ELECTRICAL INSPECTIONS FOR TRANSIENT OR MIGRATORY EVENTS

Electrical Safety Standards

The most recently adopted addition of the **NATIONAL ELECTRICAL CODE** along with the following sections of the **ADMINISTRATIVE RULES OF SOUTH DAKOTA** governs electrical work for transient or migratory events.

Section 20:44:24:02. Temporary Installations for Carnivals and Celebrations

All temporary installations of electrical wiring for carnivals or other celebrations consisting of surface or overhead installations for light and power to tents, stands, concessions, or amusement rides must conform to the following standards:

1. Circuit wires of adequate size, according to the **National Electrical Code**, may be twisted together or run parallel and taped together and must be attached to a messenger by insulators at intervals not to exceed five feet;
2. Sockets and receptacles, including their individual conductors, must be of the standard molded pigtail weatherproof type. Connections of these socket wires to the cable circuit wires must be staggered, and splices must be made in accordance with Section 110-14(b) of the **National Electrical Code**;
3. Cut outs or switches installed outdoors must be enclosed in weatherproof cabinets. Cabinets lower than eight feet above ground must be kept locked when they are accessible to the public;
4. All metal stands, concessions, amusements, rides, trailers, and other units that require electricity to operate must be grounded. All electrical equipment and motors must be grounded;
5. All feeders and circuits must have over current protection.

Section 20:44:24:03. Additional Requirements for Temporary Installations for Carnivals and Celebrations

In addition to the requirements of §20:44:24:02, temporary installations for carnivals and celebrations must conform to the following:

1. Each ride or concession must be provided with only one disconnect switch with over current protection;
2. Splices and taps must be enclosed in a weatherproof box or cabinet and may not be accessible to the public. Splices or taps may not be buried in the ground;

3. Cable must be in good condition, have standard insulating qualities for the voltage level, have adequate mechanical strength, and be a continuous length from box to box. Outdoor court connectors must be used;
4. All temporary installations must be approved by the Electrical Inspector before use; and
5. All installations must comply with SDCL Chapter 36-16 and all provisions of this article.

Inspections

Requests for inspections should be made at least 48 hours in advance by calling 367-8670.

Inspection Fees

Section 15-18 Fees. Inspection of transient or migratory events. Inspection fees for transient events, including but not limited to carnivals, circuses shall be as follows:

1. General inspection fee $100.
2. State wiring permit $2.
3. Each ride or concession $5.
4. Each generator or transformer $20.
5. An hourly rate will be charged for additional inspections of equipment that is not ready for inspection at the time and date specified on the request for inspection. Additional fees must be paid at the Office of Planning and Building Services located at the address below. Inspectors are not permitted to collect fees.

Planning and Building Services
224 West Ninth Street
P.O. Box 7402
Ground Floor
Sioux Falls, SD 57117-7402

For additional information, please call (605) 367-8670 or visit our web page at www.siouxfalls.org/building.

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ARTICLE 525 Carnivals, Circuses, Fairs, and Similar Events

Summary of Changes

- **Article 525:** Replaced "rides, attractions, or concessions" with "portable structures" in several sections to correlate with new definition.
- **525.2:** Added definitions for *operator* and *portable structures.*
- **525.5(B):** Revised to differentiate the requirements for overhead conductors operating at 600 volts or less from those operating at over 600 volts.
- **525.11:** Revised requirements on bonding at portable structures separated by less than 12 ft and supplied from different power sources.
- **525.21(A):** Deleted the requirement for the local disconnect switch to be of the fused type to be installed with or without overcurrent protection.
- **525.30:** Clarified that the equipment grounding conductor of the supply circuit is permitted to serve as the bonding means.

I. General Requirements

525.1 Scope.

This article covers the installation of portable wiring and equipment for carnivals, circuses, fairs, and similar functions, including wiring in or on all structures.

Article 525 addresses the installation of portable wiring and equipment for temporary attractions, such as carnivals, circuses, and fairs. Article 525 is intended to apply to all wiring in or on portable structures, whereas Articles 518, 520, and 522 apply to permanent structures.

525.2 Definitions.

Operator. The individual responsible for starting, stopping, and controlling an amusement ride or supervising a concession.

Portable Structures. Units designed to be moved including, but not limited to, amusement rides, attractions, concessions, tents, trailers, trucks, and similar units.

525.3 Other Articles.

(A) Portable Wiring and Equipment. Wherever the requirements of other articles of this *Code* and Article 525 differ, the requirements of Article 525 shall apply to the portable wiring and equipment.

