

# 2011 NEC ARTICLE 525

## Carnivals, Circuses, Fairs, and Similar Events

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##### 525.1 Article 525 • Carnivals, Circuses, Fairs, and Similar Events

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## 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 a space that is located 4.5 m (15 ft) horizontally and extending vertically to grade of conductors operating in excess of 600 volts.

Portable structures, which include rides, attractions, and vendor booths, are not permitted in the area defined by a square that extends 15 ft horizontally from the overhead conductors and down to grade level. Exhibit 525.1 depicts the restricted area.

### **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**

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. Fairs, carnivals, and similar events generate significant pedestrian traffic throughout the sites, including those

(F) Support

(G) Protection

(H) Boxes and Fittings

**525.21 Rides, Tents and Concessions**

(A) Disconnecting Means

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areas where electrical equipment is located. This requirement helps safeguard the general public from accidentally coming in contact with energized service equipment.

### **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 securely fastened to a solid backing and be installed so as to be protected from the weather, unless of weatherproof construction.

### **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, they must 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.** A means to disconnect each portable structure from all ungrounded conductors shall be provided.

The disconnecting means shall be located within sight

**EXHIBIT 525.1** *An area restricted by 525.5(B)(2).*

15 ft

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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 disconnecting means shall be lockable. 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).

**(A) Construction.** Boxes shall be designed so that no live parts are exposed except when necessary for examination, adjustment, servicing, or maintenance by qualified persons.

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.

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

**(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.** GFCI protection for personnel shall be provided for the following:

- (1) All 125-volt, single-phase, 15- and 20-ampere nonlocking-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

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.

**(B) Where GFCI Protection Is Not Required.** Receptacles that are not accessible from grade level and 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. The application where GFCI protection is not required is very specific. The receptacles must be locking, quick disconnect/reconnect and must not be accessible from grade. GFCI protection is not allowed on circuits that supply means-of-egress illumination.