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WORKING DRAFT OF NEC CODE-MAKING PANEL 15 MEETING OUTPUT

CONTENT NOT FINAL – SUBJECT TO REVISION PRIOR TO LETTER BALLOT AND PUBLICATION OF FIRST DRAFT REPORT

Document: National Electrical Code®

Revision Cycle: A2025

Meeting Dates: January 24 – 26, 2024

Panel Activity: Input Stage

This is a working draft, prepared by NFPA staff, to record the output generated at the Code-Making Panel 15 First Draft Meeting. It includes draft copies of the First Revisions and any Global Revisions.

It is being made available to Panel members for the purpose of facilitating early review, particularly for those Panel members who may be seeking input from their respective organizations in preparation for the First Draft Ballot.

First Revision No. 9229-NFPA 70-2024 [Global Input]

[See attached word document NEC_517.43_Global_FR-9229.docx]

517.43 Automatic Connection to Life Safety ~~and Equipment Branch.~~

(A) Life Safety Branch.

The life safety ~~and equipment~~ branches shall be installed and connected to the alternate source of power specified in 517.41 so that all functions specified herein for the life safety ~~and equipment~~ branches are automatically restored to operation within 10 seconds after interruption of the normal source. [**99:**6.7.6.4.1]

No functions other than those listed in 517.43(A)(1) through (~~6~~ 6) shall be connected to the life safety branch. [**99:**6.7.6.2.1.5(D)]

The life safety branch shall supply power as follows:

(1) ~~**(A) Illumination of Means of Egress.**~~

Illumination of means of egress as is necessary for corridors, passageways, stairways, landings, and exit doors and all ways of approach to exits. ~~Switching arrangement to transfer patient corridor lighting from general illumination circuits shall be permitted if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.~~

Informational Note: See NFPA *101*-2021, *Life Safety Code*, Sections 7.8 and 7.9.

(2) ~~**(B) Exit Signs.**~~

Exit signs and exit directional signs~~.~~

Informational Note: See NFPA *101*-2021, *Life Safety Code*, Section 7.10.

(3) ~~**(C) Alarm and Alerting Systems.**~~

Alarm and alerting systems, including the following:

a. ~~(1)~~ Fire alarms

Informational Note No. 1: See NFPA *101*-2021, *Life Safety Code*, Sections 9.6 and 18.3.4.

b. ~~(2)~~ Alarms required for systems used for the piping of nonflammable medical gases

Informational Note No. 2: See NFPA 99-2021, *Health Care Facilities Code*, 6.7.5.1.2.5.

(4) ~~**(D) Communications Systems.**~~

Communications systems, where used for issuing instructions during emergency conditions~~.~~ [**99:**6.7.5.1.2.4(3)]

(5) ~~**(E) Generator Set Location.**~~

Task illumination and select receptacles at the generator set location and essential electrical system transfer switch locations~~.~~

(6) ~~**(F) Elevators.**~~

Elevator cab lighting, control, communications, and signal systems~~.~~ [**99:**6.7.5.1.2.4(5)]

(B) Illumination of Means of Egress . [Moved from existing 517.43(A)]

Switching arrangement to transfer patient corridor lighting from general illumination circuits shall be permitted if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.

Supplemental Information

File Name	Description	Approved
NEC_517.43_Global_FR-9229.docx	NEC_517.43_Global_FR-9229.docx	
NEC_517.43_Global_FR-9229.docx	For prod use	

Submitter Information Verification

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Committee Statement

Committee Statement: Revisions made to comply with NEC Style Manual and coordinate with NFPA 99.
Response Message: FR-9229-NFPA 70-2024

517.43 Automatic Connection to Life Safety ~~and Equipment~~ Branch.

(A) Life Safety Branch.

The life safety ~~and equipment~~ branches shall be installed and connected to the alternate source of power specified in 517.41 so that all functions specified herein for the life safety ~~and equipment~~ branches are automatically restored to operation within 10 seconds after interruption of the normal source. [**99:**6.7.6.4.1]

No functions other than those listed in 517.43(A)(1) through (~~G~~6) shall be connected to the life safety branch. [**99:**6.7.6. 2.1.5(D)]

The life safety branch shall supply power as follows:

(1)~~**(A) Illumination of Means of Egress.**~~

Illumination of means of egress as is necessary for corridors, passageways, stairways, landings, and exit doors and all ways of approach to exits. ~~Switching arrangement to transfer patient corridor lighting from general illumination circuits shall be permitted if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.~~

Informational Note: See NFPA *101*-2021, *Life Safety Code*, Sections 7.8 and 7.9.

(2)~~**(B) Exit Signs.**~~

Exit signs and exit directional signs~~.~~

Informational Note: See NFPA *101*-2021, *Life Safety Code*, Section 7.10.

(3)~~**(C) Alarm and Alerting Systems.**~~

Alarm and alerting systems, including the following:

a.~~(1)~~ Fire alarms

Informational Note No. 1: See NFPA *101*-2021, *Life Safety Code*, Sections 9.6 and 18.3.4.

b.~~(2)~~ Alarms required for systems used for the piping of nonflammable medical gases

Informational Note No. 2: See NFPA 99-2021, *Health Care Facilities Code*, 6.7.5.1.2.5.

(4)~~**(D) Communications Systems.**~~

Communications systems, where used for issuing instructions during emergency conditions~~.~~ [**99:**6.7.5.1.2.4(3)]

(5)~~**(E) Generator Set Location.**~~

Task illumination and select receptacles at the generator set location and essential electrical system transfer switch locations~~.~~

(6)~~**(F) Elevators.**~~

Elevator cab lighting, control, communications, and signal systems~~.~~ [**99:**6.7.5.1.2.4(5)]

(B) Illumination of Means of Egress. [Moved from existing 517.43(A)]

Switching arrangement to transfer patient corridor lighting from general illumination circuits shall be permitted if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.

First Revision No. 9233-NFPA 70-2024 [Global Input]

517.44 Connection to Equipment Branch.

The equipment branch shall be installed and connected to the alternate power source such that equipment described in 517.35(A)(6) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety and critical branches. [**99:**6.7.5.1.4.2(A)]

The equipment branch arrangement shall also provide for the additional connection of equipment listed in 517.44(B).

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment branch shall be permitted.

(A) Delayed Automatic Connections to Equipment Branch.
The following equipment shall be permitted to be connected to the equipment branch and shall be arranged for delayed automatic connection to the alternate power source:

(1) Task illumination and select receptacles in the following: [**99:**6.7.6.2.1.6(D)(1)]

(a) Patient care spaces [**99:**6.7.6.2.1.6(D)(1)(a)]

(b) Medication preparation spaces

[**99:**6.7.6.2.1.6(D)(1)(b)]

(1)

(a) Pharmacy dispensing space [**99:**6.7.6.2.1.6(D)(1)(c)]

(b) Nurses' stations — unless adequately lighted by corridor luminaires [**99:**6.7.6.2.1.6(D)(1)(d)]

(2) Supply, return, and exhaust ventilating systems for airborne infectious isolation rooms [**99:**6.7.6.2.1.6(D)(2)]

(3) Sump pumps and other equipment required to operate for the safety of major apparatus and associated control systems and alarms [**99:**6.7.6.2.1.6(D)(3)]

(4) Smoke control and stair pressurization systems [**99:**6.7.6.2.1.6(D)(4)]

(5) Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood [**99:**6.7.6.2.1.6(D)(5)]

(6) Nurse call systems [**99:**6.7.6.2.1.6(D)(6)]

(B) Delayed-Automatic or Manual Connection to the Equipment Branch.

The equipment specified in 517.44(B)(1) through (B)(4) shall be permitted to be connected to the equipment branch and shall be arranged for either delayed-automatic or manual connection to the alternate power source.

(1) Heating Equipment to Provide Heating for General Patient Rooms.

Heating of general patient rooms during disruption of the normal source shall not be required under any of the following conditions:

(1) The outside design temperature is higher than −6.7°C (20°F).

(2) The outside design temperature is lower than −6.7°C (20°F) and, where a selected room(s) is provided for the needs of all confined patients, then only such room(s) need be heated.

(3) The facility is served by a dual source of normal power as described in 517.30(C), Informational Note.

Informational Note: See ASHRAE Handbook of Fundamentals (~~2013~~ 2021) Chapter 24 , which show s ~~The~~ the outside design temperature is based on the 97.5 percent design values~~, as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013)~~ .

(2) Elevator Service.

In instances where interruptions of power would result in elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of passengers.

(3) Optional Connections to the Equipment Branch.

Additional illumination, receptacles, and equipment shall be permitted to be connected only to the equipment branch.

(4) Multiple Systems.

Where one switch serves multiple systems as permitted in 517.43, transfer for all loads shall be nondelayed automatic.

[**99:**6.7.6.2.1.6(E)]

Informational Note: See 517.43(G) for elevator cab lighting, control, and signal system requirements.
[**99:**A.6.7.6.2.1.6(E)(2)]

Supplemental Information

File Name	Description	Approved
NEC_517.44_Global_FR-9233.docx	For editorial use	

Submitter Information Verification

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Committee Statement

Committee Statement: Revisions made to comply with the NEC Style Manual.
Response Message: FR-9233-NFPA 70-2024

517.44 Connection to Equipment Branch.

The equipment branch shall be installed and connected to the alternate power source such that equipment described in 517.35(A)(6) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety and critical branches. [**99:**6.7.5.1.4.2(A)]

The equipment branch arrangement shall also provide for the additional connection of equipment listed in 517.44(B).

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment branch shall be permitted.

(~~A~~B) Delayed Automatic Connections to Equipment Branch.

The following equipment shall be permitted to be connected to the equipment branch and shall be arranged for delayed automatic connection to the alternate power source:

1. Task illumination and select receptacles in the following: [**99:**6.7.6.2.1.6(D)(1)]
    a. Patient care spaces [**99:**6.7.6.2.1.6(D)(1)(a)]
    b. Medication preparation spaces

[**99:**6.7.6.2.1.6(D)(1)(b)]

    c. Pharmacy dispensing space [**99:**6.7.6.2.1.6(D)(1)(c)]
    d. Nurses' stations — unless adequately lighted by corridor luminaires [**99:**6.7.6.2.1.6(D)(1)(d)]
2. Supply, return, and exhaust ventilating systems for airborne infectious isolation rooms [**99:**6.7.6.2.1.6(D)(2)]
3. Sump pumps and other equipment required to operate for the safety of major apparatus and associated control systems and alarms [**99:**6.7.6.2.1.6(D)(3)]
4. Smoke control and stair pressurization systems [**99:**6.7.6.2.1.6(D)(4)]
5. Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood [**99:**6.7.6.2.1.6(D)(5)]
6. Nurse call systems [**99:**6.7.6.2.1.6(D)(6)]

(~~B~~C) Delayed-Automatic or Manual Connection to the Equipment Branch.

The equipment specified in 517.44(B)(1) through (B)(4) shall be permitted to be connected to the equipment branch and shall be arranged for either delayed-automatic or manual connection to the alternate power source.

(1) Heating Equipment to Provide Heating for General Patient Rooms.

Heating of general patient rooms during disruption of the normal source shall not be required under any of the following conditions:

1. The outside design temperature is higher than −6.7°C (20°F).
2. The outside design temperature is lower than −6.7°C (20°F) and, where a selected room(s) is provided for the needs of all confined patients, then only such room(s) need be heated.
3. The facility is served by a dual source of normal power as described in 517.30(C), Informational Note.

Informational Note: See ASHRAE Handbook of Fundamentals (~~2013~~2021) Chapter 24, which shows ~~The~~ the outside design temperature is based on the 97.5 percent design values~~, as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013)~~.

(2) Elevator Service.

In instances where interruptions of power would result in elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of passengers.

(3) Optional Connections to the Equipment Branch.

Additional illumination, receptacles, and equipment shall be permitted to be connected only to the equipment branch.

(4) Multiple Systems.

Where one switch serves multiple systems as permitted in 517.43, transfer for all loads shall be nondelayed automatic.

[**99:**6.7.6.2.1.6(E)]

Informational Note: See 517.43(G) for elevator cab lighting, control, and signal system requirements.
[**99:**A.6.7.6.2.1.6(E)(2)]

First Revision No. 9240-NFPA 70-2024 [Global Input]

[See attached word document NEC_517.33_Global_FR-9240]

517.33 Automatic Connection to Life Safety Branch.

(A) Life Safety Branch.

The life safety branch shall be limited to circuits essential to life safety. [**99:**6.7.5.1.2.3]

No functions other than those listed in 517.33(A)(1) through (~~H~~ 7) shall be connected to the life safety branch. The life safety branch shall supply power as follows:

~~(A)~~ (1) ~~Illumination of Means of Egress.~~

Illumination of means of egress such as lighting required for corridors, passageways, stairways, and landings at exit doors, and all necessary ways of approach to exits~~.~~

~~Switching arrangements to transfer patient corridor lighting in hospitals from general illumination circuits to night illumination circuits shall be permitted, if only one of two circuits can be selected and both circuits cannot be extinguished at the same time~~ .

Informational Note: See NFPA *101*-2024, *Life Safety Code*, Sections 7.8 and 7.9.

(2) ~~**(B) Exit Signs.**~~

Exit signs and exit directional signs~~.~~

Informational Note: See NFPA *101*-2024, *Life Safety Code*, Section 7.10.

(3) ~~**(C) Alarm and Alerting Systems.**~~

Alarm and alerting systems shall ~~including~~ include the following:

a. ~~(1)~~ Fire alarm systemsshall be required .

b. ~~(2)~~ Alarm and alerting systems (other than fire alarm systems) shall be connected to the life safety branch or critical branch. [**99:**6.7.5.1.2.5]

c. ~~(3)~~ Alarms shall be required for systems used for the piping of nonflammable medical gases.

d. ~~(4)~~ Mechanical, control, and other accessories required for effective life safety systems operation shall be permitted to be connected to the life safety branch.

(4) ~~**(D) Communications Systems.**~~

Communications systems, where used for issuing instructions during emergency conditions~~.~~ [**99:**6.7.5.1.2.4(3)]

(5) ~~**(E) Generator Set Locations.**~~

Generator set locations as follows:

(1) Task illumination

(2) Battery charger for emergency battery-powered lighting unit(s)

(3) Select receptacles at the generator set location and essential electrical system transfer switch locations

[**99:**6.7.5.1.2.2(4)]

~~(6) (F) Generator Set Accessories.~~

~~Loads dedicated to a specific generator, including the fuel transfer pump(s), ventilation fans, electrically operated louvers, controls, cooling system, and other generator accessories essential for generator operation, shall be connected to the life safety branch or to the output terminals of the generator with overcurrent protective devices. [99:6.7.5.1.2.4]~~

(~~7~~ 6) ~~(G) Elevators.~~

Elevator cab lighting, control, communications, and signal systems~~.~~ [**99:**6.7.5.1.2.4(5)]

(~~8~~ 7) ~~(H) Automatic Doors.~~

Electrically powered doors used for building egress~~.~~ [**99:**6.7.5.1.2.4(6)]

(B) Illumination of Means of Egress.

Switching arrangements to transfer patient corridor lighting in hospitals from general illumination circuits to night illumination circuits shall be permitted, if only one of two circuits can be selected and both circuits cannot be extinguished at the same time .

(C) Generator Set Accessories.

Loads dedicated to a specific generator, including the fuel transfer pump(s), ventilation fans, electrically operated louvers, controls, cooling system, and other generator accessories essential for generator operation, shall be connected to the life safety branch or to the output terminals of the generator with overcurrent protective devices. [**99:**6.7.5.1.2.4]

Supplemental Information

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Submitter Information Verification

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Committee Statement

Committee Statement: “Structural” revisions made to comply with the NEC Style Manual.
Response Message: FR-9240-NFPA 70-2024

517.33 Automatic Connection to Life Safety Branch.

(A) Life Safety Branch.

The life safety branch shall be limited to circuits essential to life safety. [**99:**6.7.5.1.2.3]

No functions other than those listed in 517.33(A)(1) through (~~H~~7) shall be connected to the life safety branch. The life safety branch shall supply power as follows:

~~**(A)**~~(1) ~~**Illumination of Means of Egress.**~~

Illumination of means of egress such as lighting required for corridors, passageways, stairways, and landings at exit doors, and all necessary ways of approach to exits~~.~~

~~Switching arrangements to transfer patient corridor lighting in hospitals from general illumination circuits to night illumination circuits shall be permitted, if only one of two circuits can be selected and both circuits cannot be extinguished at the same time~~.

Informational Note: See NFPA *101*-2024, *Life Safety Code*, Sections 7.8 and 7.9.

(2)~~**(B) Exit Signs.**~~

Exit signs and exit directional signs~~.~~

Informational Note: See NFPA *101*-2024, *Life Safety Code*, Section 7.10.

(3)~~**(C) Alarm and Alerting Systems.**~~

Alarm and alerting systems shall ~~including~~ include the following:

a.~~(1)~~ Fire alarm systems shall be required.

b.~~(2)~~ Alarm and alerting systems (other than fire alarm systems) shall be connected to the life safety branch or critical branch. [**99:**6.7.5.1.2.5]

c.~~(3)~~ Alarms shall be required for systems used for the piping of nonflammable medical gases.

d.~~(4)~~ Mechanical, control, and other accessories required for effective life safety systems operation shall be permitted to be connected to the life safety branch.

(4)~~**(D) Communications Systems.**~~

Communications systems, where used for issuing instructions during emergency conditions~~.~~ [**99:**6.7.5.1.2.4(3)]

(5)~~**(E) Generator Set Locations.**~~

Generator set locations as follows:

(1) Task illumination

(2) Battery charger for emergency battery-powered lighting unit(s)

(3) Select receptacles at the generator set location and essential electrical system transfer switch locations

[**99:**6.7.5.1.2.2(4)]

~~(6)~~ ~~**(F) Generator Set Accessories.**~~

~~Loads dedicated to a specific generator, including the fuel transfer pump(s), ventilation fans, electrically operated louvers, controls, cooling system, and other generator accessories essential for generator operation, shall be connected to the life safety branch or to the output terminals of the generator with overcurrent protective devices. [**99:**6.7.5.1.2.4]~~

(~~7~~6) ~~**(G) Elevators.**~~

Elevator cab lighting, control, communications, and signal systems. [**99:**6.7.5.1.2.4(5)]

(~~8~~7) ~~**(H) Automatic Doors.**~~

Electrically powered doors used for building egress. [**99:**6.7.5.1.2.4(6)]

(B) Illumination of Means of Egress.

Switching arrangements to transfer patient corridor lighting in hospitals from general illumination circuits to night illumination circuits shall be permitted, if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.

(C) Generator Set Accessories.

Loads dedicated to a specific generator, including the fuel transfer pump(s), ventilation fans, electrically operated louvers, controls, cooling system, and other generator accessories essential for generator operation, shall be connected to the life safety branch or to the output terminals of the generator with overcurrent protective devices. [**99:**6.7.5.1.2.4]

First Revision No. 8864-NFPA 70-2024 [Detail]

[Section 517.30(B)]

(3) Fuel Cell Systems.

Fuel cell systems shall be permitted to serve as the ~~alternate~~ on-site power source for all or part of an EES.~~[99:6.7.1.5.1]~~

(1) ~~Installation of fuel cells shall comply with the requirements in Parts I through VII of Article 692 for 1000 volts or less and Part VIII for over 1000 volts.~~

(2) N + 1 units shall be provided where N units have sufficient capacity to supply the demand load of the portion of the system served.

(3) ~~Systems shall be able to assume loads within 10 seconds of loss of normal power source.~~

(4) ~~Systems shall have a continuing source of fuel supply, together with sufficient on-site fuel storage for the essential system type.~~

(5) Where life safety and critical portions of the distribution system are present, a connection shall be provided for a portable diesel generator.

Informational Note: See NFPA 853-2020, *Standard for the Installation of Stationary Fuel Cell Power Systems*, for information on installation of stationary fuel cells.

Supplemental Information

File Name	Description	Approved
NEC_CMP15_Detail_FR-8864_517.30_B_3_.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 09:38:49 EST 2024

Committee Statement

Committee Statement: 517.30(B)(3)(a) was deleted. Part VIII of Article 692 (which is the reference being proposed for deletion) was deleted from the NEC in 2017. Fuel cells must comply with Article 692, and the reference to this Article is unnecessary.

Response Message: FR-8864-NFPA 70-2024

Public Input No. 2428-NFPA 70-2023 [Global Input]

(3) Fuel Cell Systems.

Fuel cell systems shall be permitted to serve as the ~~alternate~~ on-site power source for all or part of an EES. ~~[**99:**6.7.1.5.1]~~

~~(a) Installation of fuel cells shall comply with the requirements in Parts I through VII of Article 692 for 1000 volts or less and Part VIII for over 1000 volts.~~

(~~b~~a) N + 1 units shall be provided where N units have sufficient capacity to supply the demand load of the portion of the system served.

~~(c) Systems shall be able to assume loads within 10 seconds of loss of normal power source.~~

~~(d) Systems shall have a continuing source of fuel supply, together with sufficient on-site fuel storage for the essential system type.~~

(~~e~~b) Where life safety and critical portions of the distribution system are present, a connection shall be provided for a portable diesel generator.

Informational Note: See NFPA 853-2020, *Standard for the Installation of Stationary Fuel Cell Power Systems*, for information on installation of stationary fuel cells.

First Revision No. 8977-NFPA 70-2024 [Detail]

[Section 517.20(A)]

(A) Receptacles and Fixed Equipment.

Wet procedure locations shall be provided with special protection against electric shock. [**99:**6.3.2.3.1]

This special protection shall be provided by one of the following:

(1) Isolated power systems that remain in operation in the event of a single line-to-ground fault condition that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

Informational Note No. 1: Isolated power systems can eliminate the danger of electric shock to patients who might be more susceptible to leakage current and unable to move in their beds.

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI[99: 6.3.2.3.2(2)]

Informational Note No. 2: See Annex E of ANSI/UL 943-2018, *Ground-Fault Circuit-Interrupters*, and110.3(B) for the manufacturers' installation instructions of listed ground-fault circuit interrupters for information on the supply connection of life-support equipment to circuits providing ground-fault circuit-interrupter (GFCI) protection of personnel at outlets.

~~[**99:**6.3.2.3.2]~~

Exception: Branch circuits supplying only listed, fixed, therapeutic, and diagnostic equipment shall be permitted to be supplied from a grounded service, single- or 3-phase system if the following conditions are met:

(1) Wiring for grounded and isolated circuits does not occupy the same raceway.

(2) All conductive surfaces of the equipment are connected to an insulated copper equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 14:44:37 EST 2024

Committee Statement

Committee Statement: Extraction language does not match existing NFPA 99 language. Section 517.20 language was revised in 2023 and has better clarity than NFPA 99 language. Since this language is not an extraction, the extraction reference was removed.

Response Message: FR-8977-NFPA 70-2024

Public Input No. 2972-NFPA 70-2023 [Section No. 517.20(A)]

First Revision No. 8979-NFPA 70-2024 [Detail]

[Section 517.20(A) revises Informational Note 2 to apply to (2) and (3)]

(A) Receptacles and Fixed Equipment.

Wet procedure locations shall be provided with special protection against electric shock. [**99:**6.3.2.3.1]

This special protection shall be provided by one of the following:

(1) Isolated power systems that remain in operation in the event of a single line-to-ground fault condition that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

Informational Note No. 1: Isolated power systems can eliminate the danger of electric shock to patients who might be more susceptible to leakage current and unable to move in their beds.

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI

Informational Note No. 2 to (2) and (3) : See Annex E of ANSI/UL 943-2018, *Ground-Fault Circuit-Interrupters*, and110.3(B) for the manufacturers' installation instructions of listed ground-fault circuit interrupters for information on the supply connection of life-support equipment to circuits providing ground-fault circuit-interrupter (GFCI) protection of personnel at outlets.

[**99:**6.3.2.3.2]

Exception: Branch circuits supplying only listed, fixed, therapeutic, and diagnostic equipment shall be permitted to be supplied from a grounded service, single- or 3-phase system if the following conditions are met:

(1) Wiring for grounded and isolated circuits does not occupy the same raceway.

(2) All conductive surfaces of the equipment are connected to an insulated copper equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 14:50:09 EST 2024

Committee Statement

Committee Statement: Revised information note to clarify that it applies to (2) and (3).
Response Message: FR-8979-NFPA 70-2024

First Revision No. 8987-NFPA 70-2024 [Detail]

[Section 517.29]

517.29 Type 1 Essential Electrical Systems.

Type 1 essential electrical systems shall comply with 517.29(A) and 517.29(B).

Informational Note: Type 1 essential electrical systems are comprised of three separate branches capable of supplying a limited amount of lighting and power service that is considered essential for life safety and effective facility operation during the time the normal electrical service is interrupted for any reason. These three separate branches are the life safety, critical, and equipment branches. [**99:**A.6.7.2.3]

(A) Applicability.

