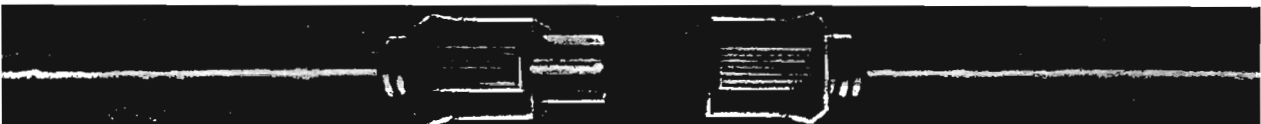
525.20 Portable cords. Portable cords shall be size 12 or larger Type G, PPE, S, SE, SEO, SEOO, SC, SCE, SCT, SO, SOO, ST, STO, STOO, W or other types identified for extra-hard usage, and must be of the grounding type. The cord type is printed or embossed on approved cords. Two-wire cords are not allowed. Cables with a "J" in the type designation (such as Type SJT) are junior-hard-service rated and are not permitted where subject to physical damage. When used outdoors, cords shall be listed for wet locations and be sunlight resistant, unless they are an integral part of listed portable equipment. All cords shall be continuous and contain no splices. Repair of the outer jacket of cords may only be done with heavy-wall heat-shrink tubing with proper adhesive or by a vulcanizing process.

525.6 Mechanical protection. Wiring in and on rides, concessions and other units shall be provided with mechanical protection where subject to physical damage. Flexible cords and cables run on the ground shall be located, routed and arranged to minimize the tripping hazard. Cords and cables may be covered with approved non-conductive mats. Mats shall be self-weighted to minimize movement and drape over cords and cables. Forethought regarding the placement of electrical supply equipment, concessions, and attractions so that cords are not placed in pedestrian or vehicular traffic areas will minimize the use of mats and cable guards.

Wire size	Maximum ampacity	Maximum fuse or circuit breaker
14	15	15
12	20	20
10	30	30
8	40	40
6	55	60
4	70	70
3	85	90
2	95	100

525.13 Electrical wiring. All permanent wiring installed on or within a structure or concession trailer shall be an approved wiring method installed according to the requirements of the National Electrical Code. Wiring for an amusement ride, attraction, tent, or similar structure shall not be supported by any other ride or structure. Hollow framing spaces within a structure shall not be used as a raceway or as an enclosure for electrical equipment.

240.20 and 240.22 Overcurrent protective devices. Motors and lighting circuits shall have separate fuses or circuit breakers. Lighting circuits shall be protected at no more than 20 amperes. Motors shall be protected at not more than 125 percent of full load current or shall be thermally protected. All cords, cables and equipment must be protected from overcurrent by properly sized fuses or circuit breakers.



General Electrical Code requirements

525.31 Equipment grounding. Equipment grounding conductors shall be run with all feeders and circuits. Electrically operated equipment with exposed metal parts shall be grounded, and if cord connected, the cord shall have a grounding conductor and grounding type attachment plug. Equipment that is listed and labeled as double insulated is allowed. All grounding conductors in an enclosure shall terminate in a common grounding bus or not more than two lugs under the same screw or bolt. Equipment grounding conductors shall be isolated from neutral conductors. The grounding bar or lugs shall be secured to the enclosure with screws or bolts used for no other purpose. Sheet metal screws shall not be used to connect grounding conductors to enclosures.

525.11 Multiple sources of supply. Where multiple separately derived systems or services supply rides, attractions or other structures that are separated by less than 12 feet, they shall be bonded to the same grounding electrode system.

525.23 Ground-fault circuit-interrupter protection. All 125-volt, single phase, 15- and 20-ampere receptacle outlets that are in use by personnel shall have listed GFCI protection for personnel. Manufactured cord sets incorporating listed ground-fault circuit-interrupter protection for personnel shall be permitted. Egress lighting shall not be connected to the load side of a ground-fault circuit-interrupter receptacle.

525.3 Attractions using contained volumes of water. Attractions utilizing pools, fountains and similar installations with contained volumes of water shall be installed per applicable the requirements of NEC Article 680.

525.21 Lighting. Concession wiring for overhead lighting may be installed with approved Type C brewery cord no smaller than #12 with a built-in tracer for identification of the neutral wire. Open single conductors are not acceptable. Wiring for temporary lighting, where installed inside tents and concessions, shall be securely installed and shall be protected from accidental breakage by a suitable fixture or lamp-holder with a guard. Approved pin type sockets are acceptable when used on stranded conductors. Each end of a string of lights shall terminate in an insulating block or knob. Type SO cord sets may be used. Festoon lighting or cord sets shall be installed at least 10 feet above ground where accessible to the public.