(B) Permanent Structures. Articles 518 and 520 shall apply to wiring in permanent structures.

(C) Audio Signal Processing, Amplification, and Reproduction Equipment. Article 640 shall apply to the wiring and installation of audio signal processing, amplification, and reproduction equipment.

(D) Attractions Utilizing Pools, Fountains, and Similar Installations with Contained Volumes of Water. This equipment shall be installed to comply with the applicable requirements of Article 680.

525.5 Overhead Conductor Clearances.

(A) Vertical Clearances. Conductors shall have a vertical clearance to ground in accordance with 225.18. These clearances shall apply only to wiring installed outside of tents and concessions.

(B) Clearance to Portable Structures.

(1) Under 600 Volts. Portable structures shall be maintained not less than 4.5 m (15 ft) in any direction from overhead conductors operating at 600 volts or less, except for the conductors supplying the portable structure. Portable structures included in 525.3(D) shall comply with Table 680.8.

(2) Over 600 Volts. Portable structures shall not be located under or within 4.5 m (15 ft) horizontally of conductors operating in excess of 600 volts.

525.6 Protection of Electrical Equipment.

Electrical equipment and wiring methods in or on portable structures shall be provided with mechanical protection where such equipment or wiring methods are subject to physical damage.

II. Power Sources

525.10 Services.

Services shall comply with 525.10(A) and (B).

(A) Guarding. Service equipment shall not be installed in a location that is accessible to unqualified persons, unless the equipment is lockable.

(B) Mounting and Location. Service equipment shall be mounted on solid backing and be installed so as to be protected from the weather, unless of weatherproof construction.

Part II, Power Sources, provides some of the requirements for services and multiple sources of supply, such as generators and transformers, that are separately derived systems. In addition to the requirements in 525.10(A) and (B), the requirements for services in Article 230 are applicable.

Service equipment must be installed in accordance with Article 230 and must be lockable where accessible to unqualified persons. Fairgrounds, carnivals, and similar events generate significant pedestrian traffic throughout the sites, including those areas where electrical equipment is located. This requirement helps safeguard the general public from accidentally coming in contact with energized service equipment.

525.11 Multiple Sources of Supply.

Where multiple services or separately derived systems, or both, supply portable structures, the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be bonded together at the portable structures. The bonding conductor shall be copper and sized in accordance with Table 250.122 based on the largest overcurrent device supplying the portable structures, but not smaller than 6 AWG.

To maintain an equal potential between exposed, non-current-carrying metal parts of portable structures that have a physical separation less than 12 ft, 525.11 requires that they be bonded to each other using a copper conductor sized per Table 250.122, but not smaller than 6 AWG.

III. Wiring Methods

525.20 Wiring Methods.

(A) Type. Where flexible cords or cables are used, they shall be listed for extra-hard usage. Where flexible cords or cables are used and are not subject to physical damage, they shall be permitted to be listed for hard usage. Where used outdoors, flexible cords and cables shall also be listed for wet locations and shall be sunlight resistant. Extra-hard usage flexible cords or cables shall be permitted for use as permanent wiring on portable amusement rides and attractions where not subject to physical damage.

(B) Single-Conductor. Single-conductor cable shall be permitted only in sizes 2 AWG or larger.

(C) Open Conductors. Open conductors are prohibited except as part of a listed assembly or festoon lighting installed in accordance with Article 225.

(D) Splices. Flexible cords or cables shall be continuous without splice or tap between boxes or fittings.

(E) Cord Connectors. Cord connectors shall not be laid on the ground unless listed for wet locations. Connectors and cable connections shall not be placed in audience traffic paths or within areas accessible to the public unless guarded.

(F) Support. Wiring for an amusement ride, attraction, tent, or similar structure shall not be supported by any other ride or structure unless specifically designed for the purpose.

(G) Protection. Flexible cords or cables accessible to the public shall be arranged to minimize the tripping hazard and shall be permitted to be covered with nonconductive matting, provided that the matting does not constitute a greater tripping hazard than the uncovered cables. It shall be permitted to bury cables. The requirements of 300.5 shall not apply.

(H) Boxes and Fittings. A box or fitting shall be installed at each connection point, outlet, switchpoint, or junction point.