The requirements of 517.29 through 517.35 shall apply to Type 1 essential electrical systems. Type 1 systems shall be required for Category 1 spaces. Type 1 systems shall be permitted to serve Category 2, Category 3, and Category 4 spaces.

Informational Note No. 1: See NFPA 99-2021, *Health Care Facilities Code*, for performance, maintenance, and testing requirements of essential electrical systems in hospitals. See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, for installation of centrifugal fire pumps.

Informational Note No. 2: See NFPA 99-2021, *Health Care Facilities Code*, 6.7.5 and 6.7.6, for additional information on Type 1 and Type 2 essential electrical systems.

(B) Type 1 Essential Electrical Systems.

Category 1 spaces shall be served by a Type 1 essential electrical system. [**99:**6.4.1]

Category 1 spaces shall not be served by a Type 2 EES. [**99:**6.4.2]

Submitter Information Verification

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Committee Statement

Committee Statement: Charging statement added prior to informational note in order to comply with the 2023 NEC Style Manual.

Response Message: FR-8987-NFPA 70-2024

First Revision No. 9029-NFPA 70-2024 [Detail]

[Section 517.33(D)]

(D) Communications Systems.

~~Hospital c~~ C ommunications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.~~4~~ 2 (3)]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:42:30 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language.
Response Message: FR-9029-NFPA 70-2024

Public Input No. 2981-NFPA 70-2023 [Section No. 517.33(D)]

First Revision No. 9100-NFPA 70-2024 [Detail]

[Section 517.43]

(D) Communications Systems.

(1) Communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.6.2.1.5(4)]

(2) Emergency responder radio communication systems (ERRCs)

Supplemental Information

File Name	Description	Approved
NEC_CMP15_Detail_FR-9100_517.43_D_.docx		

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 10:54:01 EST 2024

Committee Statement

Committee Statement: Adds Radio coverage for first responders to provide a level of safety for first responders. NFPA 99 extract updated.

Response Message: FR-9100-NFPA 70-2024

Public Input No. 2115-NFPA 70-2023 [Section No. 517.43(D)]

(D) Communications Systems.

~~Communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.4(3)]~~

(1)

Communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.4(3)]

(2)

Emergency responder radiocommunication systems (ERRCs)

First Revision No. 9140-NFPA 70-2024 [Detail]

518.4 ~~2~~ General Classification.

(A) Examples.

Assembly occupancies shall include, but not be limited to, the following:

(1) Armories
(2) Assembly halls
(3) Auditoriums
(4) Bowling lanes
(5) Casinos and gaming facilities
(6) Club rooms
(7) Conference rooms
(8) Courtrooms
(9) Dance halls
(10) Dining and drinking facilities
(11) Exhibition halls
(12) Gymnasiums
(13) Mortuary chapels
(14) Multipurpose rooms
(15) Museums
(16) Places of awaiting transportation
(17) Places of religious worship
(18) Pool rooms
(19) Restaurants
(20) Skating rinks

(B) Multiple Occupancies.

Where an assembly occupancy forms a portion of a building containing other occupancies, Article 518 applies only to that portion of the building considered an assembly occupancy. Occupancy of any room or space for assembly purposes by less than 100 persons in a building of other occupancy, and incidental to such other occupancy, shall be classified as part of the other occupancy.

(C) Theatrical Areas.

Where any such building or structure, or portion of a building or structure, contains a projection booth or stage platform or area for the presentation of theatrical or musical productions, either fixed or portable, the wiring for that area, including associated audience seating areas, and all equipment that is used in the

referenced area, and portable equipment and wiring for use in the production that will not be connected to permanently installed wiring, shall comply with Article 520.

Informational Note: See NFPA *101*-2021, *Life Safety Code*, or the local building code for methods of determining population capacity.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 13:58:57 EST 2024

Committee Statement

Committee Statement: 518.2 was revised to “518.4” to comply with the NEC Style Manual.
Response Message: FR-9140-NFPA 70-2024

First Revision No. 9212-NFPA 70-2024 [Detail]

[Section 517.30(B)]

(2) Generating Units.

Generating units shall be permitted to serve as the on-site power source for all or part of an EES.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 09:11:53 EST 2024

Committee Statement

Committee Statement: This is revised to meet the 2023 NEC Style Manual.
Response Message: FR-9212-NFPA 70-2024

First Revision No. 9214-NFPA 70-2024 [Detail]

[Section 517.35]

(B) Equipment for Delayed Automatic or Manual Connection.

The following equipment shall be permitted to be arranged for either delayed automatic or manual connection to the alternate power source:

(1) Heating equipment to provide heating for operating, delivery, labor, recovery, intensive care, coronary care, nurseries, infection/isolation rooms, emergency treatment spaces, and general patient rooms and pressure maintenance (jockey or make-up) pump(s) for water-based fire protection systems

Exception: Heating of general patient rooms and infection/isolation rooms during disruption of the normal source shall not be required under any of the following conditions:

(1)

(a) *The outside design temperature is higher than −6.7°C (20°F).*

(b) *The outside design temperature is lower than −6.7°C (20°F), and where a selected room(s) is provided for the needs of all confined patients, only such room(s) need be heated.*

(c) *The facility is served by a dual source of normal power.*

Informational Note No. 1: See ASHRAE Handbook on Fundamentals (2013) Chapter 24, which shows the outside design temperature is based on the 97.5 percent design values ~~The design temperature is based on the 97.5 percent design value as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013)~~ .

Informational Note No. 2: See 517.30(C) for a description of a dual source of normal power.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 09:19:15 EST 2024

Committee Statement

Committee Statement: Revised to conform with the NEC Style Manual.
Response Message: FR-9214-NFPA 70-2024

First Revision No. 9227-NFPA 70-2024 [Detail]

[Move existing 517.43(G) as a new 517.44(A) see attached word document NEC_517.44_FR-9227**]**

(A~~G~~) AC Equipment for Nondelayed Automatic Connection.

Generator accessories, including, but not limited to, the transfer fuel pump, electrically operated louvers, and other generator accessories essential for generator operation shall be arranged for automatic connection to the alternate power source. [**99**:6.7.6.2.1.6(C)]

Supplemental Information

File Name	Description	Approved
NEC_517.44_FR-9227.docx	NEC_517.44_FR-9227.docx	

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Fri Jan 26 10:35:19 EST 2024

Committee Statement

Committee Statement: AC Equipment for Nondelayed Automatic Connection moved to new 517.44(A) to coordinate with NFPA 99.

Response Message: FR-9227-NFPA 70-2024

[Move existing 517.43(G) as a new 517.44(A)]

(A~~G~~) AC Equipment for Nondelayed Automatic Connection.

Generator accessories, including, but not limited to, the transfer fuel pump, electrically operated louvers, and other generator accessories essential for generator operation shall be arranged for automatic connection to the alternate power source. [**99**:6.7.6.2.1.6(C)]

First Revision No. 9243-NFPA 70-2024 [Detail]

[See word document NEC_517.160(A)(2)_Detail_FR-9243]

[517.160(A)(2)]

(2) Circuit Characteristics.

(a) Circuits supplying primaries of isolating transformers shall operate at not more than 600 volts between conductors and shall be provided with proper overcurrent protection.

(b) The secondary voltage of such transformers shall not exceed 600 volts between conductors of each circuit. All circuits supplied from such secondaries shall be ungrounded and shall have an approved overcurrent device of proper ratings in each conductor.

(c) Circuits supplied directly from batteries or from motor generator sets shall be ungrounded and shall be protected against overcurrent in the same manner as transformer-fed secondary circuits.

(d) If an electrostatic shield is present, it shall be connected to the reference grounding point.

Supplemental Information

File Name	Description	Approved
NEC_517.160_A_2_Detail_FR-9243.docx	NEC_517.160(A)(2)_Detail_FR-9243	
NEC_517.160_A_2_Detail_FR-9243.docx	For prod use	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 11:26:49 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with the NEC Style Manual.
Response Message: FR-9243-NFPA 70-2024

(2) Circuit Characteristics.

(a) Circuits supplying primaries of isolating transformers shall operate at not more than 600 volts between conductors and shall be provided with proper overcurrent protection.

(b) The secondary voltage of such transformers shall not exceed 600 volts between conductors of each circuit. All circuits supplied from such secondaries shall be ungrounded and shall have an approved overcurrent device of proper ratings in each conductor.

(c) Circuits supplied directly from batteries or from motor generator sets shall be ungrounded and shall be protected against overcurrent in the same manner as transformer-fed secondary circuits.

(d) If an electrostatic shield is present, it shall be connected to the reference grounding point.

First Revision No. 9244-NFPA 70-2024 [Detail]

[See attached word document NEC_517.160(B)(1)_Detail_FR-9244.docx]

[517.160(B)(1)]

(B) Line Isolation Monitor.

(1) Characteristics.

In addition to the usual control and overcurrent protective devices, each isolated power system shall be provided with a listed continually operating line isolation monitor that indicates total hazard current.

(1) The monitor shall be designed such that a green signal lamp, conspicuously visible to persons in each area served by the isolated power system, remains lighted when the system is adequately isolated from ground.

(2) An adjacent red signal lamp and an audible warning signal (remote if desired) shall be energized when the total hazard current (consisting of possible resistive and capacitive leakage currents) from either isolated conductor to ground reaches a threshold value of 5 mA under nominal line voltage conditions.

(3) The line monitor shall not alarm for a fault hazard of less than 3.7 mA or for a total hazard current of less than 5 mA.

Exception: A system shall be permitted to be designed to operate at a lower threshold value of total hazard current. A line isolation monitor for such a system shall be permitted to be approved, with the provision that the fault hazard current shall be permitted to be reduced but not to less than 35 percent of the corresponding threshold value of the total hazard current, and the monitor hazard current is to be correspondingly reduced to not more than 50 percent of the alarm threshold value of the total hazard current.

Supplemental Information

File Name	Description	Approved
NEC_517.160_B_1_Detail_FR-9244.docx	NEC_517.160(B)(1)_Detail_FR-9244	
NEC_517.160_B_1_Detail_FR-9244.docx	For prod use	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 11:29:35 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with the NEC Style Manual.
Response Message: FR-9244-NFPA 70-2024

(B) Line Isolation Monitor.

(1) Characteristics.

In addition to the usual control and overcurrent protective devices, each isolated power system shall be provided with a listed continually operating line isolation monitor that indicates total hazard current.

(a) The monitor shall be designed such that a green signal lamp, conspicuously visible to persons in each area served by the isolated power system, remains lighted when the system is adequately isolated from ground.

(b) An adjacent red signal lamp and an audible warning signal (remote if desired) shall be energized when the total hazard current (consisting of possible resistive and capacitive leakage currents) from either isolated conductor to ground reaches a threshold value of 5 mA under nominal line voltage conditions.

(c) The line monitor shall not alarm for a fault hazard of less than 3.7 mA or for a total hazard current of less than 5 mA.

Exception: A system shall be permitted to be designed to operate at a lower threshold value of total hazard current. A line isolation monitor for such a system shall be permitted to be approved, with the provision that the fault hazard current shall be permitted to be reduced but not to less than 35 percent of the corresponding threshold value of the total hazard current, and the monitor hazard current is to be correspondingly reduced to not more than 50 percent of the alarm threshold value of the total hazard current.

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First Revision No. 9250-NFPA 70-2024 [Detail]

517.42 Essential Electrical Systems~~for Nursing Homes and Limited Care Facilities~~ .

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Fri Jan 26 11:48:51 EST 2024

Committee Statement

Committee Statement: Revision made to mirror the title of “517.29 Type 1 Essential Electrical Systems” and to remove the terms “nursing home and limited care facilities” from the title which could setup a potentially dangerous situation. There are nursing homes and limited care facilities that provide life support services through additional reimbursement contracts with CMS that would likely require a type 1 system. Similar language was removed from NFPA 99 via TIA that required these facilities to be considered Category 2 – which would have also forced reductions in the electrical system components. Article 517 has been working the past couple of cycles to remove old terminology that based the requirements off of the occupancy of the building. This is a relic of those versions of the code.

Response Message: FR-9250-NFPA 70-2024

First Revision No. 9283-NFPA 70-2024 [Detail]

517.33

The life safety branch shall be limited to circuits essential to life safety. [**99:**6.7.5.1.2.~~3~~1]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Feb 02 15:04:57 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language.
Response Message: FR-9283-NFPA 70-2024

Public Input No. 2979-NFPA 70-2023 [Section No. 517.33 [Excluding any Sub-Sections]]

First Revision No. 9069-NFPA 70-2024 [Definition: Alternate Power Source.]

~~**Alternate Power Source.**~~

~~One or more generator sets, or battery systems where permitted, intended to provide power during the interruption of the normal electrical service; or the public utility electrical service intended to provide power during interruption of service normally provided by the generating facilities on the premises. [**99:** 3.3.4] (517) (CMP-15)~~

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 09:27:18 EST 2024

Committee Statement

Committee Statement: The definition for “Alternate Power Source” is removed because it is no longer used in NFPA 99.
Response Message: FR-9069-NFPA 70-2024

Public Input No. 3608-NFPA 70-2023 [Definition: Alternate Power Source.]

First Revision No. 9079-NFPA 70-2024 [Definition: Essential Electrical System.]

Essential Electrical System.

A ~~system comprised of alternate power sources and all connected distribution systems and ancillary equipment,~~ distribution system designed to ensure continuity of electrical power to designated areas and functions of a health care facility ~~during disruption of normal power sources, and also to minimize disruption within the internal wiring system~~ upon loss of one of the on-site or off-site sources with reliability and capacity sufficient to provide effective facility operation consistent with the facility's emergency operations plan . [**99**:3.3.~~52~~ 54] (517) (CMP-15)

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 09:55:23 EST 2024

Committee Statement

Committee Statement: The extract language from NFPA 99 has been updated.
Response Message: FR-9079-NFPA 70-2024

Public Input No. 3609-NFPA 70-2023 [Definition: Essential Electrical System.]

First Revision No. 9135-NFPA 70-2024 [Definition: Two-Fer.]

~~Two-Fer~~ Twofer .

An assembly containing one male plug and two female cord connectors used to connect two loads to one branch circuit. (520) (CMP-15)

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 13:34:44 EST 2024

Committee Statement

Committee Statement: This FR corrects the word to the commonly acceptable spelling.
Response Message: FR-9135-NFPA 70-2024

Public Input No. 737-NFPA 70-2023 [Definition: Two-Fer.]

First Revision No. 9130-NFPA 70-2024 [New Definition after Definition: Dental Office.]

Deploy (Deployed).

The use of portable equipment for the duration required by the event or production for which it is used. (CMP-15)

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 13:25:03 EST 2024

Committee Statement

Committee Statement: The words “install” / “installed” are normally associated with permanent installations. Portable equipment is not permanently installed in venues covered by the “Entertainment Industry” Articles 518, 520, 525, and 530. Use of the words “deploy” / “deployed” is more descriptive of the portable equipment use and prevents misinterpretation. It also provides additional distinction from Article 590 – Temporary Installations which is often erroneously applied to portable equipment deployed under the Entertainment Articles.

Response Message: FR-9130-NFPA 70-2024

Public Input No. 2585-NFPA 70-2023 [New Definition after Definition: Dental Office.]

First Revision No. 9131-NFPA 70-2024 [New Definition after Definition: Motion Picture Studio (Tel...]

Motion Picture Sound Stage.

A building or portion of a building, usually insulated from outside noise and natural light, designed, constructed, or altered for the purpose of image capture. (CMP-15)

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 13:27:59 EST 2024

Committee Statement

Committee Statement: It appears this definition was inadvertently removed from the 2023 NEC. It was submitted by CMP #15 Task Group #2 during the 2023 revision cycle.

Response Message: FR-9131-NFPA 70-2024

Public Input No. 3232-NFPA 70-2023 [New Definition after Definition: Motion Picture Studio (Tel...]

First Revision No. 9133-NFPA 70-2024 [New Definition after Definition: Pier, Floating. (Floating ...]

Pinout Configuration.

The assignment of electrical functions to connector pins in a multicircuit connector. (CMP-15)

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 13:32:20 EST 2024

Committee Statement

Committee Statement: There are multiple multicircuit connectors using varying pinout configurations in wide use in portable equipment in the Entertainment Industry. This new definition coordinates section 520.68(D) requiring identification of the configurations.

Response Message: FR-9133-NFPA 70-2024

Public Input No. 2211-NFPA 70-2023 [New Definition after Definition: Pier, Floating. (Floating ...]

First Revision No. 9075-NFPA 70-2024 [New Definition after Definition: Power Source Output Conduc...]

Power Sources.

A system of one or more off-site or one or more on-site power generation or storage components intended to provide power to nonessential electrical loads and the essential electrical system. [**99:** 3.3.155] (517) (CMP-15)

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 09:39:19 EST 2024

Committee Statement

Committee Statement: The definition for “alternate power sources” was removed from NFPA 99. The term “power source” is used in article 517. As such, the definition for “power sources” has been added to article 100 as an extract from NFPA 99.

Response Message: FR-9075-NFPA 70-2024

Public Input No. 2999-NFPA 70-2023 [Definition: Alternate Power Source.]

First Revision No. 9282-NFPA 70-2024 [New Definition after Definition: Riser Cable, Cable Routing...]

Road Show Connection Panel (A Type of Patch Panel).

A panel designed to allow for road show connection of portable stage switchboards to fixed lighting outlets by means of permanently installed supplementary circuits. (520) (CMP-15)

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Tue Jan 30 12:46:06 EST 2024

Committee Statement

Committee Statement: Definition created for term used in 520.50.
Response Message: FR-9282-NFPA 70-2024

First Revision No. 9204-NFPA 70-2024 [New Section after 220.110]

220.111 Specific Appliance Loads.

Receptacle loads calculated in accordance with 220.14(A) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in Table 220.111 for health care facilities.

Table 220.111 Specific Appliance Demand Factor for Health Care Facilities.

Number of circuits	Demand Factor
0-10	100%
11 or more	30%

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9204_220.111-new.docx		

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 17:53:53 EST 2024

Committee Statement

Committee Statement: The task group analyzed data (detailed statistical analysis based on data collection on demand factors) and proposed more appropriate demand factors to the proposed demand factor table.

Response Message: FR-9204-NFPA 70-2024

Public Input No. 3607-NFPA 70-2023 [New Section after 220.110]

New section

220.111 Specific Appliance Loads.
Receptacle loads calculated in accordance with 220.14(A) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in Table 220.111 for health care facilities.

Table 220.111 **Specific Appliance Demand Factor for Health Care Facilities.**

Number of circuits	Demand Factor (%)
0—10	100
11 or more	30

First Revision No. 9203-NFPA 70-2024 [Section No. 220.110]

[See attached word document NEC_ 220. 110_FR-9203]

220. 110 Receptacle Loads.

Receptacle loads calculated in accordance with 220.14(H) and (I) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in Table 220.110~~(1) and Table 220.110(2)~~ for health care facilities.

Informational Note No. 1: See Article 100 for the definitions of patient care space categories.

Informational Note No. 2: See 220.14(I) for the calculation of receptacle outlet loads.

Table 220.110 ~~(1) Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in Category 1 and Category 2 Patient Care Spaces~~

~~Portion of Receptacle Load to Which~~

Demand

~~Factor Applies (Volt-Amperes) Demand Factor (%) First 5000 or less 100 From 5001 to 10,000 50 - - Remainder over 10,000 25~~

~~Table 220.110(2) Demand~~ Factors for Receptacles Supplied by General-Purpose Branch Circuits in ~~Category 3 and Category 4 Patient Care Spaces~~ Health Care Facilities

Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (%)
First 10,000 or less	100
Remainder over 10,000	~~50~~ 20

Supplemental Information

File Name	Description	Approved
NEC_220.110_FR-9203.docx	NEC_220.110_FR-9203	

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 17:44:29 EST 2024

Committee Statement

Committee Statement: The task group analyzed data (detailed statistical analysis based on data collection on demand factors), and, proposed more appropriate demand factors to the proposed demand factor table.

Response Message: FR-9203-NFPA 70-2024

Public Input No. 3606-NFPA 70-2023 [Section No. 220.110]

220.110 Receptacle Loads.
Receptacle loads calculated in accordance with 220.14(H) and (I) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in Table 220.110~~(1) and Table 220.110(2)~~ for health care facilities.

Informational Note No. 1: See Article 100 for the definitions of patient care space categories.

Informational Note No. 2: See 220.14(I) for the calculation of receptacle outlet loads.

Table 220.110~~(1)~~ Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in ~~Category 1 and Category 2 Patient~~Health Care ~~Spaces~~Facilities

Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	**Demand Factor (%)**
First ~~5~~10,000 or less	100
~~From 5001 to 10,000~~	~~50~~
Remainder over 10,000	~~25~~20

~~Table 220.110(2) Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in Category 3 and Category 4 Patient Care Spaces~~

~~**Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)**~~	~~**Demand Factor (%)**~~
~~First 10,000 or less~~	~~100~~
~~Remainder over 10,000~~	~~50~~

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First Revision No. 8863-NFPA 70-2024 [Section No. 517.1]

517.1 Scope.

This article applies to electrical construction and installation criteria in health care facilities that provide services to human beings.

The requirements of this article shall specify the installation criteria and wiring methods that ensure reliable electrical service to the health care facility and to minimize electrical hazards by the maintenance of adequately low potential differences only between exposed conductive surfaces that are likely to become energized and could be contacted by a patient.

Informational Note No. 1: In a health care facility, it is difficult to prevent the occurrence of a conductive or capacitive path from the patient's body to some grounded object, because that path might be established accidentally or through instrumentation directly connected to the patient. Other electrically conductive surfaces that might make an additional contact with the patient, or instruments that might be connected to the patient, then become possible sources of electric currents that can traverse the patient's body. The hazard is increased as more apparatus is associated with the patient, therefore more intensive precautions are needed. Control of electric shock hazard requires the limitation of electric current that might flow in an electrical circuit involving the patient's body by raising the resistance of the conductive circuit that includes the patient, or by insulating exposed conductive surfaces that might become energized, in addition to reducing the potential difference that can appear between exposed conductive surfaces in the patient care vicinity, or by combinations of these methods. A special problem is presented by the patient with an externalized direct conductive path to the heart muscle. The patient could be electrocuted at current levels so low that additional protection in the design of appliances, insulation of the catheter, and control of medical practice is required.

The requirements in Parts II and III not only apply to single-function buildings but are also intended to be individually applied to their respective forms of occupancy within a multifunction building [e.g., a doctor's examining room located within a limited care facility would be required to meet 517.10(A)].

Informational Note No. 2 : For information concerning performance, maintenance, and testing criteria, refer to the appropriate health care facilities documents.

Informational Note No. 3: Text that is followed by a reference in brackets has been extracted from NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, or NFPA *101*-~~2021~~ 2024 , *Life Safety Code*. Only editorial changes were made to the extracted text to make it consistent with this *Code*.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 09:34:27 EST 2024

Committee Statement

Committee Statement: The change provides clarity over the purpose of this article to also provide reliability in addition to minimizing electrical hazards. NFPA 99 and NFPA 101 references updated.

Response Message: FR-8863-NFPA 70-2024

Public Input No. 2783-NFPA 70-2023 [Section No. 517.1]

First Revision No. 8897-NFPA 70-2024 [New Section after 517.6]

[New 517.7 after existing 5.17.6]

517.7 Patient Care Space Risk Categories and Risk Assessment.

(A) Risk Categories.

All activities, as well as systems and equipment, that are new or altered, shall be designed and installed to meet Category 1 through Category 4 requirements, as detailed in this Code. [**99:** 4.1]

Activities, systems, and equipment shall be permitted to be designed and installed to meet requirements for a more severe risk category. [**99:** 4.1.5]

(1) Category 1. Activities, systems, or equipment whose failure is likely to cause major injury or death of patients, staff, or visitors shall be designed and installed to meet Category 1 requirements, as detailed in this Code. [**99:** 4.1.1]

(2) Category 2. Activities, systems, or equipment whose failure is likely to cause minor injury of patients, staff, or visitors shall be designed and installed to meet Category 2 requirements, as detailed in this Code. [**99:** 4.1.2]

(3) Category 3. Activities, systems, or equipment whose failure is not likely to cause injury of patients, staff, or visitors shall be designed and installed to meet Category 3 requirements, as detailed in this Code. [**99:** 4.1.3]

(4) Category 4. Activities, systems, or equipment whose failure is likely to have no impact on patient care shall be designed and installed to meet Category 4 requirements, as detailed in this Code. [**99:** 4.1.4]

Informational Note No. 1: Major injuries can include the following:

(1) Any amputation

(2) Loss of the sight of an eye (whether temporary or permanent)

(3) Chemical or hot metal burn to the eye or any penetrating injury to the eye

(4) Any injury that results in electric shock and electric burns leading to unconsciousness and that requires resuscitation or admittance to a hospital for 24 hours or more

(5) Any other injury that results in hypothermia, heat-induced shock, or unconsciousness requiring resuscitation or admittance to a hospital for 24 hours or more

(6) Loss of consciousness caused by asphyxia or lack of oxygen or exposure to a biological agent or harmful substance

(7) Absorption of any substance by inhalation, skin, or ingestion causing loss of consciousness or acute illness requiring medical treatment

(8) Acute illness requiring medical treatment where there is reason to believe the exposure was to biological agents, toxins, or infected material [**99:** A.4.1.1]

Informational Note No. 2: A minor injury means not serious or not involving risk of life. [**99:** A.4.1.2]

(B) Risk Assessment.