525.5 Overhead clearances. A clearance of 15 feet in any direction shall be maintained from overhead conductors operating at 600 volts or less and any portion of an amusement ride or attraction. No portion of an amusement ride or attraction may be located under or within 15 feet horizontally of conductors operating at over 600 volts.

525.21 Receptacles. Receptacle outlets shall have the proper rating for the circuit amperes, voltage, and number of phases. All receptacles shall be grounded by an equipment grounding conductor installed with the circuit conductors. Unless otherwise protected from the weather, receptacles and switches used outdoors must be protected from rain by weatherproof covers. The grounding prong shall only be used for grounding. Cord and cable plugs and receptacles shall not lie on the ground. Where single-pole separable connectors are used, they shall comply with 530.22.

445.13 Generators. Generators or other power supply units and the associated electrical distribution cords and panelboards must be inspected at each engagement during the season. The conductors from the generator terminals to the first overcurrent device shall not be less than 115 percent of the nameplate rating of the generator. To establish ground, the neutral terminal in the service equipment, transformer truck, or generator shall be connected to an approved grounding electrode system with an insulated, flexible, stranded grounding electrode conductor sized no smaller than 4 AWG. This conductor shall be installed without splice from the grounding terminal to the last grounding electrode shall be connected with approved clamps. Generators that supply only loads connected directly to receptacle outlets where the equipment grounding terminals of the receptacles are bonded to the generator frame shall not be required to be connected to a grounding electrode system.

This information is not complete due to space limitations. Additional information and knowledge are necessary for an electrical installation that complies with the National Electrical Code and is free from fire and electric shock hazards.

Frequently asked questions

1. What is the responsibility of Electrical Licensing and Inspection (ELI)?

Under Minnesota Statutes 326.244, ELI has the responsibility for inspection of all electrical wiring and equipment for carnivals, circuses, celebrations or similar transient events.

2. What is the responsibility of the exhibitor?

State law requires that each ride, device, game, concession or similar unit be inspected at the first appearance of the season. Concessionaires and exhibitors are responsible for notifying the inspector sufficiently in advance to permit inspection completion, correct code violations and re-inspection if necessary.

3. Is inspection of equipment necessary before it can be energized and put into use?

Equipment should not be energized until it has been inspected and approved.

4. Does ELI perform electrical inspections statewide?

ELI inspectors make electrical inspections statewide, except for political subdivisions (cities, towns, etc.) that by ordinance have made provisions for making electrical inspections within their jurisdiction.

5. How do I request an electrical inspection?

A *Request for Electrical Inspection* form shall be completed and submitted to ELI with the inspection fee, at or before the inspection.

6. Do I need an inspection every year?

An initial inspection is required at or before the first setup each season. cursory inspections of all units are made at each additional stop. There is no additional charge unless electrical code violations are identified and corrections are required.

7. Can an inspection be requested and made before the start of the season?

Inspections can be arranged in advance by contacting the ELI. Inspections can be made at any mutually agreeable time and location.

8. What is required if an inspection identifies code violations?

Equipment that is not in compliance shall be replaced, repaired, altered, or otherwise brought into compliance before it is energized and put into use. Identified code violations are documented on an inspection report by the electrical inspector, and a copy is provided to the user of the equipment.

9. Are there restrictions about who can do electrical work?

The installation, repair, or correction of code violations of all on-site electrical wiring shall be done by licensed electrical contractors. Exhibitors are not allowed to do any electrical wiring on-site. Persons other than licensed employees of electrical contractors are limited to plugging portable equipment into receptacle outlets that have been provided.

10. How is the equipment marked to indicate that it has passed inspection?

When equipment is in compliance, an inspection sticker is placed on the equipment with the date of inspection and the inspection number. It is strongly recommended that the user keep a copy of the *Request for Inspection* form with the equipment for the remainder of the calendar year.

11. What can be done to prepare for the inspection?

Before bringing your electrical equipment onto the grounds, verify that it meets the requirements of the National Electrical Code and is in proper working order. If you think your unit may be unattended when the inspector is on the festival site, you must make arrangements for the inspector to gain access.

12. How much does an inspection cost?

The inspection fee for each amusement ride, device, concession, attraction or similar unit with a supply up to 60 amperes is \$20. The fee for a unit with a supply over 60 amperes is \$30.

The inspection fee for each service or generator is:

0 to 400 amp capacity	\$25
401 to 800 amp capacity	\$50
Above 800 amp capacity	\$75

In addition to the above fees, inspections made on Saturdays, Sundays, holidays or after regular business hours will be charged at the \$30 hourly rate with a two-hour minimum charge. If re-inspection of corrections is necessary, there is a \$20 charge for each re-inspection.

Fees must be paid in cash or check.

Credit cards are not accepted.