525.21 Rides, Tents, and Concessions.

(A) Disconnecting Means. Each portable structure shall be provided with a disconnect switch located within sight of and within 1.8 m (6 ft) of the operator's station. The disconnecting means shall be readily accessible to the operator, including when the ride is in operation. Where accessible to unqualified persons, the enclosure for the switch or circuit breaker shall be of the lockable type. A shunt trip device that opens the fused disconnect or circuit breaker when a switch located in the ride operator's console is closed shall be a permissible method of opening the circuit.

(B) Portable Wiring Inside Tents and Concessions. Electrical wiring for lighting, where installed inside of tents and concessions, shall be securely installed and, where subject to physical damage, shall be provided with mechanical protection. All lamps for general illumination shall be protected from accidental breakage by a suitable luminaire or lampholder with a guard.

525.22 Portable Distribution or Termination Boxes.

Portable distribution or termination boxes shall comply with 525.22(A) through (D).

Portable distribution or termination equipment must be mounted so that the bottom of the enclosure is at least 6 in. above the ground. This requirement prevents excessive moisture from entering the equipment and allows for proper radius of bend on conductors entering and exiting the equipment from below.

(A) Construction. Boxes shall be designed so that no live parts are exposed to accidental contact. Where installed outdoors, the box shall be of weatherproof construction and mounted so that the bottom of the enclosure is not less than 150 mm (6 in.) above the ground.

(B) Busbars and Terminals. Busbars shall have an ampere rating not less than the overcurrent device supplying the feeder supplying the box. Where conductors terminate directly on busbars, busbar connectors shall be provided.

(C) Receptacles and Overcurrent Protection. Receptacles shall have overcurrent protection installed within the box. The overcurrent protection shall not exceed the ampere rating of the receptacle, except as permitted in Article 430 for motor loads.

(D) Single-Pole Connectors. Where single-pole connectors are used, they shall comply with 530.22.

525.23 Ground-Fault Circuit-Interrupter (GFCI) Protection.

(A) Where GFCI Protection is Required. The ground-fault circuit-interrupter shall be permitted to be an integral part of the attachment plug or located in the power-supply cord, within 300 mm (12 in.) of the attachment plug. Listed cord sets incorporating ground-fault circuit interrupter for personnel shall be permitted.

(1) 125-volt, single-phase, 15- and 20-ampere non-locking-type receptacles used for disassembly and reassembly or readily accessible to the general public.

(2) Equipment that is readily accessible to the general public and supplied from a 125-volt, single-phase, 15- or 20-ampere branch circuit

(B) Where GFCI Protection Is Not Required. Receptacles that only facilitate quick disconnecting and reconnecting of electrical equipment shall not be required to be provided with GFCI protection. These receptacles shall be of the locking type.

(C) Where GFCI Protection Is Not Permitted. Egress lighting shall not be protected by a GFCI.

Section 525.23 provides three categories: where GFCIs are required, where GFCIs are not required, and where GFCIs are not permitted to be installed. GFCI protection is not allowed on circuits that supply means-of-egress illumination.

IV. Grounding and Bonding

525.30 Equipment Bonding.

The following equipment connected to the same source shall be bonded:

(1) Metal raceways and metal-sheathed cable

(2) Metal enclosures of electrical equipment

(3) Metal frames and metal parts of portable structures, trailers, trucks, or other equipment that contain or support electrical equipment

The equipment grounding conductor of the circuit supplying the equipment in items (1), (2) or (3) that is likely to energize the metal frame or part shall be permitted to serve as the bonding means.

525.31 Equipment Grounding.

All equipment to be grounded shall be connected to an equipment grounding conductor of a type recognized by 250.118 and installed in accordance with Parts VI and VII of Article 250. The equipment grounding conductor shall be connected to the system grounded conductor at the service disconnecting means or, in the case of a separately derived system such as a generator, at the generator or first disconnecting means supplied by the generator. The grounded circuit conductor shall not be connected to the equipment grounding conductor on the load side of the service disconnecting means or on the load side of a separately derived system disconnecting means.

525.32 Grounding Conductor Continuity Assurance.

The continuity of the grounding conductor system used to reduce electrical shock hazards as required by 250.114, 250.138, 406.3(C), and 590.4(D) shall be verified each time that portable

electrical equipment is connected.

The transient nature of amusements and, in some cases, the entire electrical distribution system associated with fairs, carnivals, and circuses increase the possibility that continuity of the equipment grounding conductor system could be interrupted. Verification of the grounding system continuity helps ensure the safety of workers and members of the general public who may come in contact with exposed non-current-carrying surfaces of electrical equipment or equipment that is electrically powered. Verification of the grounding system continuity is required each time portable equipment is reconnected.