The health care facility's governing body shall establish the processes and operations that are planned for the health care facility. The governing body shall conduct risk assessments and shall determine patient care space risk categories based on the character of the processes and operations conducted by the health care facility. [**99** :4.2.1, 4.2.1.1]

Risk categories shall be classified by the health care facility's governing body by following and documenting a defined risk assessment procedure. Where required by the authority having jurisdiction, the risk assessment shall be provided to the authority having jurisdiction for review

based on the character of the processes and operations conducted in the health care facility. [**99:** 4.2.2, 4.2.2.1]

A documented risk assessment shall not be required where Category 1 is selected. [**99:** 4.2.3]

Informational Note: See ISO/IEC 31010 , Risk Management — Risk Assessment Techniques; NFPA 551; SEMI S10-0307E , Safety Guideline for Risk Assessment and Risk Evaluation Process; or SFPE's Engineering Guide to Fire Risk Assessment for information and guidance on risk assessment procedures. The results of the assessment procedure should be documented and records retained. [**99:** A.4.2]

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 11:14:36 EST 2024

Committee Statement

Committee Statement: This provides the definitions of risk category assignments from NFPA 99 into the NEC to assist the user. Language was added to conform to the NEC Style Manual.

Response Message: FR-8897-NFPA 70-2024

Public Input No. 1171-NFPA 70-2023 [New Section after 517.6]

First Revision No. 8870-NFPA 70-2024 [Section No. 517.6]

517.6 Patient Care–Related Electrical Equipment.

The reconditioning requirements of this *Code* shall not apply to patient care–related electrical equipment.

Informational Note No. 1: Patient care–related electrical equipment is differentiated from electrical equipment as described in 110.21(A)(2).

Informational Note No. 2: If patient care–related electrical equipment is relocated, it is expected to be recommissioned or recertified in accordance with the U.S. *Federal Food, Drug, and Cosmetic Act (FDCA)*.

Informational Note. No. 3: Patient care-related electrical equipment is defined by NFPA 99, *Health Care Facilities Code* , as electrical equipment appliance that is intended to be used for diagnostic, therapeutic, or monitoring purposes in a patient care vicinity.

[99: 3.3.144]

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 09:57:03 EST 2024

Committee Statement

Committee Statement: The reconditioned equipment requirements apply to typical electrical distribution equipment and not patient care-related equipment. 517.3 should be reserved for requirements that pertain to reconditioned electrical equipment. Other articles within this code address reconditioning, these would be consistent with article 517. Reconditioned equipment that is allowed by other sections of this code are allowed by 517.

Response Message: FR-8870-NFPA 70-2024

Public Input No. 2613-NFPA 70-2023 [Section No. 517.6]

First Revision No. 8900-NFPA 70-2024 [Section No. 517.10(B)]

[See attached word doc NEC_517.10_B_FR-8900.docx]

(B) Not Covered.

Part II shall not apply to the following:

(1) ~~Business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices, and outpatient facilities~~ Spaces not intended for direct patient care

(2) Spaces of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this *Code* where these spaces are used exclusively as patient sleeping rooms, as determined by the health care facility's governing body

Informational Note No. 1: See 406.12(5) for receptacles located in health care facility business offices, corridors, and waiting rooms that are required to be tamper resistant.

Informational Note No. 2: See 210.12(D) for branch circuits supplying outlets and receptacles located in patient sleeping rooms in nursing homes and limited care facilities that are connected to arc-fault circuit-interrupter circuits.

(3) ~~Areas~~ Spaces used exclusively for any of the following purposes:

(4) Intramuscular (IM), subcutaneous (SC), and intradermal (ID) injections (immunizations)

(5) Psychiatry and psychotherapy

(6) Alternative medicine

(7) Optometry

(8) Pharmacy services not contiguous to health care facilities

Informational Note No. 3: See NFPA *101* -

~~2021~~

a.

2024 , *Life Safety Code* .

Informational Note No. 4: Intravenous (IV) infusions and transfusions, epidural infusions, and intraosseous (OS) injections are not considered to be intramuscular (IM), subcutaneous (SC), or intradermal (ID) injections, and are considered to be medical procedures that are accompanied by greater patient risk. Intravenous (IV) infusions and transfusions are not considered to be alternative medicine.

Informational Note No. 5: See 517.8 for a definition of categories.

Informational Note No. 6: Spaces that provide direct patient care may need to meet the grounding and bonding requirements of this section when procedures are performed that provide a direct electrical pathway to the heart. NFPA 99 defines Direct Electrical Pathway to the Heart.

An externalized conductive pathway, insulated except at its ends, one end of which is in direct contact with heart muscle while the other is outside the body and is accessible for inadvertent or intentional contact with grounded objects or energized, ground-referenced sources. [99:3.3.43] Electrodes, such as those used for pacing the heart, and catheters filled with conductive fluids, are examples of direct electrical pathways to the heart

Supplemental Information

File Name	Description	Approved
NEC_517.10_B_FR-8900.docx	NEC_517.10_B_FR-8900.docx	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 11:21:09 EST 2024

Committee Statement

Committee Statement: The change adds clarity that many clinics performing routine services are not required to meet the grounding and bonding requirements in this section.
Response Message: FR-8900-NFPA 70-2024

Public Input No. 1170-NFPA 70-2023 [Section No. 517.10(B)]
Public Input No. 3545-NFPA 70-2023 [Section No. 517.10(B)]

(B) Not Covered.

Part II shall not apply to the following:

1. Spaces not intended for direct patient care~~Business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices, and outpatient facilities~~

2. Spaces of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this *Code* where these spaces are used exclusively as patient sleeping rooms, as determined by the health care facility's governing body

   Informational Note No. 1: See 406.12(5) for receptacles located in health care facility business offices, corridors, and waiting rooms that are required to be tamper resistant.

   Informational Note No. 2: See 210.12(D) for branch circuits supplying outlets and receptacles located in patient sleeping rooms in nursing homes and limited care facilities that are connected to arc-fault circuit-interrupter circuits.

3. ~~Areas~~ Spaces used exclusively for any of the following purposes:

   1. Intramuscular (IM), subcutaneous (SC), and intradermal (ID) injections (immunizations)
   2. Psychiatry and psychotherapy
   3. Alternative medicine
   4. Optometry
   5. Pharmacy services not contiguous to health care facilities

   Informational Note No. 3: See NFPA *101*-~~2021~~2024, *Life Safety Code*.

   Informational Note No. 4: Intravenous (IV) infusions and transfusions, epidural infusions, and intraosseous (OS) injections are not considered to be intramuscular (IM), subcutaneous (SC), or intradermal (ID) injections, and are considered to be medical procedures that are accompanied by greater patient risk. Intravenous (IV) infusions and transfusions are not considered to be alternative medicine.

   Informational Note No. 5: See 517.8 for a definition of categories.

   Informational Note No. 6: Spaces that provide direct patient care may need to meet the grounding and bonding requirements of this section when procedures are performed that provide a direct electrical pathway to the heart. NFPA 99 defines Direct Electrical Pathway to the Heart.

   An externalized conductive pathway, insulated except at its ends, one end of which is in direct contact with heart muscle while the other is outside the body and is accessible for inadvertent or intentional contact with grounded objects or energized, ground-referenced sources. [99:3.3.43] Electrodes, such as those used for pacing the heart, and catheters filled with conductive fluids, are examples of direct electrical pathways to the heart.

First Revision No. 8940-NFPA 70-2024 [Section No. 517.13(A)]

(A) Wiring Methods.

All branch circuits serving patient care spaces shall be provided with an effective ground-fault current path by installation in a metal raceway system or a cable having a metallic armor or sheath assembly. The metal raceway system, metallic cable armor, or sheath assembly shall itself qualify as an equipment grounding conductor in accordance with 250.118.

Informational Note: The metal raceway system includes outlet boxes, device boxes, junction boxes, and other wiring enclosures.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 13:24:32 EST 2024

Committee Statement

Committee Statement: The requirement of a metal raceway system indirectly suggests that metal boxes are required. As such, and informational note was added to provide clarity for the user.

Response Message: FR-8940-NFPA 70-2024

Public Input No. 1815-NFPA 70-2023 [Section No. 517.13(A)]

First Revision No. 8974-NFPA 70-2024 [Section No. 517.13(B)(1)]

(1) General.

An insulated copper equipment grounding conductor that is clearly identified along its entire length by green insulation and installed with the branch circuit conductors within the wiring method in accordance with 517.13(A) shall be connected to the following:

(1) Grounding terminals of all receptacles other than isolated ground receptacles

(2) Metal outlet boxes, metal device boxes, or metal enclosures

(3) Non-current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts

Exception No. 1: For other than isolated ground receptacles, an insulated equipment bonding jumper that directly connects to the equipment grounding conductor shall be permitted to connect the box and receptacle(s) to the equipment grounding conductor. Isolated ground receptacles shall be connected in accordance with 517.16.

Exception No. 2: Metal faceplates shall be connected to an effective ground-fault current path by means of a metal mounting screw(s) securing the faceplate to a metal yoke or strap of a ~~receptacle~~ device or to a metal outlet box.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 14:34:49 EST 2024

Committee Statement

Committee Statement: Metal plates can be installed in locations other than receptacles such as wall switches.
Response Message: FR-8974-NFPA 70-2024

Public Input No. 323-NFPA 70-2023 [Section No. 517.13(B)(1)]

First Revision No. 8948-NFPA 70-2024 [Section No. 517.14]

517.14 Panelboard Enclosure Bonding.

The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient care vicinity shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. Where two or more enclosed panelboards serving the same individual patient care vicinity are served from separate transfer switches on the essential electrical system, the equipment grounding terminal buses of those ~~panelboards~~ panelboard enclosures shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. This conductor shall be permitted to be broken in order to terminate on the equipment grounding terminal bus in each panelboard enclosure .

Exception: The insulated continuous copper conductor not smaller than 10 AWG shall be permitted to be terminated on listed connections to aluminum or copper busbars not smaller than 6 mm thick × 50 mm wide (¼ in. thick × 2 in. wide) and of sufficient length to accommodate the number of terminations necessary for the bonding of the panelboards enclosure . The busbar shall be securely fastened and installed in an accessible location.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 13:34:30 EST 2024

Committee Statement

Committee Statement: In 2023 a new definition “enclosed panelboard” was added, this has triggered the need to revise this section to recognize the equipment grounding terminal bars are often connected directly to the panelboard enclosures.

Response Message: FR-8948-NFPA 70-2024

Public Input No. 4379-NFPA 70-2023 [Section No. 517.14]

First Revision No. 8850-NFPA 70-2024 [Section No. 517.17(B)]

[see attached word document NEC_517.17_B_FR-8850]

(B) Feeders.

Where ground-fault protection of equipment is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent protective devices ~~and current transformers~~ or other protective equipment that shall cause the feeder disconnecting means to open. ~~The additional levels of ground~~ If ground-fault protection is provided for the service disconnecting means and the feeder distribution from the service, a third level of ground fault protection downstream of the feeder shall not be required.

Ground -fault protection of equipment with automatic disconnecting means shall not be

~~installed~~

required on alternate power supply sources, between alternate power supply sources and any essential electrical system transfer switch, or on the load side of

~~an~~

any essential electrical system transfer switch. [**99:** 6.7.2.1.2.1]

Ground-fault indication without automatic disconnection shall be provided at any on-site power source. [**99:** 6.7.2.1.2.2]

Supplemental Information

File Name	Description	Approved
NEC_517.17_B_FR-8850.docx	NEC_517.17_B_FR-8850	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 08:55:49 EST 2024

Committee Statement

Committee Statement: Updates extract language with NFPA 99. “Protective” was added to “overcurrent devices” and removed “current transformers” to coordinate use approved terminology with the NEC. This incorporates Global PI 4050. Additional language was added to the application of three levels of ground fault protection.

Response Message: FR-8850-NFPA 70-2024

Public Input No. 3659-NFPA 70-2023 [Section No. 517.17(B)]

B) Feeders.
Where ground-fault protection of equipment is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent protective devices ~~and current transformers~~ or other protective equipment that shall cause the feeder disconnecting means to open.

Ground-fault protection of equipment with automatic disconnecting means shall not be required on alternate power supply sources, between alternate power supply sources and any essential electrical system transfer switch, or on the load side of any essential electrical system transfer switch. [99: 6.7.2.1.2.1] ~~The additional levels of ground-fault protection of equipment shall not be installed on the load side of an essential electrical system transfer switch.~~

Ground-fault indication without automatic disconnection shall be provided at any on-site power source. [99: 6.7.2.1.2.2]

First Revision No. 8954-NFPA 70-2024 [Section No. 517.19(E)]

(E) Equipment Grounding and Bonding.

Where a grounded electrical distribution system is used and a feeder is installed in a metal ~~feeder~~ raceway or Type MC or MI cable that qualifies as an equipment grounding conductor in accordance with 250.118 is installed, grounding of enclosures and equipment, such as panelboards, switchboards, and switchgear, shall be ensured by one of the following bonding means at each termination or junction point of the metal raceway or Type MC or MI cable:

(1) A grounding bushing and a continuous copper bonding jumper, sized in accordance with 250.122, with the bonding jumper connected to the junction enclosure or the ground bus of the panel

(2) Connection of feeder raceways or Type MC or MI cable to threaded hubs or bosses on terminating enclosures

(3) Other approved devices such as bonding-type locknuts or bushings. Standard locknuts shall not be used for bonding.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 13:41:47 EST 2024

Committee Statement

Committee Statement: Adds clarity since metal feeder raceways are not a recognized wiring method.
Response Message: FR-8954-NFPA 70-2024

Public Input No. 1475-NFPA 70-2023 [Section No. 517.19(E)]

First Revision No. 8955-NFPA 70-2024 [Section No. 517.19(H)]

(H) Special-Purpose Receptacle Grounding.

The equipment grounding conductor for special-purpose receptacles, such as the operation of mobile ~~X-ray~~ diagnostic imaging equipment, shall be extended to the reference grounding points of branch circuits for all locations likely to be served from such receptacles. Where such a circuit is served from an isolated ungrounded system, the equipment grounding conductor shall not be required to be run with the power conductors; however, the equipment grounding terminal of the special-purpose receptacle shall be connected to the reference grounding point.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 13:43:49 EST 2024

Committee Statement

Committee Statement: Adds diagnostic imaging to add clarity. Did not add treatment equipment as that may inadvertently add expand the requirements.
Response Message: FR-8955-NFPA 70-2024

Public Input No. 1002-NFPA 70-2023 [Section No. 517.19(H)]

First Revision No. 8976-NFPA 70-2024 [Section No. 517.20(A)]

(A) Receptacles and Fixed Equipment.

Wet procedure locations shall be provided with special protection against electric shock. [**99:**6.3.2.3.1]

This special protection shall be provided by one of the following:

(1) Isolated power systems that remain in operation in the event of a single line-to-ground fault condition that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

Informational Note No. 1: Isolated power systems can eliminate the danger of electric shock to patients who might be more susceptible to leakage current and unable to move in their beds.

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI

Informational Note No. 2: See Annex E of ANSI/UL 943-2018, *Ground-Fault Circuit-Interrupters*, and110.3(B) for the manufacturers' installation instructions of listed ground-fault circuit interrupters for information on the supply connection of life-support equipment to circuits providing ground-fault circuit-interrupter (GFCI) protection of personnel at outlets.

(3) Where GFCI protection is used in an operating room, one of the following shall apply:

(1) Each receptacle shall be an individual GFCI device.

(2) Each receptacle shall be individually protected by a single GFCI device. [**99:** 6.3.2.3. 9].

[**99:** 6.3. 2 .3.2]

Exception: Branch circuits supplying only listed, fixed, therapeutic, and diagnostic equipment shall be permitted to be supplied from a grounded service, single- or 3-phase system if the following conditions are met:

(1) Wiring for grounded and isolated circuits does not occupy the same raceway.

(2) All conductive surfaces of the equipment are connected to an insulated copper equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 14:41:11 EST 2024

Committee Statement

Committee Statement: Adds clarity and consistency with NFPA 99.
Response Message: FR-8976-NFPA 70-2024

Public Input No. 2100-NFPA 70-2023 [Section No. 517.20(A)]

First Revision No. 8972-NFPA 70-2024 [Section No. 517.20(B)]

(B) Isolated Power Systems.

Where an isolated power system is utilized, the isolated power equipment shall be listed as isolated power equipment, and the isolated power system shall be designed and installed in accordance with 517.160.

Informational Note: See ~~Part IV of~~ Article 680, Part IV for requirements on the installation of therapeutic pools and tubs.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 14:28:02 EST 2024

Committee Statement

Committee Statement: Section fixed to match NEC Manual of Style.
Response Message: FR-8972-NFPA 70-2024

Public Input No. 2747-NFPA 70-2023 [Section No. 517.20(B)]

First Revision No. 8982-NFPA 70-2024 [Section No. 517.26]

[See attached word doc NEC_ 517. 26_FR-8982.docx]

517. 26 Application of Other Articles.

The ~~life safety branch of the essential electrical system shall meet the~~ requirements of Article 700 ~~, except as amended as follows:~~

~~Section~~ ~~700.4~~

shall not apply.

- ~~Section~~ ~~700.10(D)~~ ~~shall not apply.~~
- ~~Section~~ ~~700.17~~ ~~shall be replaced with the following: Branch circuits that supply emergency lighting shall be installed to provide service from a source in accordance with~~ ~~700.12~~ ~~when normal supply for lighting is interrupted or where single circuits supply luminaires containing secondary batteries.~~
- ~~Section~~ ~~700.32~~ ~~shall not apply.~~

  ~~Informational Note No. 1:~~ ~~See NFPA 110-2019,~~ ~~*Standard for Emergency and Standby Power Systems*~~ ~~, for additional information.~~

  ~~Informational Note No. 2:~~ ~~See~~ ~~517.29~~ ~~and NFPA 99-2021,~~ ~~*Health Care Facilities Code*~~ ~~, for additional information.~~

Supplemental Information

File Name	Description	Approved
NEC_517.26_FR-8982.docx	NEC_517.26_FR-8982.docx	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 15:01:43 EST 2024

Committee Statement

Committee Statement: This revision clearly identifies that Article 700 does not apply to health care facilities.
Response Message: FR-8982-NFPA 70-2024

Public Input No. 2789-NFPA 70-2023 [Section No. 517.26]

Public Input No. 3664-NFPA 70-2023 [Section No. 517.26]

517.26 Application of Other Articles.

The ~~life safety branch of the essential electrical system shall meet the~~ requirements of Article 700 shall not apply.~~, except as amended as follows:~~

~~1. Section 700.4 shall not apply.~~

~~2. Section 700.10(D) shall not apply.~~

~~3. Section 700.17 shall be replaced with the following: Branch circuits that supply emergency lighting shall be installed to provide service from a source in accordance with 700.12 when normal supply for lighting is interrupted or where single circuits supply luminaires containing secondary batteries.~~

~~4. Section 700.32 shall not apply.~~

~~Informational Note No. 1: See NFPA 110-2019, *Standard for Emergency and Standby Power Systems*, for additional information.~~

~~Informational Note No. 2: See 517.29 and NFPA 99-2021, *Health Care Facilities Code*, for additional information.~~

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First Revision No. 8988-NFPA 70-2024 [Section No. 517.29]

517.29 Type 1 Essential Electrical Systems.

Informational Note: Type 1 essential electrical systems are comprised of three separate branches capable of supplying a limited amount of lighting and power service that is considered essential for life safety and effective facility operation during the time the normal electrical service is interrupted for any reason. These three separate branches are the life safety, critical, and equipment branches. [**99:**A.6.7.~~2~~ 5 .~~3~~ 1]

(A) Applicability.

The requirements of 517.29 through 517.35 shall apply to Type 1 essential electrical systems. Type 1 systems shall be required for Category 1 spaces. Type 1 systems shall be permitted to serve Category 2, Category 3, and Category 4 spaces.

Informational Note No. 1: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, for performance, maintenance, and testing requirements of essential electrical systems in hospitals. See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, for installation of centrifugal fire pumps.

Informational Note No. 2: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, 6.7.5 and 6.7.6, for additional information on Type 1 and Type 2 essential electrical systems.

(B) Type 1 Essential Electrical Systems.

Category 1 spaces shall be served by a Type 1 essential electrical system. [**99:**6.4.1]

Category 1 spaces shall not be served by a Type 2 EES. [**99:**6.4.2]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 15:20:24 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract.
Response Message: FR-8988-NFPA 70-2024

Public Input No. 2849-NFPA 70-2023 [Section No. 517.29 [Excluding any Sub-Sections]]

First Revision No. 8991-NFPA 70-2024 [Section No. 517.30(A)]

(A) ~~Two~~ Independent Power Sources.

~~Essential~~ The essential electrical systems (EES) loads shall ~~have~~ be served by two or more independent sources (or sets of sources). One ~~on-site~~ source (or sets of sources) shall be ~~sized to supply the entire EES. The other independent source (or sets of sources) shall be sized to supply the entire EES and shall be permitted to be located~~ on-site ~~or off-site. Additional sources other than the first two independent sources shall be permitted to be~~ power production equipment, storage components, or a combination, sized to supply the ~~intended load~~ entire EES .

Informational Note: An example of a set of sources may be several generators that combined serve the entire EES.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 15:23:07 EST 2024

Committee Statement

Committee Statement: The suggested change does coordinate with NFPA 99. However, the language “power production equipment” is a term defined in NFPA 70, and more accurately describes the need for the kinds of equipment included. This language solves the ambiguity of, for instance, an on-site utility substation which could be interpreted by some as an on-site source.

Response Message: FR-8991-NFPA 70-2024

Public Input No. 1968-NFPA 70-2023 [Section No. 517.30]

First Revision No. 9286-NFPA 70-2024 [Sections 517.30(B), 517.30(C)]

Sections 517.30(B), 517.30(C)

(B) On-Site Power Sources for the EES.

Power sources for the EES shall be ~~permitted to be any of those~~ one or more of the follwoing specified in 517.30(B)(1) through (B)(~~5~~ 4).

(1)

~~Utility Supply Power.~~

~~Where utility power is used as the normal source, utility power shall not be used as the alternate source unless permitted elsewhere in this article.~~

~~Informational Note: See 517.35 and 517.45 for essential system loads that can be supplied from dual sources of utility supply power.~~

~~(2) Generating Units.~~

(~~3~~ 2) Fuel Cell Systems.

Fuel cell systems shall be permitted to serve as the alternate power source for all or part of an EES. [**99:**6.7.1.5.1]

(a) Installation of fuel cells shall comply with the requirements in Parts I through VII of Article 692 for 1000 volts or less and Part VIII for over 1000 volts.

(b) N + 1 units shall be provided where N units have sufficient capacity to supply the demand load of the portion of the system served.

(c) Systems shall be able to assume loads within 10 seconds of loss of normal power source.

(d) Systems shall have a continuing source of fuel supply, together with sufficient on-site fuel storage for the essential system type.

(e) Where life safety and critical portions of the distribution system are present, a connection shall be provided for a portable diesel generator.

Informational Note: See NFPA 853-2020, *Standard for the Installation of Stationary Fuel Cell Power Systems*, for information on installation of stationary fuel cells.

(~~4~~ 3) Energy Storage Systems.

Energy storage systems shall be permitted to serve as the alternate source for all or part of an EES.

Informational Note: See NFPA 111-2022, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, for information on the installation of energy storage systems.

(5 4) Health Care Microgrid.

EES shall be permitted to be supplied by a health care microgrid that also supplies nonessential loads. The health care microgrid shall be permitted to share distributed resources with the normal system. Health care microgrid systems shall be designed with sufficient reliability to provide effective facility operation consistent with the facility emergency operations plan. Health care microgrid system components shall not be compromised by failure of the normal source.

Informational Note: See NFPA 99-2021 2024 , *Health Care Facilities Code, for information on health care microgrids*.

(C) Utility Supply Power.

Utility power shall not be used as the essential electrical system source unless permitted elsewhere in this article.

Informational Note: See 517.35 and 517.45 for essential system loads that can be supplied from dual sources of utility supply power.

(D) Location of EES Components.

EES Electrical system components shall be located to minimize interruptions caused by natural forces common to the area (e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities) or natural disasters identified in the facility's emergency operation plan . [**99:**6.2.4.1]

(1) Services Sources .

Installation of electrical service distribution equipment two independent sources (or sets of sources) shall be located to reduce possible interruption of normal electrical services resulting from natural or manmade causes as well as internal wiring and equipment failures the likelihood of simultaneous interruption of EES components and non-EES components .

(2) Feeders.

Feeders and associated raceways serving essential electrical system transfer equipment shall be located to provide such that physical separation is provided between each of the feeders of the alternate source and from the feeders of the normal electrical source electrical system feeders to prevent possible simultaneous interruption. [**99:**6.2.4.3]

Informational Note: Facilities in which the normal source of power is supplied by two or more separate central station-fed services experience greater than normal electrical service reliability than those with only a single feed. Such a dual source of normal power consists of two or more electrical services fed from separate generator sets or a utility distribution network that has multiple power input sources and is arranged to provide mechanical and electrical separation so that a fault between the facility and the generating sources is not likely to cause an interruption of more than one of the facility service feeders.

Supplemental Information

File Name	Description	Approved
NEC_517.30_B_FR-9286.docx	For editorial use	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Feb 02 15:28:56 EST 2024

Committee Statement

Committee Statement: "On-site" was added to "Power Sources for the EES" to coordinate with NFPA 99. The requirements for (B) were revised to group and clarify on-site and off-site power sources. The edition of NFPA 99 was revised.

Response Message: FR-9286-NFPA 70-2024

Public Input No. 2850-NFPA 70-2023 [Section No. 517.30(C)]

Public Input No. 3016-NFPA 70-2023 [Section No. 517.30(B)(4)]

Public Input No. 3366-NFPA 70-2023 [Section No. 517.30(B)(3)]

Public Input No. 2748-NFPA 70-2023 [Section No. 517.30(B)(3)]

Public Input No. 998-NFPA 70-2023 [Section No. 517.30(B)(3)]

Public Input No. 3013-NFPA 70-2023 [Section No. 517.30(B)(1)]

(B) On-Site Power Sources for the EES.

Power sources for the EES shall be ~~permitted to be any~~one or more of ~~those~~ the following as specified in 517.30(B)(1) through (B)(~~4~~5).

~~(1) Utility Supply Power.~~

~~Where utility power is used as the normal source, utility power shall not be used as the alternate source unless permitted elsewhere in this article.~~

~~Informational Note: See 517.35 and 517.45 for essential system loads that can be supplied from dual sources of utility supply power.~~

(~~1~~2) Generating Units.

(~~2~~3) Fuel Cell Systems.

Fuel cell systems shall be permitted to serve as the alternate power source for all or part of an EES. [**99:**6.7.1.5.1]

(a) Installation of fuel cells shall comply with the requirements in Parts I through VII of Article 692 for 1000 volts or less and Part VIII for over 1000 volts.

(b) N + 1 units shall be provided where N units have sufficient capacity to supply the demand load of the portion of the system served.

(c) Systems shall be able to assume loads within 10 seconds of loss of normal power source.

(d) Systems shall have a continuing source of fuel supply, together with sufficient on-site fuel storage for the essential system type.

(e) Where life safety and critical portions of the distribution system are present, a connection shall be provided for a portable diesel generator.

Informational Note: See NFPA 853-2020, *Standard for the Installation of Stationary Fuel Cell Power Systems*, for information on installation of stationary fuel cells.

(~~3~~4) Energy Storage Systems.

Energy storage systems shall be permitted to serve as the alternate source for all or part of an EES.

Informational Note: See NFPA 111-2022, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, for information on the installation of energy storage systems.

(~~4~~5) Health Care Microgrid.

EES shall be permitted to be supplied by a health care microgrid that also supplies nonessential loads. The health care microgrid shall be permitted to share distributed resources with the normal system. Health care microgrid systems shall be designed with sufficient reliability to provide effective facility operation consistent with the facility emergency operations plan. Health care microgrid system components shall not be compromised by failure of the normal source.

Informational Note: See NFPA 99-~~2021~~2024, *Health Care Facilities Code, for information on health care microgrids*.

(C) Utility Supply Power.

Utility power shall not be used as the essential electrical system source unless permitted elsewhere in this article.

Informational Note: See 517.35 and 517.45 for essential system loads that can be supplied from dual sources of utility supply power.

(~~C~~D) Location of EES Components.

~~EES~~Electrical system components shall be located to minimize interruptions caused by natural forces common to the area or natural disasters identified in the facility's emergency operation plan~~(e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities)~~. [**99:**6.2.4.1]

(1) ~~Services~~Sources.

Installation of two independent sources (or sets of sources) ~~electrical service distribution equipment~~ shall be located to reduce the likelihood of ~~possible~~simultaneous interruption of ~~normal electrical services resulting from natural or manmade causes as well as internal wiring and equipment failures~~EES components and non-EES components.

(2) Feeders.

Feeders and associated raceways serving essential electrical system transfer equipment shall be located ~~to~~ such that ~~provide~~ physical separation is provided between each of the electrical systems~~of the~~ feeders ~~of the alternate source and from the feeders of the normal electrical source~~ to prevent possible simultaneous interruption. [**99:**6.2.4.3]

~~Informational Note: Facilities in which the normal source of power is supplied by two or more separate central station-fed services experience greater than normal electrical service reliability than those with only a single feed. Such a dual source of normal power consists of two or more electrical services fed from separate generator sets or a utility distribution network that has multiple power input sources and is arranged to provide mechanical and electrical separation so that a fault between the facility and the generating sources is not likely to cause an interruption of more than one of the facility service feeders.~~

First Revision No. 9016-NFPA 70-2024 [Sections 517.31(A), 517.31(B)]

[See attached word documnet NEC_517.31(A)(B)_FR-9016.docx]

Sections 517.31(A), 517.31(B)

(A) Separate Branches.

Type 1 essential electrical systems shall be comprised of three separate branches capable of supplying a limited amount of lighting and power service that is considered essential for life safety and effective hospital operation~~- during the time the normal electrical service is interrupted for any reason~~ . The three branches are life safety, critical, and equipment.

The division between the branches shall occur at transfer switches where more than one transfer switch is required. [**99:**6.7.2.~~3~~ 2 .1]

(B) Transfer Switches.

Transfer switches shall be in accordance with one of the following:

(1) The number of transfer switches to be used shall be based on reliability and design. Each branch of the essential electrical system shall have one or more transfer switches.

(2) One transfer switch shall be permitted to serve one or more branches in a facility with a continuous load on the ~~switch of~~ EESof 150 kVA (120 kW) or less. [**99:**6.7.6.2.~~1~~ 2 .~~4~~ 3.2]

Informational Note No. 1: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, 6.7.3.1, 6.7.2.2.5, 6.7.2.2.5.15, and 6.7.2.2.7, for more information on transfer switches.

Informational Note No. 2: See Informational Note Figure 517.31(B)(1).

Informational Note No. 3: See Informational Note Figure 517.31(B)(2).

Figure Informational Note Figure 517.31(B)(1) Type 1 Essential Electrical System — Minimum Requirement (Greater Than 150 kVA) for Transfer Switch Arrangement.

[Replace Figure 517.31(B)(1) below with "Figure 517.31(B)(1)" jpg file. Keep same title as above]

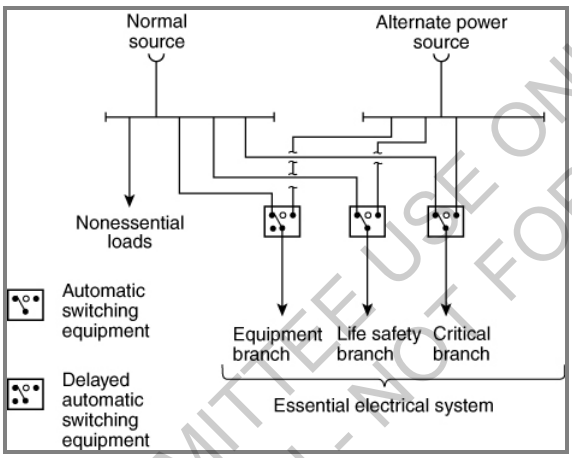
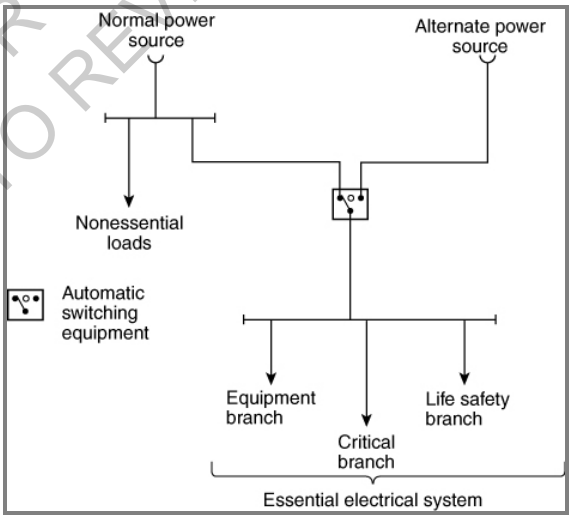


Figure Informational Note Figure 517.31(B)(2) Type 1 Essential Electrical System — Minimum Requirement (150 kVA or Less) for Transfer Switch Arrangement.

[Replace Figure 517.31(B)(2) below with "Figure 517.31(B)(2)" jpg file. Keep same title as above]



(1) Optional Loads.

Loads served by the ~~generating equipment~~ on-site source (or set of sources) not specifically named in this article shall be served by their own transfer switches such that the following conditions apply:

(1) These loads shall not be transferred if the transfer will overload the ~~generating equipment~~ on-site source(s) .

(2) These loads shall be automatically shed upon generating equipment overloading.

(2) Contiguous Facilities.

Hospital power sources and alternate power sources shall be permitted to serve the essential electrical systems of contiguous or same-site facilities.

Supplemental Information

File Name	Description	Approved
NEC_517.31_A_B_FR-9016.docx	NEC_517.31(A)(B)_FR-9016.docx	
Figure_517.31_B_1_.jpg	For editorial use	
Figure_517.31_B_2_.jpg	For editorial use	
NEC_517.31_A_B_FR-9016.docx	For prod use	

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 16:50:16 EST 2024

Committee Statement

Committee Statement: The revisions were made to correlate with NFPA 99.
Response Message: FR-9016-NFPA 70-2024

Public Input No. 3556-NFPA 70-2023 [Section No. 517.31(B)(1)]
Public Input No. 2109-NFPA 70-2023 [Section No. 517.31(B) [Excluding any Sub-Sections]]
Public Input No. 3006-NFPA 70-2023 [Section No. 517.31(B)(2)]
Public Input No. 3590-NFPA 70-2023 [Section No. 517.31(B)(2)]
Public Input No. 3551-NFPA 70-2023 [Section No. 517.31(A)]
Public Input No. 2142-NFPA 70-2023 [Section No. 517.31(B)(1)]
Public Input No. 2975-NFPA 70-2023 [Section No. 517.31(B) [Excluding any Sub-Sections]]
Public Input No. 2973-NFPA 70-2023 [Section No. 517.31(A)]
Public Input No. 3553-NFPA 70-2023 [Section No. 517.31(B) [Excluding any Sub-Sections]]

Sections 517.31(A), 517.31(B)

(A) Separate Branches.

Type 1 essential electrical systems shall be comprised of three separate branches capable of supplying a limited amount of lighting and power service that is considered essential for life safety and effective hospital operation ~~during the time the normal electrical service is interrupted for any reason~~. The three branches are life safety, critical, and equipment.

The division between the branches shall occur at transfer switches where more than one transfer switch is required. [**99:**6.7.2.~~3~~2.1]

(B) Transfer Switches.

Transfer switches shall be in accordance with one of the following:

1. The number of transfer switches to be used shall be based on reliability and design. Each branch of the essential electrical system shall have one or more transfer switches.
2. One transfer switch shall be permitted to serve one or more branches in a facility with a continuous load on the ~~switch~~ EES of 150 kVA (120 kW) or less. [**99:**6.7.6.2.2.3.2~~1.4~~]

Informational Note No. 1: See NFPA 99-~~2021~~2024, *Health Care Facilities Code*, 6.7.3.1, 6.7.2.2.5, 6.7.2.2.5.15, and 6.7.2.2.7, for more information on transfer switches.

Informational Note No. 2: See Informational Note Figure 517.31(B)(1).

Informational Note No. 3: See Informational Note Figure 517.31(B)(2).

Figure Informational Note Figure 517.31(B)(1) Type 1 Essential Electrical System — Minimum Requirement (Greater Than 150 kVA) for Transfer Switch Arrangement.

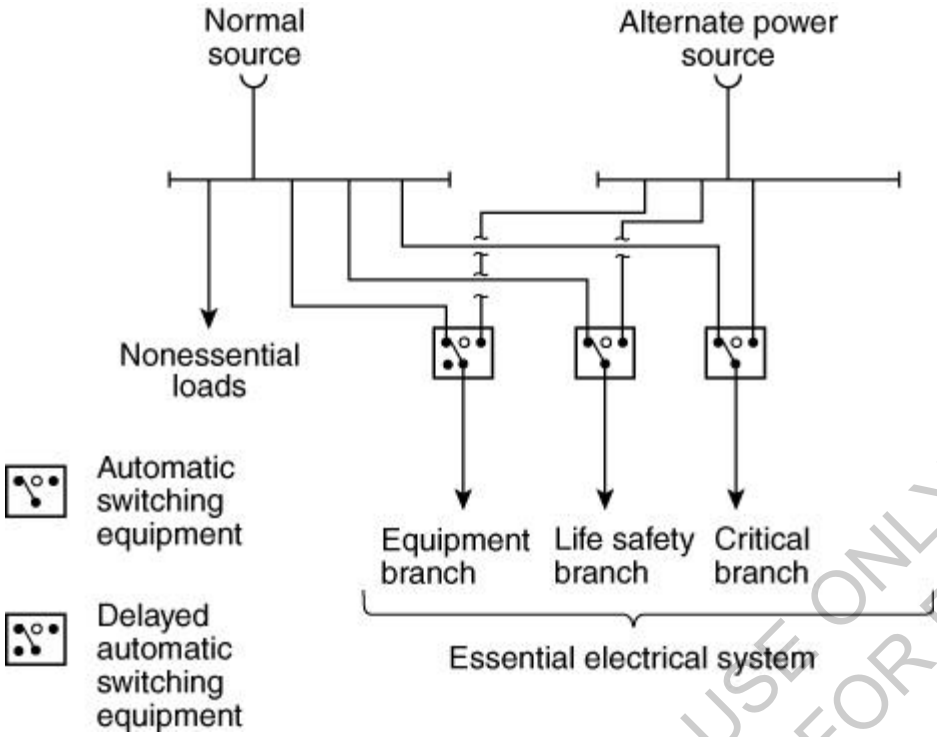
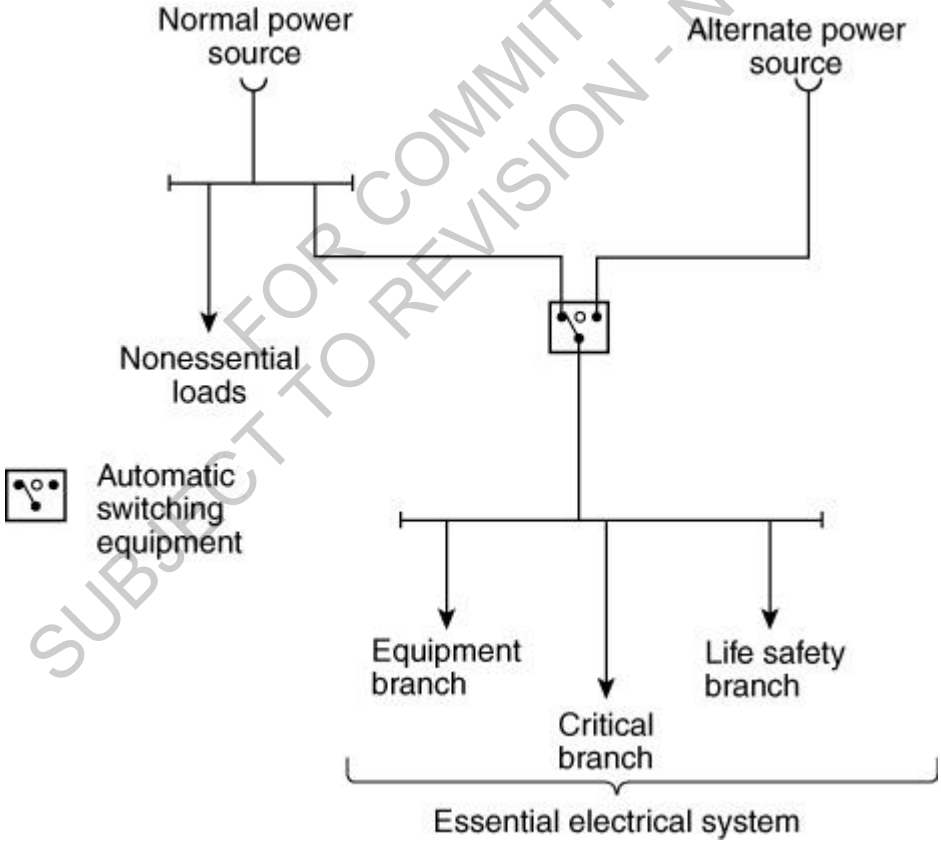


Figure Informational Note Figure 517.31(B)(2) Type 1 Essential Electrical System — Minimum Requirement (150 kVA or Less) for Transfer Switch Arrangement.



(1) Optional Loads.

Loads served by the ~~generating equipment~~on-site source (or set of sources) not specifically named in this article shall be served by their own transfer switches such that the following conditions apply:

1. These loads shall not be transferred if the transfer will overload the ~~generating equipment~~on-site source(s).
2. These loads shall be automatically shed upon generating equipment overloading.

(2) Contiguous Facilities.

Hospital power sources and alternate power sources shall be permitted to serve the essential electrical systems of contiguous or same-site facilities.

First Revision No. 9216-NFPA 70-2024 [Section No. 517.31(C)(3)]

(3) Mechanical Protection of the Essential Electrical System.

The wiring of the life safety and critical branches shall be mechanically protected by raceways. Where installed as branch circuits in patient care spaces, the installation shall comply with the requirements of 517.13(A) and (B) and 250.118. Only the following wiring methods shall be permitted:

(1) Nonflexible metal raceways, Type MI cable, RTRC marked with the suffix –XW, or Schedule 80 PVC conduit.

Exception: Nonmetallic raceways shall not be used for branch circuits that supply patient care spaces.

(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete.

Exception: Nonmetallic raceways shall not be used for branch circuits that supply patient care spaces.

(3) Listed flexible metal raceways and listed metal sheathed cable assemblies, as follows:

(4) Where used in listed prefabricated medical headwalls

(5) In listed office furnishings

(6) Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage

(7) Where necessary for flexible connection to equipment

(8) For equipment that requires a flexible connection due to movement, vibration, or operation

(9) Luminaires installed in ceiling structures

(10) Flexible power cords of appliances or other utilization equipment connected to the essential electrical system.

(11) Cables for Class 2 or Class 3 systems permitted in Part VI of this article, with or without raceways.

Informational Note: See 517.13 for additional grounding requirements in patient care areas.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 09:29:15 EST 2024

Committee Statement

Committee Statement: This is revised to meet the NEC Style Manual. These are written as exceptions.

Response Message: FR-9216-NFPA 70-2024

First Revision No. 9023-NFPA 70-2024 [Section No. 517.31(D)]

(D) Capacity of Systems.

The essential electrical system shall have the capacity and rating to meet the maximum actual demand likely to be produced by the connected load.

Feeders shall be sized in accordance with 215.2 and ~~Part III of~~ Article 220, Part III . The ~~alternate~~ on-site power source(s) required in 517.30 shall have the capacity and rating to meet the demand produced by the load at any given time.

Demand calculations for sizing of the ~~alternate~~ on-site power source(s) shall be based on any of the following:

(1) Prudent demand factors and historical data

(2) Connected load

(3) Feeder calculations

(4) Any combination of the above

The sizing requirements in 700.4 and 701.4 shall not apply to ~~alternate~~ essential electrical system power sources.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 17:10:01 EST 2024

Committee Statement

Committee Statement: Revision moves “Part” in order to be consistent with MOS. The term “alternate” was removed to be consistent with NFPA 99.

Response Message: FR-9023-NFPA 70-2024

Public Input No. 2749-NFPA 70-2023 [Section No. 517.31(D)]

Public Input No. 3019-NFPA 70-2023 [Section No. 517.31(D)]

First Revision No. 9024-NFPA 70-2024 [Section No. 517.31(F)]

(F) Feeders from ~~Alternate~~ EES Power Source.

A single feeder supplied by ~~a local or remote alternate~~ an EES power source shall be permitted to supply the essential electrical system to the point at which the life safety, critical, and equipment branches are separated. Installation of the transfer equipment shall be permitted at locations other than the ~~location of the alternate~~ EES power source.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:14:50 EST 2024

Committee Statement

Committee Statement: The revision is to be consistent with terminology used elsewhere in the section replacing “alternate” with “EES.”
Response Message: FR-9024-NFPA 70-2024

Public Input No. 3004-NFPA 70-2023 [Section No. 517.31(F)]
Public Input No. 3594-NFPA 70-2023 [Section No. 517.31(F)]

First Revision No. 9026-NFPA 70-2024 [Section No. 517.32]

517.32 Branches Requiring Automatic Connection.

(A) Life Safety and Critical Branch Used in a Type 1 EES.

(1) Those functions of patient care depending on lighting or appliances that are connected to the essential electrical system shall be divided into the life safety branch and the critical branch, as described in 517.33 and 517.34.

(

~~B) Life Safety and Critical Branch Used in a Type 2 EES.~~

~~2) The life safety and critical branches shall be installed and connected to the alternate power on-site source specified in 517.41 30 (A) and (B) so that all functions specified herein for the life safety and critical branches are automatically restored to operation within 10 seconds after interruption of the normal source power . [99: 6.7.5.3.1]~~

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9026_517.32.docx		

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 17:19:57 EST 2024

Committee Statement

Committee Statement: Titles and references were updated that address inconsistencies between Type 1 and Type 2 EES. In addition, NFPA 99 extract language was updated.

Response Message: FR-9026-NFPA 70-2024

Public Input No. 2978-NFPA 70-2023 [Section No. 517.32]

Public Input No. 2976-NFPA 70-2023 [Section No. 517.32(B)]

517.32 Branches Requiring Automatic Connection.

(A) Life Safety and Critical Branch Used in a Type 1 EES. [Move text to (1)]

~~Those functions of patient care depending on lighting or appliances that are connected to the essential electrical system shall be divided into the life safety branch and the critical branch, as described in 517.33 and 517.34.~~

(1)

Those functions of patient care depending on lighting or appliances that are connected to the essential electrical system shall be divided into the life safety branch and the critical branch, as described in 517.33 and 517.34.

(2)

The life safety and critical branches shall be installed and connected to the ~~alternate power~~on-site source specified in 517.~~41~~30(A) and 517.30(B) so that all functions specified herein for the life safety and critical branches are automatically restored to operation within 10 seconds after interruption of ~~the normal source~~power. [**99:**6.7.5.3.1]

~~**(B) Life Safety and Critical Branch Used in a Type 2 EES.**~~ **[Move text to (2)]**

~~The life safety and critical branches shall be installed and connected to the alternate power source specified in 517.41(A) and (B) so that all functions specified herein for the life safety and critical branches are automatically restored to operation within 10 seconds after interruption of the normal source. [**99:**6.7.5.3.1]~~

First Revision No. 9027-NFPA 70-2024 [Section No. 517.33(C)]

(C) Alarm and Alerting Systems.

Alarm and alerting systems including the following:

(1) Fire alarm systems

(2) Alarm and alerting systems (other than fire alarm systems) shall be connected to the life safety branch or critical branch. [**99:**6.7.5.1.2.~~5~~ 3]

(3) Alarms for systems used for the piping of nonflammable medical gases

(4) Mechanical, control, and other accessories required for effective life safety systems operation shall be permitted to be connected to the life safety branch.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:27:36 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language.
Response Message: FR-9027-NFPA 70-2024

Public Input No. 2980-NFPA 70-2023 [Section No. 517.33(C)]

Committee Input No. 9028-NFPA 70-2024 [Section No. 517.33(D)]

(D) Communications Systems.

(1) Hospital communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.4(3)]

(2) Where used, emergency responder radio communication systems (ERRCs).

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9028_517.33_D_.docx		

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 17:38:34 EST 2024

Committee Statement

Committee Statement: Ensures radio coverage for first responders and emergency personnel within the building.

Response Message: CI-9028-NFPA 70-2024

Public Input No. 2114-NFPA 70-2023 [Section No. 517.33(D)]

(D) Communications Systems.

~~Hospital communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.4(3)]~~

(1)

Hospital communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.5.1.2.4(3)]

(2)

Where used, emergency responder radio communication systems (ERRCs).

Committee Input No. 9030-NFPA 70-2024 [Section No. 517.33(E)]

(E) Generator Set Locations.

Generator set locations as follows:

(1) Task illumination

(2) Battery charger for emergency battery-powered lighting unit(s)

(3) Select receptacles at the generator set location and essential electrical system transfer switch locations

[**99:**6.7.5.1.2.~~1~~ 2 (4)]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:45:31 EST 2024

Committee Statement

Committee Statement: Updates NPFA 99 extract.
Response Message: CI-9030-NFPA 70-2024

Public Input No. 2983-NFPA 70-2023 [Section No. 517.33(E)]

First Revision No. 9031-NFPA 70-2024 [Section No. 517.33(F)]

(F) Generator Set Accessories.

Loads dedicated to a specific generator, including the fuel transfer pump(s), ventilation fans, electrically operated louvers, controls, cooling system, and other generator accessories essential for generator operation, shall be connected to the life safety branch or to the output terminals of the generator with overcurrent protective devices. [**99:**6.7.5.1.2.~~6~~ 4]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:48:04 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract.
Response Message: FR-9031-NFPA 70-2024

Public Input No. 2985-NFPA 70-2023 [Section No. 517.33(F)]

First Revision No. 9032-NFPA 70-2024 [Section No. 517.33(G)]

(G) Elevators.

Elevator cab lighting, control, communications, and signal systems. [**99:**6.7.5.1.2.~~4~~ 2 (5)]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:50:31 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract reference.
Response Message: FR-9032-NFPA 70-2024

Public Input No. 2986-NFPA 70-2023 [Section No. 517.33(G)]

First Revision No. 9033-NFPA 70-2024 [Section No. 517.33(H)]

(H) Automatic Doors.

Electrically powered doors used for building egress. [**99:**6.7.5.1.2.~~4~~ 2 (6)]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 17:51:29 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract reference.
Response Message: FR-9033-NFPA 70-2024

Public Input No. 2987-NFPA 70-2023 [Section No. 517.33(H)]

First Revision No. 9035-NFPA 70-2024 [Section No. 517.35]

517.35 Equipment Branch Connection to ~~Alternate Power~~ On-Site Source.

The equipment branch shall be installed and connected to the ~~alternate~~ on-site power source such that the equipment described in 517.35(A) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety and critical branches. [**99:**6.7.5.1.4.2(A)]

The arrangement of the connection to the ~~alternate~~ on-site power source shall also provide for the subsequent connection of equipment described in 517.35(B). [**99:**6.7.5.1.4.2(B)]

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment system shall be permitted.

(A) Equipment for Delayed Automatic Connection.

The following equipment shall be permitted to be arranged for delayed automatic connection to the ~~alternate~~ on-site power source:

(1) Central suction systems serving medical and surgical functions, including controls, with such suction systems permitted to be placed on the critical branch

(2) Sump pumps and other equipment required to operate for the safety of major apparatus, including associated control systems and alarms

(3) Compressed air systems serving medical and surgical functions, including controls with such air systems permitted to be placed on the critical branch

(4) Smoke control and stair pressurization systems

(5) Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood

(6) Supply, return, and exhaust ventilating systems for the following:

(7) Airborne infectious/isolation rooms

(8) Protective environment rooms

(9) Exhaust fans for laboratory fume hoods

(10) Nuclear medicine areas where radioactive material is used

(11) Ethylene oxide evacuation

(12) Anesthetic evacuation

[99:6.7.5.1.4.3(A)]

Where delayed automatic connection is not appropriate, the ventilation systems specified in 517.35(A)(6) shall be permitted to be placed on the critical branch. [**99:**6.7.5.1.4.3(B)]

(13) ~~Supply, return, and exhaust ventilating systems for operating and delivery rooms~~

(14) ~~Supply, return, exhaust ventilating systems and/or air-conditioning systems serving telephone equipment rooms and closets and data equipment rooms and closets~~

~~*Exception: Sequential delayed automatic connection to the alternate power source to prevent overloading the generator shall be permitted where engineering studies indicate it is necessary.*~~

(B) Equipment for Delayed Automatic or Manual Connection.

The following equipment shall be permitted to be arranged for either delayed automatic or manual connection to the ~~alternate~~ on-site power source:

(1) Heating equipment to provide heating for operating, delivery, labor, recovery, intensive care, and coronary care ~~,~~ spaces; nurseries~~,~~ ; infection/isolation rooms, emergency treatment spaces, and general patient rooms and pressure maintenance (i.e. jockey or make-up) pump(s) for water-based fire protection systems

Exception: Heating of general patient rooms and infection/isolation rooms during disruption of the normal source shall not be required under any of the following conditions:

(1) The outside design temperature is higher than −6.7°C (20°F).

(2) The outside design temperature is lower than −6.7°C (20°F), and where a selected room(s) is provided for the needs of all confined patients, only such room(s) need be heated.

(3) The facility is served by a dual source of normal power.

Informational Note No. 1: The design temperature is based on the 97.5 percent design value as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013).

Informational Note No. 2: See 517.30(C) for a description of a dual source of normal power.

(2) ~~An elevator~~ Elevator (s) selected to provide service to patient, surgical, obstetrical, and ground floors during interruption of normal power. ~~In instances where interruption of normal power would result in other elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of patients or other persons who may be confined between floors~~

(3) Supply, return, and exhaust ventilating systems for surgical and obstetrical delivery suites; intensive case and coronary care spaces; nurseries; and emergency treatment spaces .

(4) Hyperbaric facilities.

(5) Hypobaric facilities.

(6) Automatically operated doors.

(7) ~~Minimal electrically heated autoclaving equipment shall be~~ Autoclaving equipment wich is permitted to be arranged for either automatic or manual connection to the alternate source.

(8) Controls for equipment listed in 517.35.

(9) Other selected equipment ~~shall be permitted to be served by the equipment system~~ . [**99:**6.7.5.1.4.4]

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9035_517.35.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 18:00:27 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language. Revisions were made to meet the manual of style. A requirement cannot be in the middle of a list. (7), (8), and an exception below it were

removed to conform with NFPA 99, thus moving the requirement to a position that meets the NEC Style Manual.

Response Message: FR-9035-NFPA 70-2024

Public Input No. 2989-NFPA 70-2023 [Section No. 517.35]

517.35 Equipment Branch Connection to ~~Alternate Power~~On-Site Source.
The equipment branch shall be installed and connected to the ~~alternate~~on-site power source such that the equipment described in 517.35(A) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety and critical branches. [**99:**6.7.5.1.4.2(A)]

The arrangement of the connection to the ~~alternate~~on-site power source shall also provide for the subsequent connection of equipment described in 517.35(B). [**99:**6.7.5.1.4.2(B)]

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment system shall be permitted.

(A) Equipment for Delayed Automatic Connection.
The following equipment shall be permitted to be arranged for delayed automatic connection to the ~~alternate~~on-site power source:

1. Central suction systems serving medical and surgical functions, including controls, with such suction systems permitted to be placed on the critical branch
2. Sump pumps and other equipment required to operate for the safety of major apparatus, including associated control systems and alarms
3. Compressed air systems serving medical and surgical functions, including controls with such air systems permitted to be placed on the critical branch
4. Smoke control and stair pressurization systems
5. Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood
6. Supply, return, and exhaust ventilating systems for the following:
    1. Airborne infectious/isolation rooms
    2. Protective environment rooms
    3. Exhaust fans for laboratory fume hoods
    4. Nuclear medicine areas where radioactive material is used
    5. Ethylene oxide evacuation
    6. Anesthetic evacuation

    [99:6.7.5.1.4.3(A)]

    Where delayed automatic connection is not appropriate, the ventilation systems specified in 517.35(A)(6) shall be permitted to be placed on the critical branch. [**99:**6.7.5.1.4.3(B)]

~~1. Supply, return, and exhaust ventilating systems for operating and delivery rooms~~
~~2. Supply, return, exhaust ventilating systems and/or air-conditioning systems serving telephone equipment rooms and closets and data equipment rooms and closets~~

~~*Exception: Sequential delayed automatic connection to the alternate power source to prevent overloading the generator shall be permitted where engineering studies indicate it is necessary.*~~

(B) Equipment for Delayed Automatic or Manual Connection.
The following equipment shall be permitted to be arranged for either delayed automatic or manual connection to the ~~alternate~~on-site power source:

1. Heating equipment to provide heating for operating, delivery, labor, recovery, intensive care, and coronary care~~,~~ spaces; nurseries~~,~~; infection/isolation rooms, emergency treatment spaces, and general patient rooms and pressure maintenance (i.e. jockey or make-up) pump(s) for water-based fire protection systems

   Exception: Heating of general patient rooms and infection/isolation rooms during disruption of the normal source shall not be required under any of the following conditions:

   1. *The outside design temperature is higher than −6.7°C (20°F).*
   2. *The outside design temperature is lower than −6.7°C (20°F), and where a selected room(s) is provided for the needs of all confined patients, only such room(s) need be heated.*
   3. *The facility is served by a dual source of normal power.*

   Informational Note No. 1: The design temperature is based on the 97.5 percent design value as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013).

   Informational Note No. 2: See 517.30(C) for a description of a dual source of normal power.

(2) ~~An elevator~~Elevator(s) selected to provide service to patient, surgical, obstetrical, and ground floors during interruption of normal power. ~~In instances where interruption of normal power would result in other elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of patients or other persons who may be confined between floors.~~

(3) Supply, return, and exhaust ventilating systems for surgical and obstetrical delivery suites; intensive case and coronary care spaces; nurseries; and emergency treatment spaces.

(~~3~~4) Hyperbaric facilities.

(~~4~~5) Hypobaric facilities.

(~~5~~6) Automatically operated doors.

(~~6~~7) ~~Minimal electrically heated autoclaving~~Autoclaving equipment ~~shall be~~which is permitted to be arranged for either automatic or manual connection to the alternate source.

(~~7~~8) Controls for equipment listed in 517.35.

(~~8~~9) Other selected equipment ~~shall be permitted to be served by the equipment system.~~. [**99:**6.7.5.1.4.4]

First Revision No. 9036-NFPA 70-2024 [Section No. 517.40]

517.40 Type 2 Essential Electrical Systems.

Type 2 Essential Electrical Systems shall comply with 517.40

Informational Note No. 1: Nursing homes and other limited care facilities can contain Category 1 and/or Category 2 patient care spaces, depending on the design and type of care administered in the facility. For Category 1 spaces, see 517.29 through 517.35. For Category 2 spaces not served by Type 1 essential electrical systems, see 517.40 through 517.44.

Informational Note No. 2: Type 2 essential electrical systems are comprised of two separate branches capable of supplying a limited amount of lighting and power service that is considered essential for the protection of life and safety and effective operation of the institution during the time normal electrical service is interrupted for any reason. These two separate branches are the life safety and equipment branches. The number of transfer switches to be used should be based upon reliability, design, and load considerations. Each branch of the essential electrical system should have one or more transfer switches. One transfer switch should be permitted to serve one or more branches in a facility with a maximum demand on the essential electrical system of 150 kVA (120 kW). [**99:**A.6.7.6.2.1]

(A) Applicability.

The requirements of 517.40(C) through 517.44 shall apply to Type 2 essential electrical systems. Type 2 systems shall be permitted to serve Category 2, Category 3, and Category 4 spaces.

Exception: The requirements of 517.40(C) through 517.44 shall not apply to freestanding buildings used as nursing homes and limited care facilities if the following apply:

(1) Admitting and discharge policies are maintained that preclude the provision of care for any patient or resident who might need to be sustained by electrical life-support equipment.

(2) No surgical treatment requiring general anesthesia is offered.

(3) An automatic battery-operated system(s) or equipment shall be effective for at least 1½ hours and is otherwise in accordance with 700.12 and that shall be capable of supplying lighting for exit lights, exit corridors, stairways, nursing stations, medical preparation areas, boiler rooms, and communications areas. This system shall also supply power to operate all alarm systems.

Informational Note: See NFPA *101-~~2021~~* 2024 , *Life Safety Code*.

(B) Category 1 Spaces in Inpatient Hospital Care Facilities.

For those nursing homes and limited care facilities that admit patients who need to be sustained by electrical life-support equipment, the essential electrical system from the source to the portion of the facility where such patients are treated shall comply with the requirements of 517.29 through 517.35.

(C) Facilities Contiguous or Located on the Same Site with Hospitals.

Nursing homes and limited care facilities that are contiguous or located on the same site with a hospital shall be permitted to have their essential electrical systems supplied by the hospital.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Wed Jan 24 18:08:37 EST 2024

Committee Statement

Committee Statement: Clarifies the application of type 2 systems serving category 2, 3 and 4 spaces. NFPA 101 edition date revised. A requirement was added prior to the informational notes to comply with the NEC Style Manual.

Response Message: FR-9036-NFPA 70-2024

Public Input No. 2149-NFPA 70-2023 [Section No. 517.40]

First Revision No. 9042-NFPA 70-2024 [Section No. 517.41]

517.41 Required Power Sources.

(A) Independent Power Sources.

~~Essential~~ The essential electrical systems (EES) loads shall ~~have~~ be served by two or more independent sources (or sets of sources). One ~~on-site~~ source (or sets of sources) shall be ~~sized to supply the entire EES. The other independent source (or sets of sources) shall be sized to supply the entire EES and shall be permitted to be located~~ on-site ~~or off-site. Additional sources other than the first two independent sources shall be permitted to be~~ power production equipment, storage components, or combination thereof, sized to supply the ~~intended load~~ entire EES .

Informational Note: An example of a set of sources may be several generators that combined serve the entire EES.

(B) Location of EES Components.

~~EES~~ Electrical system components shall be located to minimize interruptions caused by natural forces common to the area ~~(e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities).~~ identified in the facility's emergency operations plan. [**99:**6.2.4.1]

Installations of ~~electrical services~~ the two independent electrical sources (or sets of sources) shall be located to reduce ~~possible interruption of normal electrical services resulting from similar causes as well as possible disruption of normal electrical service due to internal wiring and equipment failures~~ the likelihood of simultaneous interruption of EES and non-EES components . [**99:**6.2.4.2]

Feeders and associated raceways serving essential electrical system transfer equipment shall be located ~~to provide~~ such that the physical separation is provided between each of the ~~feeders of the alternate source and from the feeders of the normal electrical source~~ electrical system feeders to prevent possible simultaneous interruption. [**99:**6.2.4.3]

(C) Power Sources for the EES

Power sources for the EES shall be permitted to be any of those specifiifed in 517.30.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 08:03:45 EST 2024

Committee Statement

Committee Statement: "On-site" was added to "Power Sources for the EES" to coordinate with NFPA 99. The requirements for (B) were revised to group and clarify on-site and off-site power sources. NFPA 99 extracts were revised.

Response Message: FR-9042-NFPA 70-2024

Public Input No. 2992-NFPA 70-2023 [Section No. 517.41(B)]

Public Input No. 2150-NFPA 70-2023 [Section No. 517.41]

Public Input No. 3598-NFPA 70-2023 [Section No. 517.41]

Public Input No. 2153-NFPA 70-2023 [Section No. 517.41]

Public Input No. 2152-NFPA 70-2023 [Section No. 517.41]

Public Input No. 2154-NFPA 70-2023 [Section No. 517.41]

First Revision No. 9046-NFPA 70-2024 [Section No. 517.42(B)]

(B) Transfer Switches.

The number of transfer switches to be used shall be based upon reliability, design, and load considerations. [**99:**6.7.2.2.3]

Transfer switches shall be in accordance with one of the following:

(1) Each branch of the essential electrical system shall have one or more transfer switches. [**99:**6.7.2.2.3.1]

(2) One transfer switch shall be permitted to serve one or more branches in a facility with a continuous load on the ~~switch~~ EES of 150 kVA (120 kW) or less. [**99:**6.7.2.2.3.2]

Informational Note No. 1: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, 6.7.2.2.4, 6.7.2.2.5, 6.7.2.2.5.15, and 6.7.2.2.7 for more information on transfer switches.

Informational Note No. 2: See Informational Note Figure 517.42(B)(1).

Informational Note No. 3: See Informational Note Figure 517.42(B)(2).

Figure Informational Note Figure 517.42(B)(1) Type 2 Essential Electrical Systems (Nursing Home and Limited Health Care Facilities) — Minimum Requirement (Greater Than 150 kVA) for Transfer Switch Arrangement.

[Replace Figure 517.42(B)(1) below with "Figure 517.42(B)(1)" jpg file. Keep same title as above]

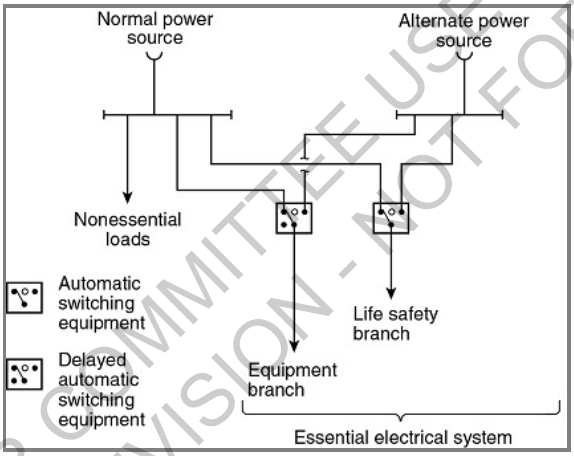
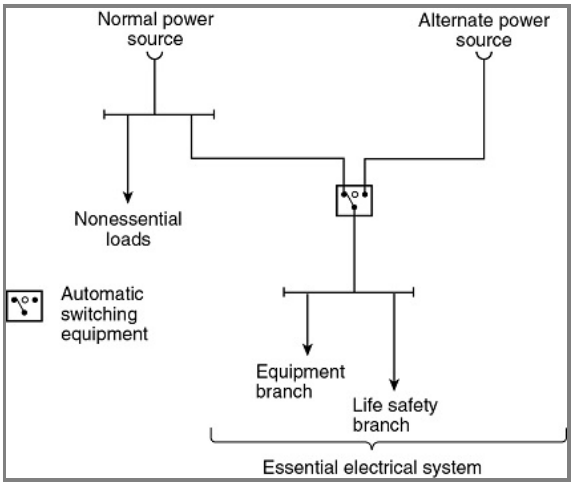


Figure Informational Note Figure 517.42(B)(2) Type 2 Essential Electrical Systems (Nursing Home and Limited Health Care Facilities) — Minimum Requirement (150 kVA or Less) for Transfer Switch Arrangement.

[Replace Figure 517.42(B)(2) below with "Figure 517.42(B)(2)" jpg file. Keep same title as above]



Supplemental Information

File Name	Description	Approved
Figure_517.42_B_1_.jpg	For editorial use	
Figure_517.42_B_2_.jpg	For editorial use	

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 08:25:42 EST 2024

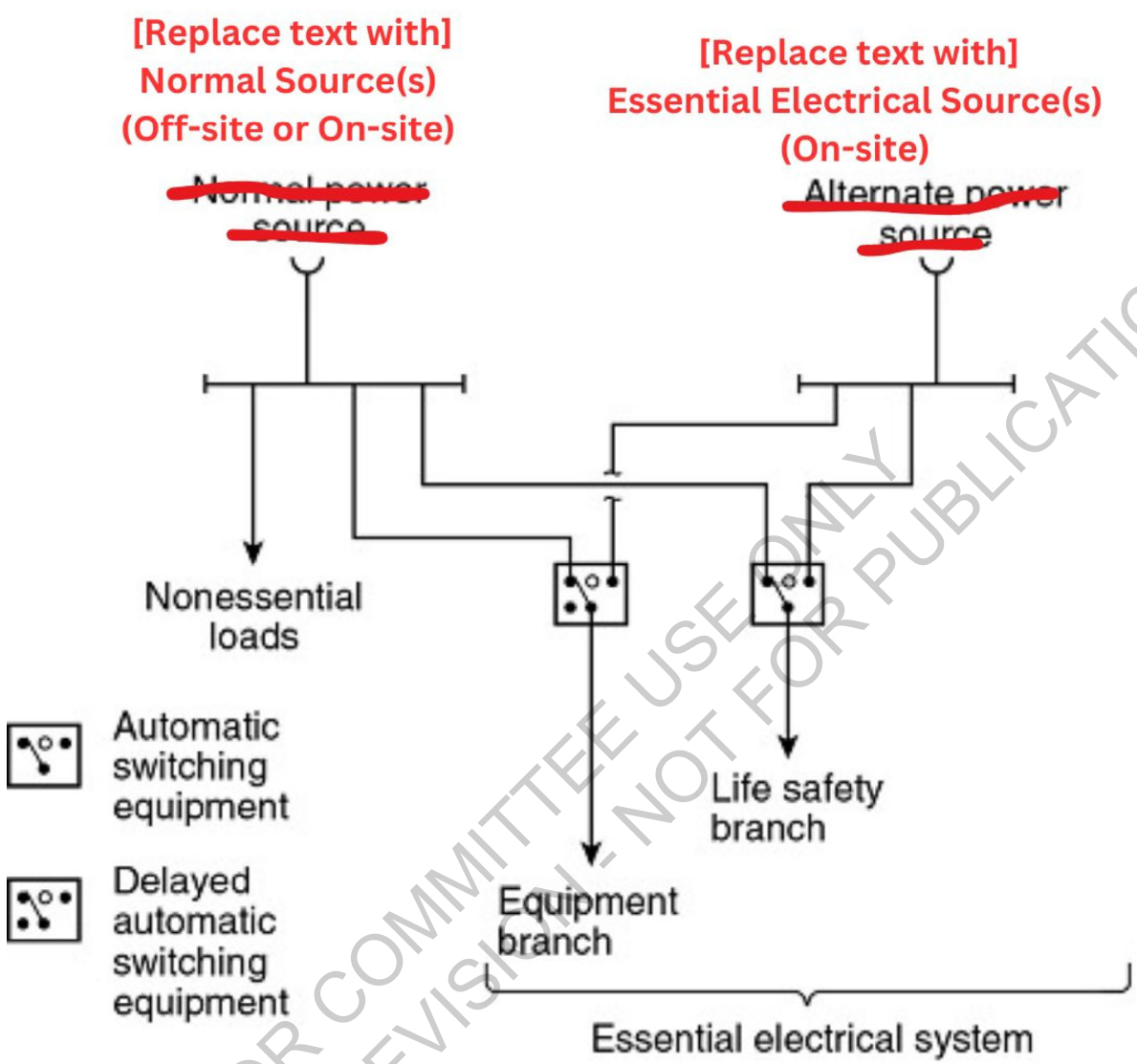
Committee Statement

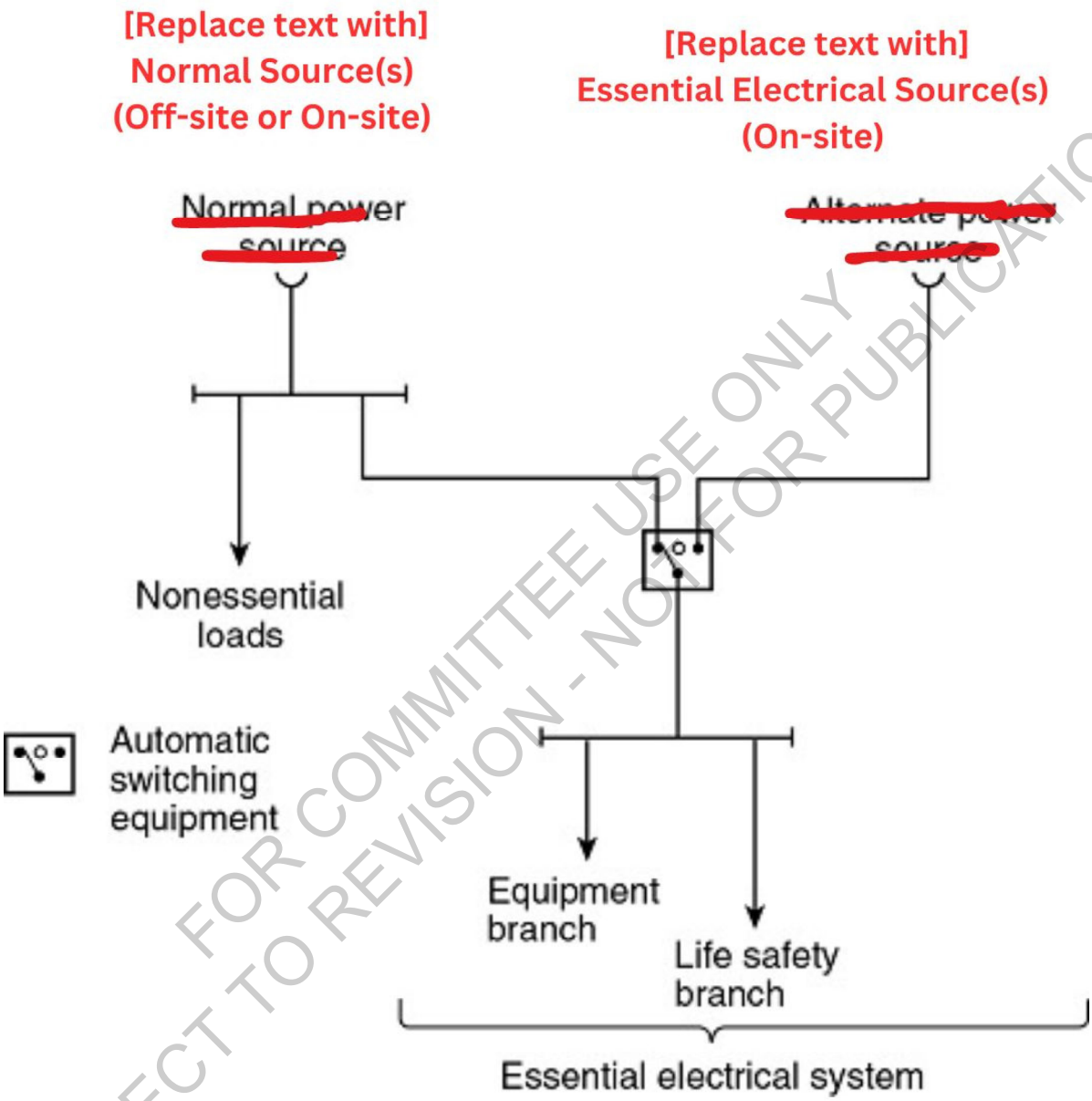
Committee Statement: The only time you can combine the loads on a single transfer switch on a type 2 system is if the total system load is 150 kVA or less on the EES. All other NFPA 99 extracts updated.

Response Message: FR-9046-NFPA 70-2024

Public Input No. 3600-NFPA 70-2023 [Section No. 517.42(B)]

Public Input No. 2110-NFPA 70-2023 [Section No. 517.42(B)]





First Revision No. 9048-NFPA 70-2024 [New Section after 517.42(E)]

[New 517.42(F) after existing 517.42(E)]

(F) Coordination.

Overcurrent protective devices serving the essential electrical system shall be coordinated for the period of time that a fault's duration extends beyond 0.1 second.

Exception No. 1: Coordination shall not be required between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exists on the transformer secondary.

Exception No. 2: Coordination shall not be required between overcurrent protective devices of the same size (ampere rating) in series.

Informational Note No. 1: The terms coordination and coordinated as used in this section do not cover the full range of overcurrent conditions.

Informational Note No. 2: See 517.17(C) for information on requirements for the coordination of ground-fault protection.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 08:31:01 EST 2024

Committee Statement

Committee Statement: Adds coordination requirements for Type 2 EES.
Response Message: FR-9048-NFPA 70-2024

Public Input No. 2155-NFPA 70-2023 [Section No. 517.42]

First Revision No. 9094-NFPA 70-2024 [Section No. 517.43]

517.43 Automatic Connection to Life Safety and Equipment Branch.

The life safety and equipment branches shall be installed and connected to the ~~alternate source of~~ on-site power specified in 517.41 so that all functions specified herein for the life safety and equipment branches are automatically restored to operation within 10 seconds after interruption of the normal source. [**99:**6.7.6.4.1]

No functions other than those listed in 517.43(A) through (G) shall be connected to the life safety branch. [**99:**6.7.6.2.1.5(D)]

The life safety branch shall supply power as follows:

(A) Illumination of Means of Egress.

Illumination of means of egress as is necessary for corridors, passageways, stairways, landings, and exit doors and all ways of approach to exits. Switching arrangement to transfer patient corridor lighting from general illumination circuits shall be permitted if only one of two circuits can be selected and both circuits cannot be extinguished at the same time.

Informational Note: See NFPA *101-~~2021~~* 2024 , *Life Safety Code*, Sections 7.8 and 7.9.

(B) Exit Signs.

Exit signs and exit directional signs.

Informational Note: See NFPA *101-~~2021~~* 2024 , *Life Safety Code*, Section 7.10 and NFPA 99-2024, *Health Care Facilities Code*, 6 .7.6.2.1.5(2).

(C) Alarm and Alerting Systems.

Alarm and alerting systems, including the following:

(1) Fire alarms

Informational Note No. 1: See ~~NFPA *101* -2021, *Life Safety Code* , Sections 9.6 and 18.3.4.~~ NFPA *99-202 4* , *Health Care Facilities Code*, 6.7.6.2.1.5(3)(a).

(2) Alarms required for systems used for the piping of nonflammable medical gases

Informational Note No. 2: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*, 6.7.5.1.2.5.

(D) Communications Systems.

Communications systems, where used for issuing instructions during emergency conditions. [**99:**6.7.~~5~~ 6 .2. 1.~~2.~~ 5(4~~(3~~)]

(E) Generator Set Location.

Task illumination and select receptacles at the generator set location and essential electrical system transfer switch locations.

(F) Elevators.

Elevator cab lighting, control, communications, and signal systems. [**99:**6.7.~~5~~ 6 .2. 1.~~2.4~~ 5 (~~5~~ 6)]

(G) AC Equipment for Nondelayed Automatic Connection.

Generator accessories, including, but not limited to, the transfer fuel pump, electrically operated louvers, and other generator accessories essential for generator operation shall be arranged for automatic connection to the alternate power source. [**99:**6.7.6.2.1.6(C)]

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 10:42:58 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language.

Response Message: FR-9094-NFPA 70-2024

Public Input No. 2993-NFPA 70-2023 [Section No. 517.43]

First Revision No. 9104-NFPA 70-2024 [Section No. 517.44]

517.44 Connection to Equipment Branch.

The equipment branch shall be installed and connected to the ~~alternate~~ on-site power source such that equipment described in 517.~~35~~ 44 (A)~~(6)~~ is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety ~~and critical~~ branches. [**99:**6.7.~~5~~ 6 .2. 1.~~4.2~~ 6 (A)]

The equipment branch arrangement shall also provide for the additional connection of equipment listed in 517.44(B).

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment branch shall be permitted.

(A) Delayed Automatic Connections to Equipment Branch.

The following equipment shall be permitted to be connected to the equipment branch and shall be arranged for delayed automatic connection to the ~~alternate~~ on-site power source:

(1) Task illumination and select receptacles in the following: [**99:**6.7.6.2.1.6(D)(1)]

(2) Patient care spaces [**99:** 6.7.6.2.1.6(D)(1)(a)]

(3) Medication preparation spaces

[**99:** 6.7.6.2.1.6(D)(1)(b)]

(4) Pharmacy dispensing space [**99:** 6.7.6.2.1.6(D)(1)(c)]

(5) Nurses' stations — unless adequately lighted by corridor luminaires [**99:** 6.7.6.2.1.6(D)(1)(d)]

(6) Supply, return, and exhaust ventilating systems for airborne infectious isolation rooms [**99:**6.7.6.2.1.6(D)(2)]

(7) Sump pumps and other equipment required to operate for the safety of major apparatus and associated control systems and alarms [**99:**6.7.6.2.1.6(D)(3)]

(8) Smoke control and stair pressurization systems [**99:**6.7.6.2.1.6(D)(4)]

(9) Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood [**99:**6.7.6.2.1.6(D)(5)]

(10) Nurse call systems [**99:**6.7.6.2.1.6(D)(6)]

(11) HVAC systems serving the EF, TER, and TR [99:6.7.6.2.1.6 (D)(7)]

(B) Delayed-Automatic or Manual Connection to the Equipment Branch.

The following equipment specified in 517.44(B)(1) through (B)(4) shall be permitted to be connected to the equipment branch and shall be arranged for either delayed-automatic or manual connection to the ~~alternate~~ on-site power source.

(1) Heating Equipment to Provide Heating for General Patient Rooms.

Heating of general patient rooms during disruption of the normal source shall not be required under any of the following conditions:

(1) The outside design temperature is higher than −6.7°C (20°F).

(2) The outside design temperature is lower than −6.7°C (20°F) and, where a selected room(s) is provided for the needs of all confined patients, then only such room(s) need be heated.

(3) The facility is served by a dual source of normal power as described in 517.30(C), Informational Note.

Informational Note: The outside design temperature is based on the 97.5 percent design values, as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013).

(2) Elevator Service.

In instances where interruptions of power would result in elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of passengers.

(3) Optional Connections to the Equipment Branch.

Additional illumination, receptacles, and equipment shall be permitted to be connected only to the equipment branch.

(4) Multiple Systems.

Where one switch serves multiple systems as permitted in 517.43, transfer for all loads shall be nondelayed automatic.

[**99:**6.7.6.2.1.6(E)]

Informational Note: See 517.43(G) for elevator cab lighting, control, and signal system requirements. [**99:**A.6.7.6.2.1.6(E)(2)]

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9104_517.44.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 11:03:06 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language.
Response Message: FR-9104-NFPA 70-2024

Public Input No. 2997-NFPA 70-2023 [Section No. 517.44]

517.44 Connection to Equipment Branch.
The equipment branch shall be installed and connected to the ~~alternate~~on-site power source such that equipment described in 517.~~35~~44(A~~)(6~~) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety ~~and critical~~ branches.
[**99:**6.7.~~5~~6.2.1.~~4.2~~6(A)]

The equipment branch arrangement shall also provide for the additional connection of equipment listed in 517.44(B).

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment branch shall be permitted.

(A) Delayed Automatic Connections to Equipment Branch.
The following equipment shall be permitted to be connected to the equipment branch and shall be arranged for delayed automatic connection to the ~~alternate~~on-site power source:

1. Task illumination and select receptacles in the following: [**99:**6.7.6.2.1.6(D)(1)]
    1. Patient care spaces [**99:**6.7.6.2.1.6(D)(1)(a)]
    2. Medication preparation spaces

        [**99:**6.7.6.2.1.6(D)(1)(b)]

    3. Pharmacy dispensing space [**99:**6.7.6.2.1.6(D)(1)(c)]
    4. Nurses' stations — unless adequately lighted by corridor luminaires [**99:**6.7.6.2.1.6(D)(1)(d)]
2. Supply, return, and exhaust ventilating systems for airborne infectious isolation rooms [**99:**6.7.6.2.1.6(D)(2)]
3. Sump pumps and other equipment required to operate for the safety of major apparatus and associated control systems and alarms [**99:**6.7.6.2.1.6(D)(3)]
4. Smoke control and stair pressurization systems [**99:**6.7.6.2.1.6(D)(4)]
5. Kitchen hood supply or exhaust systems, or both, if required to operate during a fire in or under the hood [**99:**6.7.6.2.1.6(D)(5)]
6. Nurse call systems [**99:**6.7.6.2.1.6(D)(6)]
7. HVAC systems serving the EF, TER, and TR [**99:**6.7.6.2.1.6(D)(7)]

(B) Delayed-Automatic or Manual Connection to the Equipment Branch.
The following equipment specified in 517.44(B)(1) through 517.44(B)(4) shall be permitted to be connected to the equipment branch and shall be arranged for either delayed-automatic or manual connection to the ~~alternate~~on-site power source.

(1) Heating Equipment to Provide Heating for General Patient Rooms.
Heating of general patient rooms during disruption of the normal source shall not be required under any of the following conditions:

1. The outside design temperature is higher than −6.7°C (20°F).

2. The outside design temperature is lower than −6.7°C (20°F) and, where a selected room(s) is provided for the needs of all confined patients, then only such room(s) need be heated.
3. The facility is served by a dual source of normal power as described in 517.30(C), Informational Note.

   Informational Note: The outside design temperature is based on the 97.5 percent design values, as shown in Chapter 24 of the ASHRAE *Handbook of Fundamentals* (2013).

(2) Elevator Service.
In instances where interruptions of power would result in elevators stopping between floors, throw-over facilities shall be provided to allow the temporary operation of any elevator for the release of passengers.

(3) Optional Connections to the Equipment Branch.
Additional illumination, receptacles, and equipment shall be permitted to be connected only to the equipment branch.

(4) Multiple Systems.
Where one switch serves multiple systems as permitted in 517.43, transfer for all loads shall be nondelayed automatic.
[**99:**6.7.6.2.1.6(E)]

Informational Note: See 517.43(G) for elevator cab lighting, control, and signal system requirements. [**99:**A.6.7.6.2.1.6(E)(2)]

First Revision No. 9053-NFPA 70-2024 [Section No. 517.45(A)]

(A) Essential Electrical Distribution.

If required by the governing body, the essential electrical distribution system for Category 3 patient care spaces shall be comprised of an ~~alternate~~ on-site power system capable of supplying a limited amount of lighting and power service for the orderly cessation of procedures during ~~a time normal electrical service is interrupted~~ an interruption of power .

Informational Note: See NFPA 99-~~2021~~ 2024 , *Health Care Facilities Code*.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 08:50:31 EST 2024

Committee Statement

Committee Statement: Updates NFPA 99 extract language, and removes reference to normal power.
Response Message: FR-9053-NFPA 70-2024

Public Input No. 3350-NFPA 70-2023 [Section No. 517.45(A)]
Public Input No. 3603-NFPA 70-2023 [Section No. 517.45(A)]

First Revision No. 9055-NFPA 70-2024 [Section No. 517.45(E)]

~~**(E)** Power Systems.~~

~~If required, alternate power sources acceptable to the governing body shall comply with the requirements of NFPA 99-2021, *Health Care Facilities Code* .~~

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 08:57:33 EST 2024

Committee Statement

Committee Statement: There are no requirements in NFPA 99 for power systems. This section would cause confusion to the reader and, per the NEC Style Manual, you cannot reference another code in the mandatory text.

Response Message: FR-9055-NFPA 70-2024

Public Input No. 3014-NFPA 70-2023 [Section No. 517.45(E)]

First Revision No. 9222-NFPA 70-2024 [Section No. 517.60]

517.60 Anesthetizing Location Classification.

Anesthetizing location classifications shall comply with 517.60.

Informational Note: See 517.20 if either of the anesthetizing locations in 517.60(A) or 517.60(B) is designated a wet procedure location.

(A) Hazardous (Classified) Location.

(1) Use Location.

In a location where flammable anesthetics are employed, the entire area shall be considered to be a Class I, Division 1 location that extends upward to a level 1.52 m (5 ft) above the floor.

Informational Note: The remaining volume up to the structural ceiling is considered to be above a hazardous (classified) location.

(2) Storage Location.

Any room or location in which flammable anesthetics or volatile flammable disinfecting agents are stored shall be considered to be a Class I, Division 1 location from floor to ceiling.

(B) Unclassified Location.

Any inhalation anesthetizing location designated for the exclusive use of nonflammable anesthetizing agents shall be considered to be an unclassified location.

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9222_517.60.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 09:55:59 EST 2024

Committee Statement

Committee Statement: Revision made to comply with the NEC Styl Manual.
Response Message: FR-9222-NFPA 70-2024

517.60 Anesthetizing Location Classification.
Anesthetizing location classifications shall comply with 517.60.

Informational Note: See 517.20 if either of the anesthetizing locations in 517.60(A) or 517.60(B) is designated a wet procedure location.

(A) Hazardous (Classified) Location.

(1) Use Location.
In a location where flammable anesthetics are employed, the entire area shall be considered to be a Class I, Division 1 location that extends upward to a level 1.52 m (5 ft) above the floor. ~~The remaining volume up to the structural ceiling is considered to be above a hazardous (classified) location.~~

Informational Note: The remaining volume up to the structural ceiling is considered to be above a hazardous (classified) location.

(2) Storage Location.
Any room or location in which flammable anesthetics or volatile flammable disinfecting agents are stored shall be considered to be a Class I, Division 1 location from floor to ceiling.

(B) Unclassified Location.
Any inhalation anesthetizing location designated for the exclusive use of nonflammable anesthetizing agents shall be considered to be an unclassified location.

First Revision No. 9223-NFPA 70-2024 [Section No. 517.64(B)]

(B) Power Supplies.

Power shall be supplied to low-voltage equipment from one of the following:

(1) An individual portable isolating transformer ~~(autotransformers shall not be used)~~ connected to an isolated power circuit receptacle by means of an appropriate cord and attachment plug

(2) A common low-voltage isolating transformer installed in an unclassified location

(3) Individual dry-cell batteries

(4) Common batteries made up of storage cells located in an unclassified location

Autotransformers shall not be permitted.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Fri Jan 26 10:01:42 EST 2024

Committee Statement

Committee Statement: The revision was made because a requirement cannot be embedded in a requirement. This meets the NEC Style Manual.

Response Message: FR-9223-NFPA 70-2024

First Revision No. 9056-NFPA 70-2024 [Section No. 517.70]

517.70 Applicability.

~~Nothing in this part shall be construed as specifying safeguards against possible radiation or magnetic fields~~ Diagnostic imaging and treatment equipment shall be installed per Part V of this article .

Informational Note No. 1: Radiation safety and performance requirements of several classes of X-ray equipment are regulated under Public Law 90-602 and are enforced by the Department of Health and Human Services.

Informational Note No. 2: Information on radiation protection by the National Council on Radiation Protection and Measurements is published as *Reports of the National Council on Radiation Protection and Measurement*.~~ These reports are obtainable from NCRP Publications, P.O. Box 30175, Washington, DC 20014.~~

Informational Note No. 3: Examples of diagnostic imaging equipment can include, but are not limited to, the following:

(1) General radiographic (X-ray) equipment (mobile and fixed)
(2) General fluoroscopic equipment (mobile and fixed)
(3) Interventional equipment (mobile and fixed)
(4) Bone mineral density equipment
(5) Dental equipment
(6) Computerized tomography (CT) equipment
(7) Positron emission tomography (PET) equipment
(8) Nuclear medicine equipment
(9) Mammography equipment
(10) Magnetic resonance (MR) equipment
(11) Diagnostic ultrasound equipment
(12) Electrocardiogram equipment

Informational Note No. 4: Examples of treatment equipment can include, but are not limited to, the following:

(1) Linear accelerators
(2) Gamma knife
(3) Cyber knife
(4) Proton therapy
(5) Tomotherapy

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 09:00:21 EST 2024

Committee Statement

Committee Statement:	More clearly identifies applicability of this section. This adds a charging statement to the section and now complies with NEC Manual of Style.
Response Message:	FR-9056-NFPA 70-2024

Public Input No. 1273-NFPA 70-2023 [Section No. 517.70]

First Revision No. 9287-NFPA 70-2024 [Section No. 517.71(C)]

(C) Over 1000-~~Volt~~ Volts ac, 1500 Volts dc, Supply.

Circuits and equipment operated on a supply circuit of over ~~1000 volts~~ 1000 Volts ac, 1500 Volts dc, shall comply with Article 495, Parts I through IV- ~~of Article 495~~ .

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Feb 02 15:51:01 EST 2024

Committee Statement

Committee Statement: Revisions made to meet NEC MOS. 1500 Volts dc was added to include the same voltage demarcation used in many places throughout the code.
Response Message: FR-9287-NFPA 70-2024

Public Input No. 2750-NFPA 70-2023 [Section No. 517.71(C)]

First Revision No. 8859-NFPA 70-2024 [Section No. 517.74(B)]

(B) Minimum Size of Conductors.

Size 18 AWG or 16 AWG fixture wires in accordance with 724.49 and flexible cords shall be permitted for the control and operating circuits of diagnostic imaging and treatment equipment and auxiliary equipment where protected by not larger than 20-ampere overcurrent protective devices.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 09:14:28 EST 2024

Committee Statement

Committee Statement: "Overcurrent devices" was revised to read "overcurrent protective devices" to make terminology consistent with the NEC. This action is part of Global PI 4050.
Response Message: FR-8859-NFPA 70-2024

First Revision No. 9059-NFPA 70-2024 [Section No. 517.76]

517.76 Transformers and Capacitors.

Transformers and capacitors that are part of diagnostic imaging and treatment equipment shall not be required to comply with Articles 450, Parts I and II ~~of Articles 450~~ and Article 460, Parts I and II .

Capacitors shall be mounted within enclosures of insulating material or grounded metal.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 09:07:00 EST 2024

Committee Statement

Committee Statement: Changes made to meet NEC Style Manual.
Response Message: FR-9059-NFPA 70-2024

Public Input No. 2751-NFPA 70-2023 [Section No. 517.76]

First Revision No. 9062-NFPA 70-2024 [Section No. 517.78(C)]

(C) Non–Current-Carrying Metal Parts.

Non–current-carrying metal parts of diagnostic imaging and treatment equipment (e.g., controls, tables, transformer tanks, shielded cables) shall be connected to an equipment grounding conductor in accordance with ~~Part VII of~~ Article 250, Part VII as modified by 517.13(A) and (B).

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 09:11:05 EST 2024

Committee Statement

Committee Statement: Changes made to meet NEC Style Manual.
Response Message: FR-9062-NFPA 70-2024

Public Input No. 2752-NFPA 70-2023 [Section No. 517.78(C)]

First Revision No. 9114-NFPA 70-2024 [Section No. 517.80]

517.80 Patient Care Spaces.

Equivalent insulation and isolation to that required for the electrical distribution systems in patient care areas shall be provided for communications, signaling systems, data system circuits, fire alarm systems, and systems less than 120 volts, nominal.

Class 2 and Class 3 signaling and communications systems, Class 2 circuits that transmit power and data to a powered device, and power-limited fire alarm systems shall not be required to comply with the grounding requirements of 517.13, to comply with the mechanical protection requirements of 517.31(C)(3)(5), or to be enclosed in raceways, unless otherwise specified by Chapters 7 or 8 or except as noted for critical and life safety branch powered circuits .

Class 2 lighting circuit cabling fed from critical or life safety branch power shall comply with the mechanical protection requirements of this article.

Exception No. 1: Mechanical protection requirements shall not apply to wiring that does not exceed 6 feet in length and that terminates at a critical or life safety luminaire or an emergency lighting control device.

Exception No. 2: Mechanical protection requirements shall not apply to locked rooms or locked enclosures that are accessible only to qualified persons.

Informational Note: Locked rooms accessible only to qualified persons include locked telecommunications rooms, locked electrical equipment rooms, or other access-controlled areas .

Secondary circuits of transformer-powered communications or signaling systems shall not be required to be enclosed in raceways unless otherwise specified by Chapters 7 or 8. [**99:**6.7.2.2.7]

Informational Note: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems*, for information on installation of cables for PoE lighting systems.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 11:14:48 EST 2024

Committee Statement

Committee Statement: Includes protection requirements for POE circuits that are being served from the life safety or critical branches to have the same protection as other circuits of the life safety and critical branch. The extract tag to NFPA 99 6.7.5.2.2 was removed as the text in this section is no longer an extract.

Response Message: FR-9114-NFPA 70-2024

Public Input No. 977-NFPA 70-2023 [Section No. 517.80]

First Revision No. 8860-NFPA 70-2024 [Sections 517.160(A)(2), 517.160(A)(3)]

Sections 517.160(A)(2), 517.160(A)(3)

(2) Circuit Characteristics.

Circuits supplying primaries of isolating transformers shall operate at not more than 600 volts between conductors and shall be provided with proper overcurrent protection. The secondary voltage of such transformers shall not exceed 600 volts between conductors of each circuit. All circuits supplied from such secondaries shall be ungrounded and shall have an approved overcurrent protective device of proper ratings in each conductor. Circuits supplied directly from batteries or from motor generator sets shall be ungrounded and shall be protected against overcurrent in the same manner as transformer-fed secondary circuits. If an electrostatic shield is present, it shall be connected to the reference grounding point.

(3) Equipment Location.

The isolating transformers, motor generator sets, batteries and battery chargers, and associated primary or secondary overcurrent protective devices shall not be installed in hazardous (classified) locations. The isolated secondary circuit wiring extending into a hazardous anesthetizing location shall be installed in accordance with 501.10.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Wed Jan 24 09:20:15 EST 2024

Committee Statement

Committee Statement: "Overcurrent devices" was revised to read "overcurrent protective devices" to make terminology consistent with the NEC. This action is part of Global PI 4050.
Response Message: FR-8860-NFPA 70-2024

First Revision No. 9224-NFPA 70-2024 [Section No. 517.160(A)(4)]

(4) Isolation Transformers.

An isolation transformer shall not serve more than one operating room except as covered in 517.160(A)(4)(a) and (A)(4)(b).

Informational Note: For purposes of this section, anesthetic induction rooms are considered part of the operating room or rooms served by the induction rooms.

(a) *Induction Rooms.* Where an induction room serves more than one operating room, the isolated circuits of the induction room shall be permitted to be supplied from the isolation transformer of any one of the operating rooms served by that induction room.

(b) *Higher Voltages.* Isolation transformers shall be permitted to serve single receptacles in several patient areas where the following apply:

(3) The receptacles are reserved for supplying power to equipment requiring 150 volts or higher, such as portable X-ray units.

(4) The receptacles and mating plugs are not interchangeable with the receptacles on the local isolated power system.

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9224_517.160_A_4_.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 10:03:40 EST 2024

Committee Statement

Committee Statement: Made into an informational note to comply with NEC Style Manual.
Response Message: FR-9224-NFPA 70-2024

(4) Isolation Transformers.
An isolation transformer shall not serve more than one operating room except as covered in 517.160(A)(4)(a) and (A)(4)(b).

Informational Note: For purposes of this section, anesthetic induction rooms are considered part of the operating room or rooms served by the induction rooms.

~~For purposes of this section, anesthetic induction rooms are considered part of the operating room or rooms served by the induction rooms.~~

1. *Induction Rooms.* Where an induction room serves more than one operating room, the isolated circuits of the induction room shall be permitted to be supplied from the isolation transformer of any one of the operating rooms served by that induction room.
2. *Higher Voltages.* Isolation transformers shall be permitted to serve single receptacles in several patient areas where the following apply:
    1. The receptacles are reserved for supplying power to equipment requiring 150 volts or higher, such as portable X-ray units.
    2. The receptacles and mating plugs are not interchangeable with the receptacles on the local isolated power system.

First Revision No. 9109-NFPA 70-2024 [Section No. 517.160(B)]

(B) Line Isolation Monitor.

The line isolation monitor (LIM) circuit shall be tested after installation and prior to being placed in service.

Informational Note: See NFPA 99-2024, *Health Care Facilities Code*, Section 6.3.3.3.2.

(1) Characteristics.

In addition to the usual control and overcurrent protective devices, each isolated power system shall be provided with a listed continually operating line isolation monitor that indicates total hazard current. The monitor shall be designed such that a green signal lamp, conspicuously visible to persons in each area served by the isolated power system, remains lighted when the system is adequately isolated from ground. An adjacent red signal lamp and an audible warning signal (remote if desired) shall be energized when the total hazard current (consisting of possible resistive and capacitive leakage currents) from either isolated conductor to ground reaches a threshold value of 5 mA under nominal line voltage conditions. The line monitor shall not alarm for a fault hazard of less than 3.7 mA or for a total hazard current of less than 5 mA.

Exception: A system shall be permitted to be designed to operate at a lower threshold value of total hazard current. A line isolation monitor for such a system shall be permitted to be approved, with the provision that the fault hazard current shall be permitted to be reduced but not to less than 35 percent of the corresponding threshold value of the total hazard current, and the monitor hazard current is to be correspondingly reduced to not more than 50 percent of the alarm threshold value of the total hazard current.

(2) Impedance.

The line isolation monitor shall be designed to have sufficient internal impedance such that, when properly connected to the isolated system, the maximum internal current that can flow through the line isolation monitor, when any point of the isolated system is grounded, shall be 1 mA.

Exception: The line isolation monitor shall be permitted to be of the low-impedance type such that the current through the line isolation monitor, when any point of the isolated system is grounded, will not exceed twice the alarm threshold value for a period not exceeding 5 milliseconds.

Informational Note: Reduction of the monitor hazard current, provided this reduction results in an increased “not alarm” threshold value for the fault hazard current, will increase circuit capacity.

(3) Ammeter.

An ammeter calibrated in the total hazard current of the system (contribution of the fault hazard current plus monitor hazard current) shall be mounted in a plainly visible place on the line isolation monitor with the “alarm on” zone at approximately the center of the scale.

Exception: The line isolation monitor shall be permitted to be a composite unit, with a sensing section cabled to a separate display panel section on which the alarm or test functions are located.

Informational Note: It is desirable to locate the ammeter so that it is conspicuously visible to persons in the anesthetizing location.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 11:10:07 EST 2024

Committee Statement

Committee Statement: Adds reference to the requirement for initial testing found within NFPA 99.
Response Message: FR-9109-NFPA 70-2024

Public Input No. 2516-NFPA 70-2023 [Section No. 517.160(B)]

First Revision No. 9138-NFPA 70-2024 [Section No. 518.2(B)]

(B) Multiple Occupancies.

Where an assembly occupancy forms a portion of a building containing other occupancies, ~~Article 518 applies~~ this article applies only to that portion of the building considered an assembly occupancy. Occupancy of any room or space for assembly purposes by less than 100 persons in a building of other occupancy, and incidental to such other occupancy, shall be classified as part of the other occupancy.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 13:41:15 EST 2024

Committee Statement

Committee Statement: The panel corrected the reference to "Article 518" in order to comply with section 4.1.4 of the NEC Style Manual.
Response Message: FR-9138-NFPA 70-2024

Public Input No. 999-NFPA 70-2023 [Section No. 518.2(B)]

First Revision No. 9139-NFPA 70-2024 [Section No. 518.3]

518.~~3~~ 5 Temporary Wiring.

(A) General.

In exhibition halls used for display booths, as in trade shows, the temporary wiring shall be permitted to be installed in accordance with ~~Article~~ 590.4. Flexible cables and cords approved for hard or extra-hard usage shall be permitted to be laid on floors where protected from contact by the general public. ~~The ground-fault circuit-interrupter requirements of 590.6 shall not apply. All other ground-fault circuit-interrupter requirements of this *Code* shall apply.~~

(B) GFCI Protection.

Where ground-fault circuit-interrupter protection for personnel is cord-and-plug-connected to the branch circuit or to the feeder, the ground-fault circuit-interrupter protection shall be listed as portable ground-fault circuit-interrupter protection or provide a level of protection equivalent to a portable ground-fault circuit interrupter, whether assembled in the field or at the factory. The ground-fault circuit-interrupter requirements of 590.6 shall not apply. All other ground-fault circuit-interrupter requirements of this *Code* shall apply.

Exception: Where conditions of supervision and maintenance ensure that only qualified persons will service the installation, flexible cords or cables identified in Table 400.4 for hard usage or extra-hard usage shall be permitted in cable trays used only for temporary wiring. All cords or cables shall be installed in a single layer. A permanent sign shall be attached to the cable tray at intervals not to exceed 7.5 m (25 ft) and read as follows:

CABLE TRAY FOR TEMPORARY WIRING ONLY

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9139_518.3.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 13:49:51 EST 2024

Committee Statement

Committee Statement: For clarity and compliance with the NEC Style Manual section 3.5.1.2, the panel created separate sections for 518.3. Section 518.3 was renumbered to 518.5 to comply with the manual of style. “Article 590” was revised to “590.4” to comply with 2023 NEC Style Manual 4.1.4.

Response Message: FR-9139-NFPA 70-2024

Public Input No. 4184-NFPA 70-2023 [Section No. 518.3]

518.3 Temporary Wiring. [Move text to (A) and (B)] [Move to 518.5]

~~In exhibition halls used for display booths, as in trade shows, the temporary wiring shall be permitted to be installed in accordance with Article 590. Flexible cables and cords approved for hard or extra-hard usage shall be permitted to be laid on floors where protected from contact by the general public. The ground-fault circuit-interrupter requirements of 590.6 shall not apply. All other ground-fault circuit-interrupter requirements of this *Code* shall apply.~~

~~Where ground-fault circuit-interrupter protection for personnel is cord-and-plug-connected to the branch circuit or to the feeder, the ground-fault circuit-interrupter protection shall be listed as portable ground-fault circuit-interrupter protection or provide a level of protection equivalent to a portable ground-fault circuit interrupter, whether assembled in the field or at the factory.~~

~~*Exception: Where conditions of supervision and maintenance ensure that only qualified persons will service the installation, flexible cords or cables identified in Table 400.4 for hard usage or extra-hard usage shall be permitted in cable trays used only for temporary wiring. All cords or cables shall be installed in a single layer. A permanent sign shall be attached to the cable tray at intervals not to exceed 7.5 m (25 ft) and read as follows:*~~

~~*CABLE TRAY FOR TEMPORARY WIRING ONLY*~~

(A) General.

In exhibition halls used for display booths, as in trade shows, the temporary wiring shall be permitted to be installed in accordance with Article 590. Flexible cables and cords approved for hard or extra-hard usage shall be permitted to be laid on floors where protected from contact by the general public.

(B) GFCI Protection.

Where ground-fault circuit-interrupter protection for personnel is cord-and-plug-connected to the branch circuit or to the feeder, the ground-fault circuit-interrupter protection shall be listed as portable ground-fault circuit-interrupter protection or provide a level of protection equivalent to a portable ground-fault circuit interrupter, whether assembled in the field or at the factory. The ground-fault circuit-interrupter requirements of 590.6 shall not apply. All other ground-fault circuit-interrupter requirements of this *Code* shall apply.

Exception: Where conditions of supervision and maintenance ensure that only qualified persons will service the installation, flexible cords or cables identified in Table 400.4 for hard usage or extra-hard usage shall be permitted in cable trays used only for temporary wiring. All cords or cables shall be installed in a single layer. A permanent sign shall be attached to the cable tray at intervals not to exceed 7.5 m (25 ft) and read as follows:

CABLE TRAY FOR TEMPORARY WIRING ONLY

First Revision No. 9141-NFPA 70-2024 [Section No. 518.4(A)]

(A) General.

The wiring method shall ~~qualify as an equipment grounding conductor in accordance with 250.118 or shall contain an equipment grounding conductor sized in accordance with Table 250.122 , and shall~~ be any of the following:

(1) Metal raceways

(2) Flexible metal raceways

(3) Nonmetallic raceways encased in not less than 50 mm (2 in.) of concrete

(4) Type MI cable , Type MC cable , or Type AC cable containing an insulated equipment grounding conductor sized in accordance with Table 250.122

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:05:14 EST 2024

Committee Statement

Committee Statement: To simplify the language of 518.4(A) regarding equipment grounding conductor, 518.4(A) was modified to be in alignment with 520.5(A) and 530.5(A) for consistency.

Response Message: FR-9141-NFPA 70-2024

Public Input No. 1272-NFPA 70-2023 [Section No. 518.4(A)]

Public Input No. 2398-NFPA 70-2023 [Section No. 518.4(A)]

Public Input No. 642-NFPA 70-2023 [Section No. 518.4(A)]

First Revision No. 9144-NFPA 70-2024 [Section No. 518.4(B)]

(B) Communications, Signaling Systems, Data Systems, and Fire Alarm Systems~~, and Systems Less Than 120 Volts, Nominal~~ .

Fixed wiring methods for specific installations shall be as follows:

(1) Audio signal processing, amplification, and reproduction equipment — 640.9

(2) Communications systems — ~~Part IV of~~ Article 805, Part IV and ~~Part VI of~~ Article 840, Part VI

(3) Class 2 and Class 3 remote control and signaling circuits — Article 725, ~~Part III~~ Part II

(4) Class 2 circuits that transmit power, data, or both to a powered device

Informational Note: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems*, for information on installation of cables for PoE lighting systems. See Part III of Article 760 for information on fire alarm circuits.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:18:53 EST 2024

Committee Statement

Committee Statement: The Panel modified references to Articles and Parts to comply with the NEC Style Manual. The panel removed the reference in the title of 518(4)(B) to “Systems Less than 120V, Nominal because the list of wiring methods does not include any specific to systems less than 120 volts nominal. Further, the title can cause confusion as it may appear that the wiring methods listed can be used with higher voltages than the referenced requirements actually allow. This phrase in the title appears to be obsolete and originally came from Article 517, but serves no useful purpose here and should be deleted.

Response Message: FR-9144-NFPA 70-2024

Public Input No. 2753-NFPA 70-2023 [Section No. 518.4(B)]

Public Input No. 4299-NFPA 70-2023 [Section No. 518.4(B)]

First Revision No. 9248-NFPA 70-2024 [Section No. 518.4(D)]

(D) Spaces with Finish Rating.

Electrical nonmetallic tubing and rigid nonmetallic conduit shall be permitted to be installed in club rooms, conference and meeting rooms in hotels or motels, courtrooms, dining facilities, restaurants, mortuary chapels, museums, libraries, and places of religious worship where the following apply:

(1) The tubing or conduit is installed concealed within walls, floors, and ceilings where the walls, floors, and ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

(2) The tubing or conduit is installed above suspended ceilings where the suspended ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

Electrical nonmetallic tubing and rigid nonmetallic conduit ~~are not recognized for use~~ shall not be permitted in other ~~space~~ spaces used for environmental air ~~in accordance with~~ as otherwise allowed by 300.22(C).

Informational Note: A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 121°C (250°F) or an individual temperature rise of 163°C (325°F) as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 11:46:08 EST 2024

Committee Statement

Committee Statement: Revision made to comply with the NEC Style Manual.
Response Message: FR-9248-NFPA 70-2024

First Revision No. 9145-NFPA 70-2024 [Section No. 518.5(A)]

(A) Power Outlets and Commercial Appliance Outlet Centers.

(1) Overcurrent Protection.

Power outlets and commercial appliance outlet centers shall provide overcurrent protection or shall be protected by overcurrent devices.

(2) Accessibility.

Overcurrent devices, power outlets, and commercial appliance outlet centers shall not be accessible to the general public.

(3) Equipment Grounding Conductor Connections.

Connecting means for an equipment grounding conductor shall be provided.

(4) Markings.

Power outlets and commercial appliance outlet centers shall be marked as follows:

FOR USE BY QUALIFIED PERSONS ONLY. RISK OF ELECTRIC SHOCK.

Disconnect all power before servicing. Disconnecting means location:

(5) Panelboard Orientation.

A panelboard installed in a listed commercial appliance outlet center designed for in-floor mounting shall be permitted to be ~~orientated~~ oriented in the face-up position, if such orientation is part of the listing, and 408.43 shall not apply.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:28:02 EST 2024

Committee Statement

Committee Statement: While "orientated" and "oriented" have the same meaning, in common usage, "oriented" is preferred. Orientated is not commonly used in the United States. The NEC Style Manual is silent on these two words, but for clarity and commonly preferred usage, the Panel changed this word in this section to "oriented".

Response Message: FR-9145-NFPA 70-2024

Public Input No. 189-NFPA 70-2023 [Section No. 518.5(A)(5)]

First Revision No. 9146-NFPA 70-2024 [Section No. 518.6]

518.6 Illumination.

Illumination shall be provided for all working spaces about fixed service equipment, switchboards, switchgear, enclosed panelboards, or motor control centers installed outdoors that serve assembly occupancies. Control by automatic means only shall not be permitted. Additional lighting outlets shall not be required where the workspace is illuminated by an adjacent light source.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:30:16 EST 2024

Committee Statement

Committee Statement: The terms “panelboard” and “enclosed panelboard” are defined terms. Adding the term “enclosed panelboard” makes the text technically correct. Note: The term “Enclosed Panelboard” was added to Article 100 during the 2023 Code cycle.

Response Message: FR-9146-NFPA 70-2024

Public Input No. 2075-NFPA 70-2023 [Section No. 518.6]

First Revision No. 9149-NFPA 70-2024 [New Section after 520.1]

520.2 Listing Requirements.

The following equipment shall be listed:

(1) Fixed Stage Switchboards

(2) Curtain Machines

(3) Portable Stage Switchboards

(4) Single-poleportable cable connectors

(5) Arc lamps and associated ballasts

(6) Portable power distribution units

(7) Trunk cables, breakout assemblies and multicircuit enclosures

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:47:55 EST 2024

Committee Statement

Committee Statement: A new section is added to comply with the NEC Style Manual Section 2.2.1 regarding Listing Requirements.

Response Message: FR-9149-NFPA 70-2024

Public Input No. 3747-NFPA 70-2023 [New Section after 520.1]

First Revision No. 9159-NFPA 70-2024 [Section No. 520.5(B)]

(B) Communications, Signaling Systems, Data Systems, and Fire Alarm Systems~~, and Systems Less Than 120 Volts, Nominal~~ .

Fixed wiring methods for specific installations shall be as follows:

(1) Audio signal processing, amplification, and reproduction equipment — 640.9

(2) Communications systems — Article 800, Parts I and IV- ~~of~~ ; Article ~~800~~ 805 , Part IV- ~~of~~ ; and Article ~~805~~ 840 , ~~and~~ Part VI- ~~of Article 840~~

(3) Class 2 and Class 3 remote control and signaling circuits — ~~Part III of~~ Article 725, Part II

(4) Class 2 circuits that transmit power, data, or both to a powered device

Informational Note: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems*, for information on installation of cables for PoE lighting systems. See ~~Part III of~~ Article 760, Part III for information on fire alarm circuits.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 15:06:16 EST 2024

Committee Statement

Committee Statement: The Panel corrected references to Articles and Parts to comply with section 4.1.4 of the NEC Style Manual. Also, the panel corrected the reference to Article 725 Part III to Part II in 520.5(B)(3). This section included ", and Systems Less Than 120 Volts, Nominal" in the title, yet the list of wiring methods do not include any specific to systems less than 120 volts nominal. Further, the title can cause confusion as it may appear that the wiring methods listed can be used with higher voltages than the referenced requirements actually allow. This phrase in the title appears to be obsolete, and came from 517, but serves no useful purpose here and should be deleted.

Response Message: FR-9159-NFPA 70-2024

Public Input No. 2754-NFPA 70-2023 [Section No. 520.5(B)]

Public Input No. 4301-NFPA 70-2023 [Section No. 520.5(B)]

First Revision No. 9161-NFPA 70-2024 [Section No. 520.5(C)]

(C) Portable Equipment.

The wiring for portable switchboards, stage set lighting, stage effects, and other wiring not fixed as to location shall be permitted with approved flexible cords and cables as provided elsewhere in ~~Article 520~~ this article . Fastening such cables and cords by uninsulated staples or nailing shall not be permitted.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 15:13:12 EST 2024

Committee Statement

Committee Statement: The panel corrected the reference to Article 520 to comply with section 4.1.4 of the NEC Style Guide.
Response Message: FR-9161-NFPA 70-2024

Public Input No. 1000-NFPA 70-2023 [Section No. 520.5(C)]

Public Input No. 1034-NFPA 70-2023 [Section No. 520.5(C)]

First Revision No. 9152-NFPA 70-2024 [Section No. 520.10]

520.10 Portable Equipment Used Outdoors.

Portable stage and studio lighting equipment and portable power distribution equipment not identified for outdoor use shall be permitted ~~for temporary use~~ to be deployed outdoors if the equipment is supervised by qualified personnel while energized and barriered from the general public.

Informational Note No. 1 : See ANSI/ESTA E1.58-2017, *Electrical Safety Standard for Portable Stage and Studio Equipment Used Outdoors*, for information on the use of portable stage and studio lighting equipment outdoors.

Informational Note No. 2: See ANSI/ESTA E1.19-2021, *Recommended Practice for the use of Class A Ground-Fault Circuit Interrupters (GFCIs) intended for personnel protection in the Entertainment Industry* , for guidance on the use of GFCIs in wet locations.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 14:56:24 EST 2024

Committee Statement

Committee Statement: Using the word “temporary” in this section may be improperly interpreted as being covered by Article 590 – Temporary Installations. Portable equipment is not permanently installed in venues covered by the “Entertainment Industry” Articles 518, 520, 525, and 530. Use of the words “deploy” / “deployed” is more descriptive of the portable equipment use and prevents misinterpretation. In addition, Informational Note 2 was added to provide a pointer to ANSI/ESTA E1.19 for guidance on GFCI use in wet locations.

Response Message: FR-9152-NFPA 70-2024

Public Input No. 2212-NFPA 70-2023 [Section No. 520.10]

First Revision No. 9278-NFPA 70-2024 [Section No. 520.26]

520.26 Type of Switchboard.

A stage switchboard shall ~~be either~~ comply with one or a combination of the ~~types specified in 520.26(A) , (B), (C), and (D).~~

~~**(A)** Manual.~~

~~Dimmers and switches are~~

following:

~~Devices are~~

(1) Manual dimmers and switches operated by handles mechanically linked to the control devices.

~~**(B)** Remotely Controlled.~~

(1) Remotely controlled devices operated electrically from a pilot-type control console or panel.

~~Pilot control panels either shall be part of the switchboard or shall be permitted to be at another location.~~

(1)

~~(C)~~

(1) Intermediate

~~A~~

(1) stage switchboard with circuit interconnections

~~is~~

(1) (a secondary switchboard (patch panel)) or panelboard remote to the primary stage switchboard.

(2) Constant Power stage switchboard containing only overcurrent protective devices and no control elements.

Pilot control panels either shall be part of the switchboard or shall be permitted to be at another location.

It shall contain overcurrent protection. Where the required branch-circuit overcurrent protection is provided in the dimmer panel, it shall be permitted to be omitted from the intermediate switchboard.

~~**(D)** Constant Power.~~

~~A stage switchboard containing only overcurrent protective devices and no control elements.~~

Supplemental Information

File Name	Description	Approved
FR_9278_520.26.docx		
FR_9278_520.26.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Tue Jan 30 11:44:07 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with the NEC Style Manual.
Response Message: FR-9278-NFPA 70-2024

520.26 Type of Switchboard.

A stage switchboard shall ~~be either~~ comply with one or a combination of the ~~the types specified in~~ following: ~~**520.26(A)**, (B), (C), and (D).~~1 - 4

(~~A~~1)

Manual dimmers and switches ~~are~~ operated by handles mechanically linked to the control devices.

(~~B~~2)

Remotely controlled devices ~~are~~ operated electrically from a pilot-type control console or panel. ~~Pilot control panels either shall be part of the switchboard or shall be permitted to be at another location.~~

(~~C~~3)

Intermediate stage switchboard with circuit interconnections (~~is~~ a secondary switchboard (patch panel)) or panelboard remote to the primary stage switchboard. ~~It shall contain overcurrent protection. Where the required branch-circuit overcurrent protection is provided in the dimmer panel, it shall be permitted to be omitted from the intermediate switchboard.~~

(~~D~~4)

Constant power stage switchboard containing only overcurrent protective devices and no control elements.

Pilot control panels either shall be part of the switchboard or shall be permitted to be at another location.

It shall contain overcurrent protection. Where the required branch-circuit overcurrent protection is provided in the dimmer panel, it shall be permitted to be omitted from the intermediate switchboard.

First Revision No. 9279-NFPA 70-2024 [Section No. 520.27(A)(1)]

(1) Single Feeder.

A single feeder shall be disconnected by a single disconnect device.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Tue Jan 30 12:23:05 EST 2024

Committee Statement

Committee Statement: Revision made to comply with the NEC Style Manual.
Response Message: FR-9279-NFPA 70-2024

First Revision No. 9154-NFPA 70-2024 [Section No. 520.41(B)]

(B) Circuits Rated Greater Than 20 Amperes.

Where only heavy-duty lampholders are used, such circuits shall be permitted to comply with ~~Article~~ 210~~- for circuits supplying heavy-duty lampholders.~~ .21(A), 210.23(C), or 210.23(D) as applicable .

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 15:00:04 EST 2024

Committee Statement

Committee Statement: Section 4.1.4 of the NEC Style Manual prohibits referencing an entire article, except Article 100 or where required for context. This FR corrects the text to refer to individual sections of Article 210.

Response Message: FR-9154-NFPA 70-2024

Public Input No. 1040-NFPA 70-2023 [Section No. 520.41(B)]

First Revision No. 9280-NFPA 70-2024 [Section No. 520.44(C)(2)]

(2) Cords and Cables Not in Contact with Heat-Producing Equipment.

Listed multiconductor extra-hard usage type cords and cables not in direct contact with equipment containing heat-producing elements shall be permitted to have their ampacity determined by Table 520.44(C)(2)(1). Maximum load current in any conductor with an ampacity determined by Table 520.44(C)(2)(1) shall not exceed the values in Table 520.44(C)(2)(1).

Table 520.44(C)(2)(1) Ampacity of Listed Extra-Hard Usage Cords and Cables with Temperature Ratings of 75°C (167°F) and 90°C (194°F) [Based on Ambient Temperature of 30°C (86°F)]

Size (AWG)	Temperature Rating of Cords and Cables		Maximum Rating of Overcurrent Device
	75°C (167°F)	90°C (194°F)	
14	24	28	15
12	32	35	20
10	41	47	25
8	57	65	35
6	77	87	45
4	101	114	60
2	133	152	80

Note: Ampacity shown is the ampacity for multiconductor cords and cables where only three copper conductors are current-carrying in accordance with 400.5. If the number of current-carrying conductors in a cord or cable exceeds three and the load diversity is 50 percent or less, the ampacity of each conductor shall be reduced as shown in Table 520.44(C)(2)(2):

Table 520.44(C)(2)(2) Ampacity Adjustment Factors for More Than Three Current-Carrying Conductors in a Cord or Cable Where Load Diversity Is 50 Percent or Less

Number of Conductors	Percent of Ampacity Value in Table 520.44(C)(2)(a)
4–6	80
7–24	70
25–42	60
43 and above	50

Note: Ultimate insulation temperature. In no case shall conductors be associated together in such a way with respect to the kind of circuit, the wiring method used, or the number of conductors such that the temperature limit of the conductors is exceeded.

~~A neutral conductor that carries only the unbalanced current from other conductors of the same circuit need not be considered as a current-carrying conductor.~~

In a 3-wire circuit consisting of two-phase conductors and the neutral conductor of a 4-wire, 3-phase, wye-connected system, the neutral conductor carries approximately the same current as the line-to-neutral currents of the other conductors and shall be ~~considered to be~~ counted as a current-carrying conductor.

On a 4-wire, 3-phase wye circuit where the major portion of the load consists of nonlinear loads, there are harmonic currents in the neutral conductor~~. Therefore~~ , the neutral conductor shall therefore be considered ~~to be~~ a current-carrying conductor.

Informational Note 1: A neutral conductor that carries only the unbalanced current from other conductors of the same circuit need not be considered as a current-carrying conductor.

Informational Note 2 : For the purposes of Table 520.44(C)(2)(1), load diversity is the percentage of the total current of all simultaneously energized circuits fed by the cable to the sum of the ampacities of all pairs of circuit conductors in that cable.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Tue Jan 30 12:26:43 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with the NEC Style Manual.
Response Message: FR-9280-NFPA 70-2024

First Revision No. 9156-NFPA 70-2024 [Section No. 520.45]

520.45 Receptacles.

Receptacles for electrical equipment on stages shall be rated in amperes. ~~Conductors supplying receptacles shall be in accordance with Articles 310 and 400.~~

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 15:02:54 EST 2024

Committee Statement

Committee Statement: The second sentence is deleted in order to comply with the NEC Style Guide.
Response Message: FR-9156-NFPA 70-2024

Public Input No. 1143-NFPA 70-2023 [Section No. 520.45]

First Revision No. 9162-NFPA 70-2024 [Section No. 520.50(D)]

(D) Enclosure.

Panel construction shall be in accordance with Article 408, Part IV .

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 15:16:17 EST 2024

Committee Statement

Committee Statement: Create FR TG2-13. Panel Statement: Reference to Article 408 was corrected to comply with section 4.1.4 of the NEC Style Guide.
Response Message: FR-9162-NFPA 70-2024

Public Input No. 1144-NFPA 70-2023 [Section No. 520.50(D)]

First Revision No. 9281-NFPA 70-2024 [Section No. 520.50 [Excluding any Sub-Sections]]

A ~~panel designed to allow for~~ road show connection ~~of portable stage switchboards to fixed lighting outlets by means of permanently installed supplementary circuits. The~~ panel, supplementary circuits, and outlets shall comply with 520.50(A) through (D).

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Tue Jan 30 12:41:42 EST 2024

Committee Statement

Committee Statement: Revision made to comply with the NEC Style Manual.
Response Message: FR-9281-NFPA 70-2024

First Revision No. 9245-NFPA 70-2024 [Section No. 520.54(C)]

(C) Single-Conductor Cables.

(1) Sizing.

(a) Single-conductor portable supply cable sets shall be not smaller than 2 AWG conductors.

(b) The equipment grounding conductor shall not be smaller than 6 AWG conductor.

(c) Single-conductor grounded neutral cables for a supply shall be sized in accordance with 520.54(J). Where single conductors are paralleled for increased ampacity, the paralleled conductors shall be of the same length and size. Single-conductor supply cables shall be grouped together but not bundled.

(d) The equipment grounding conductor shall be permitted to be of a different type if it meets the other requirements of this section, and it shall be permitted to be reduced in size in accordance with 250.122.

(2) Grounded Conductors.

(a) Grounded (neutral) and equipment grounding conductors shall be identified in accordance with 200.6, 250.119, and 310.6.

(b) Grounded conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with white or gray.

(3) Marking.

(a) Equipment grounding conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with green or green with yellow stripes.

(b) Where more than one nominal voltage exists within the same premises, each ungrounded conductor shall be identified by system.

Supplemental Information

File Name	Description	Approved
NEC_CMP15_FR-9245_520.54_C_.docx		

Submitter Information Verification

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Submittal Date: Fri Jan 26 11:34:13 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with NEC Style Manual.
Response Message: FR-9245-NFPA 70-2024

(C) Single-Conductor Cables. [Move text to (1)—(3)]

~~Single-conductor portable supply cable sets shall be not smaller than 2 AWG conductors. The equipment grounding conductor shall not be smaller than 6 AWG conductor. Single-conductor grounded neutral cables for a supply shall be sized in accordance with 520.54(J). Where single conductors are paralleled for increased ampacity, the paralleled conductors shall be of the same length and size. Single-conductor supply cables shall be grouped together but not bundled. The equipment grounding conductor shall be permitted to be of a different type if it meets the other requirements of this section, and it shall be permitted to be reduced in size in accordance with 250.122. Grounded (neutral) and equipment grounding conductors shall be identified in accordance with 200.6, 250.119, and 310.6. Grounded conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with white or gray. Equipment grounding conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with green or green with yellow stripes. Where more than one nominal voltage exists within the same premises, each ungrounded conductor shall be identified by system.~~

(1) Sizing.

(a) Single-conductor portable supply cable sets shall be not smaller than 2 AWG conductors.

(b) The equipment grounding conductor shall not be smaller than 6 AWG conductor.

(c) Single-conductor grounded neutral cables for a supply shall be sized in accordance with 520.54(J). Where single conductors are paralleled for increased ampacity, the paralleled conductors shall be of the same length and size. Single-conductor supply cables shall be grouped together but not bundled.

(d) The equipment grounding conductor shall be permitted to be of a different type if it meets the other requirements of this section, and it shall be permitted to be reduced in size in accordance with 250.122.

(2) Grounded Conductors.

(a) Grounded (neutral) and equipment grounding conductors shall be identified in accordance with 200.6, 250.119, and 310.6.

(b) Grounded conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with white or gray.

(3) Marking.

(a) Equipment grounding conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with green or green with yellow stripes.

(b) Where more than one nominal voltage exists within the same premises, each ungrounded conductor shall be identified by system.

First Revision No. 9163-NFPA 70-2024 [Section No. 520.68(D)]

(D) Special-Purpose Multicircuit Cable Systems.

Special-purpose multicircuit cable systems shall comply with the following requirements:

(1) Branch circuits shall be rated at not more than 20 amperes and not more than 150 volts to ground.

(2) Trunk cable types shall be extra-hard usage (hard service) or hard usage (junior hard service).

(3) The ampacity of trunk cables shall be determined in accordance with Table 520.44(C)(2)(1).

(4) Trunk cables, breakout assemblies, and multicircuit enclosures shall be listed or approved .

(5) Section 406.4(F) shall not apply to multicircuit, multipole plugs or receptacles that are part of a special-purpose multicircuit cable system.

(6) ~~All~~ When deployed, all multicircuit, multipole connectors shall be clearly marked ~~with the~~ to uniquely identify the pinout configuration type of the connector and the voltage of the branch circuits serviced by the connector.

(7) ~~Installation and operation shall be performed by qualified persons.~~

(8) Qualified persons shall deploy and operate special-purpose multicircuit cable systems.

Informational Note: See ESTA E1.80-202X for information on pinout configuration types.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 15:18:52 EST 2024

Committee Statement

Committee Statement: There are multiple multicircuit connectors in wide use in Article 520 occupancies. Many different pinout configurations are used for audio, lighting, effects equipment, video walls, and other systems. There is currently no requirement to require clear identification of the different configurations. Adding this marking requirement in combination with the existing qualified persons requirement provides a clear

understanding of the pinout configuration in use. In addition, the words “or approved” were added to (4), because there is currently no physical dimensional standard available for multicircuit connectors covered under this section. This addition does not change the qualified persons requirement of (7). With regards to the Informational Note, the Entertainment Services and Technology Association (ESTA) Technical Standards Program (ANSI E1) is developing a standard for such marking.

Response Message: FR-9163-NFPA 70-2024

Public Input No. 2586-NFPA 70-2023 [Section No. 520.68(D)]

First Revision No. 9173-NFPA 70-2024 [Section No. 522.10]

522.10 Power Sources for Control Circuits.

(A) Power-Limited Control Circuits.

Power-limited control circuits shall be supplied from a source that has a rated output of not more than 30 volts and 1000 volt-amperes.

(1) Control Transformers.

Transformers used to supply power-limited control circuits shall comply with the applicable sections within Article 450, Parts I and II ~~of Article 450~~ .

(2) Other Power-Limited Control Power Sources.

Power-limited control power sources, other than transformers, shall be protected by overcurrent devices rated at not more than 167 percent of the volt-ampere rating of the source divided by the rated voltage. The fusible overcurrent devices shall not be interchangeable with fusible overcurrent devices of higher ratings. The overcurrent device shall be permitted to be an integral part of the power source.

To comply with the 1000 volt-ampere limitation of 522.10(A), the maximum output of power sources, other than transformers, shall be limited to 2500 volt-amperes, and the product of the maximum current and maximum voltage shall not exceed 10,000 volt-amperes. These ratings shall be determined with any overcurrent-protective device bypassed.

(B) Non–Power-Limited Control Circuits.

Non–power-limited control circuits shall not exceed 300 volts. The power output of the source shall not be required to be limited.

(1) Control Transformers.

Transformers used to supply non–power-limited control circuits shall comply with the applicable sections within Article 450, Parts I and II ~~of Article 450~~ .

(2) Other Non–Power-Limited Control Power Sources.

Non–power-limited control power sources, other than transformers, shall be protected by overcurrent devices rated at not more than 125 percent of the volt-ampere rating of the source divided by the rated voltage. The fusible overcurrent devices shall not be interchangeable with fusible overcurrent devices of higher ratings. The overcurrent device shall be permitted to be an integral part of the power source.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 15:46:47 EST 2024

Committee Statement

Committee Statement: The panel changed references to Articles and Parts to comply with the NEC Style Manual section 4.1.4.
Response Message: FR-9173-NFPA 70-2024

Public Input No. 2755-NFPA 70-2023 [Section No. 522.10]

First Revision No. 9205-NFPA 70-2024 [Article 525]

~~Article 525 Carnivals~~
Article 525 Carnivals , Circuses, Fairs, and Similar Events

Part I.

~~– General~~
General

525.

~~1 Scope~~
1 Scope .

This article covers the

~~installation~~
deployment of portable wiring and equipment for carnivals, circuses, fairs, and similar functions, including wiring in or on all structures.

525.

~~3 Other~~
2 Listing Requirements

The following equipment shall be listed:

Egress Luminaires

525.4 Other Articles.

(A)

~~Portable~~
Portable Wiring and Equipment.

Wherever the requirements of other articles of this Code and this Article

~~525~~
differ, the requirements of this Article

~~525~~
shall apply to the deployment of portable wiring and equipment.

(B)

~~Attractions~~
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, Parts I, II, III, and V of

~~Article 680~~
.
525.

~~5 Overhead~~
5 Overhead Conductor Clearances.

(A)

~~Vertical~~
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 , rides, and concessions.

(B)

~~Clearance~~
Clearance to Portable Structures.

Overhead clearances shall comply with either 525.5 (B)(1)

~~600 Volts (or Less)~~
or 525.5(B)(2). Structures included in 525.3(B) that contain water such as a storable pool, fountain, immersion pool, or similar portable structures shall comply with Table 680.9(A).

(1) 600 Volts or Less .

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(B) shall comply with Table 680.9(A) .~~

(2)

~~Over~~
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.

525.

~~6 Protection~~
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.

Part II.

~~Power~~
Power Sources

525.

~~10 Services~~
10 Services .

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

(A)

~~Guarding~~
Guarding .

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

(B)

~~Mounting~~
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~~
11 Generators.

Generators shall comply with 525.11(A) and (B)

(A) Portable, vehicle-mounted and trailer-mounted shall comply with 250.34

(B) Portable generators less than 15 KW shall comply with 445.20

525.12 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.

Part III.

~~Wiring~~
Wiring Methods

525.

~~20 Wiring~~
20 Wiring Methods.

(A)

~~Type~~
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~~
Single -Conductor.

Single-conductor cable shall be permitted only in sizes 2 AWG or larger.

(C)

~~Open~~
Open Conductors.

Open conductors shall be prohibited except as part of a listed assembly or festoon lighting installed in accordance with Article 225 , Part I .

(D)

~~Splices~~
Splices .

Flexible cords or cables shall be continuous without splice or tap between boxes or fittings.

(E)

~~Cord~~
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~~
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~~
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 secured to the walkway surface or protected with another approved cable protection method, provided that the matting or

other protection method does not constitute a greater tripping hazard than the uncovered cables. Burying cables shall be permitted. The requirements of 300.5 shall not apply.

(H)

~~Boxes~~
Boxes and Fittings.

A box or fitting shall be installed at each connection point, outlet, switchpoint, or junction point in accordance with 300 . 15.

525.

~~21 Rides, Tents, and Concessions~~
21 Disconnecting Means .

(A)

~~Disconnecting Means.~~
~~Moving Rides or Attractions.~~ ~~A means to disconnect each portable~~

~~structure~~
~~ride or amusement attraction~~ ~~from all ungrounded conductors shall be provided. The disconnecting means shall be 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.~~

~~If accessible~~
~~If accessible~~ ~~to unqualified persons, the disconnecting means shall be lockable. A shunt trip device that opens the fused disconnect or circuit~~

~~breaker if a~~
~~breaker if a~~ ~~switch located in the ride operator's console is closed shall be a permissible method of opening the circuit.~~

~~**(B)**~~

~~Portable~~
~~Non-moving Attractions and Portable Structures. A means to disconnect each portable structure, tent, concession, inflatable amusement attraction, Slide, and similar from all ungrounded conductors shall be provided. The disconnecting means shall be located inside, or outside within 1.8 m (6 ft) of the tent or concession. Enclosures with doors that, when opened, expose uninsulated live parts shall restrict access in accordance with 404.30.~~

~~*Exception: Where portable structures, tents, or concessions are supplied by a single cord and plug connection from a 125-volt, single phase, 15 or 20 amp, GFCI-protected receptacle, the cord and plug connection shall be permitted to serve as a disconnecting means if located within the portable structure, tent or concession.*~~

~~**525.22** 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 luminaire or lampholder with a guard.~~

~~**525.**~~

~~22 Portable~~
~~**23** Portable Distribution or Termination Boxes.~~

~~Portable distribution or termination boxes shall comply with 525.~~

~~22(A~~
~~23A) through (D).~~

~~**(A)**~~

~~Construction~~
~~Construction .~~

~~Boxes shall be designed so that no live parts are exposed except where necessary for examination, adjustment, servicing, or maintenance by qualified persons. If 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

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

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 , Parts III, IV, and V for motor loads.

(D)

Single

Single -Pole Connectors.

Where single-pole connectors are used, they shall comply with 530.10 .

525.

23 Ground

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

(A)

Where

Where GFCI Protection Is Required.

In addition to the requirements of 210.8(B) , GFCI protection for personnel shall be provided for the following:

All

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

Equipment

(2) Equipment that is readily accessible to the general public and supplied from a

125-

120 volt

,

nominal single-phase, 15- or 20-ampere branch circuit

The GFCI 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 GFCI for personnel shall be permitted.

(B)

Where

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

Where GFCI Protection Is Not Permitted.

Egress lighting shall not be protected by a GFCI.

(D)

~~- Receptacles~~
~~- Receptacles~~ ~~Supplied by Portable Cords.~~

~~Where GFCI protection is provided through the use of GFCI receptacles, and the branch circuits supplying receptacles use flexible cord, the GFCI protection shall be listed, labeled, and identified for portable use.~~

~~**525.25** Lighting.~~

(1) ~~All lamps for general illumination shall be protected from accidental breakage by a luminaire or lampholder with a guard.~~

(2) ~~Luminaires used for egress lighting shall be listed.~~

~~**Part IV.**~~

~~- Equipment~~
~~**- Equipment** **Grounding and Bonding**~~

~~**525.**~~

~~30 Equipment~~
~~**30** - Equipment~~ ~~Bonding.~~

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

~~Metal~~
~~(1) - Metal~~ ~~raceways and metal-sheathed cable~~

~~Metal~~
~~(2) - Metal~~ ~~enclosures of electrical equipment~~

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

~~Where the metal frames or parts of the equipment in~~ ~~525.30 (1), (2), or (3) are likely to become energized in the event of a fault, the equipment grounding conductor of the supply circuit shall be permitted to serve as the bonding means.~~

~~**525.**~~

~~31 Equipment~~
~~**31** - Equipment~~ ~~Grounding.~~

~~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.~~

~~**525.**~~

~~32 Equipment~~
~~**32** - Equipment~~ ~~Grounding Conductor Continuity Assurance.~~

~~The continuity of the equipment grounding conductors shall be verified each time that portable electrical equipment is connected.~~

Supplemental Information

File Name	Description	Approved
Article_525.docx		
Article_525_FR-9205.docx		

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 22:57:53 EST 2024

Committee Statement

Committee Statement: PI 1147

The panel changed the reference to Article 225 to comply with section 4.1.4 of the NEC Style Guide.

PI 1149

The Panel corrected the reference to Article 430 to specific Parts in order to comply with section 4.1.4 of the NEC Style Guide.

PI 96

The panel added the word “nominal” to the branch circuit description to clarify that GFCI protection is required for branch circuits operating at voltages within the nominal tolerance of a 120-volt branch circuit.

PI 1073

Panel Statement: The panel agrees that Egress Luminaires, because they are not permitted on GFCI circuits, must be listed, but that the requirement belongs in new section 525.25, not the proposed 525.23(C).

PI 1146

The panel revised the reference to Article 525 to comply with section 4.1.4 of the NEC Style Guide.

PI 2588

The word “deploy” and its definition properly covers the portable equipment and wiring covered in Article 525.

PI 2756

Text was revised to comply with section 4.1.4 of the NEC Style Manual.

PI 2063

For compliance with the NEC Style Manual, the term 600V “or less” should remain. For clarity and emphasis, reference to Table 680.9(A) was moved to the beginning of this section because the table applies to voltages both less than and over 600V. The panel recognizes that article 525 needs a pointer to requirements for different types of portable generators. The panel removed the redundant words “in audience traffic areas”, as these are included in areas accessible to the general public. A pointer is needed to 300.15 for clarification that it applies to relocatable structures in Article 525 venues. The reorganization of 525.21 clarifies the requirements for means of disconnect for various structures and moves the specific requirements for portable wiring in tents and concessions into a new section 525.22. Renumber section to 525.22. Remove lamp requirements to new section 525.25

Response Message: FR-9205-NFPA 70-2024

Public Input No. 1149-NFPA 70-2023 [Section No. 525.22(C)]

Public Input No. 2063-NFPA 70-2023 [Article 525]

Public Input No. 2756-NFPA 70-2023 [Section No. 525.3(B)]

Public Input No. 1146-NFPA 70-2023 [Section No. 525.3(A)]

Public Input No. 2587-NFPA 70-2023 [Section No. 525.1]

Public Input No. 2588-NFPA 70-2023 [Section No. 525.3(A)]

Public Input No. 96-NFPA 70-2023 [Section No. 525.23(A)]

Public Input No. 1073-NFPA 70-2023 [Section No. 525.23(C)]

Public Input No. 1147-NFPA 70-2023 [Section No. 525.20(C)]

Article 525 Carnivals, Circuses, Fairs, and Similar Events

Part I. General

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.

525.2 Listing Requirements.

The following equipment shall be listed:

(1) Egress Luminaires

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~~this Article shall apply to the portable wiring and equipment.

(B) Attractions Utilizing Pools, Fountains, and Similar Installations with Contained Volumes of Water.

This equipment shall be installed to comply with the applicable requirements of ~~Parts I, II, III, and V of~~ Article 680 Parts I, II, III, and V.

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.

Overhead clearances shall comply with either 525.5(B)(1) or 525.5(B)(2). Structures included in 525.3(B) that contain water such as a storable pool, fountain, immersion pool, or similar portable structures shall comply with Table 680.9(A).

(1) 600 Volts (or Less).

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(B) shall comply with Table 680.9(A).~~

(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.

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.

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

525.11 Generators.

Generators shall comply with 525.11(A) and 525.11(B).

(A)

Portable, vehicle-mounted and trailer-mounted shall comply with 250.34.

(B)

Portable generators less than 15 KW shall comply with 445.20.

525.~~11~~ 12 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.

Part 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 shall be prohibited except as part of a listed assembly or festoon lighting installed in accordance with Article 225, Part I.

(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 secured to the walkway surface or protected with another approved cable protection method, provided that the matting or other protection method does not constitute a greater tripping hazard than the uncovered cables. Burying cables shall be permitted. 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 om accordance with 300.15.

525.21 ~~Rides, Tents, and Concessions~~Disconnecting Means.

(A) Moving Rides or Attractions.

A means to disconnect each portable ride or amusement attraction from all ungrounded conductors shall be provided. The disconnecting means shall be 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. If accessible to unqualified persons, the disconnecting means shall be lockable. A shunt trip device that opens the fused disconnect or circuit breaker if a switch located in the ride operator's console is closed shall be a permissible method of opening the circuit.

(B) Non-moving Attractions and Portable Structures.

A means to disconnect each portable structure, tent, concession, inflatable amusement attraction, Slide, and similar from all ungrounded conductors shall be provided. The disconnecting means shall be located inside, or outside within 1.8 m (6 ft) of the tent or concession. Enclosures with doors that, when opened, expose uninsulated live parts shall restrict access in accordance with 404.30.

Exception: Where portable structures, tents, or concessions are supplied by a single cord and plug connection from a 125-volt, single phase, 15 or 20 amp, GFCI-protected receptacle, the cord and plug connection shall be permitted to serve as a disconnecting means if located within the portable structure, tent or concession.

~~**(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 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. If accessible to unqualified persons, the disconnecting means shall be lockable. A shunt trip device that opens the fused disconnect or circuit breaker if 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 luminaire or lampholder with a guard.~~

525.22 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.

525.~~22~~ 23 Portable Distribution or Termination Boxes.

Portable distribution or termination boxes shall comply with 525.~~22~~23(A) through 525.23(D).

(A) Construction.

Boxes shall be designed so that no live parts are exposed except where necessary for examination, adjustment, servicing, or maintenance by qualified persons. If 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. Parts III, IV, and V for motor loads.

(D) Single-Pole Connectors.

Where single-pole connectors are used, they shall comply with 530.10.

525.~~23~~ 24 Ground-Fault Circuit-Interrupter (GFCI) Protection.

(A) Where GFCI Protection Is Required.

In addition to the requirements of 210.8(B), GFCI protection for personnel shall be provided for the following:

1. All 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

The GFCI 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 GFCI 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.

(D) Receptacles Supplied by Portable Cords.

Where GFCI protection is provided through the use of GFCI receptacles, and the branch circuits supplying receptacles use flexible cord, the GFCI protection shall be listed, labeled, and identified for portable use.

525.25 Lighting.

(A)

All lamps for general illumination shall be protected from accidental breakage by a luminaire or lampholder with a guard.

(B)

Luminaires used for egress lighting shall be listed.

Part IV. Equipment 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

Where the metal frames or parts of the equipment in 525.30(1), 525.30(2), or 525.30(3) are likely to become energized in the event of a fault, the equipment grounding conductor of the supply circuit shall be permitted to serve as the bonding means.

525.31 Equipment Grounding.

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.

525.32 Equipment Grounding Conductor Continuity Assurance.

The continuity of the equipment grounding conductors shall be verified each time that portable electrical equipment is connected.

First Revision No. 9177-NFPA 70-2024 [New Section after 530.1]

530.2 Listing Requirements.

The following equipment shall be listed:

(1) Alternating-current power distribution boxes

(2) Portable luminaires

(3) Portable enclosed-arc lamps and associated ballasts

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 15:56:18 EST 2024

Committee Statement

Committee Statement: Portable stage and studio electrical equipment was not included in the list of equipment to be listed because this equipment may be either listed or approved per 530.21(A).

Response Message: FR-9177-NFPA 70-2024

Public Input No. 3763-NFPA 70-2023 [New Section after 530.1]

First Revision No. 9189-NFPA 70-2024 [Section No. 530.4]

530.4 Supervision by Qualified Personnel.

Portable electrical equipment covered in this article , including portable distribution systems, generators, battery systems, and other portable power sources, shall be deployed, energized, and, while energized, operated and continuously supervised by trained, qualified, and employer-authorized personnel.

Exception: Continuous supervision shall not be required for utility-supplied portable distribution equipment that provides uninterrupted power to other than professional stage and studio equipment, or to production equipment requiring standby power during non-operation.

Informational Note: Portable HVAC, mobile production trucks, portable UPS trailers, refrigerators, production support trailers, and portable substations are examples of equipment associated with other than professional stage and studio equipment. Lighting consoles, digital imaging technician (DIT) carts, and other information technology-based equipment are examples of production equipment requiring standby power.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 16:16:49 EST 2024

Committee Statement

Committee Statement: The existing language is too overarching and the requirement for continuous supervision should not apply to utility-supplied portable distribution systems supplying equipment on motion picture or television studio lots such as video trucks, satellite trucks, portable UPS, portable power tools, portable air conditioning units, support trailers, craft service refrigerators, and similar equipment, that are required to operate 24/7. Changes in the language are meant to narrow down the scope of this section, and the exception would allow portable equipment, supplied by utility power and designed for the purpose, to supply other equipment without continuous supervision. The equipment is still required to be deployed and energized by qualified persons.

Response Message: FR-9189-NFPA 70-2024

Public Input No. 3235-NFPA 70-2023 [Section No. 530.4]

First Revision No. 9193-NFPA 70-2024 [Section No. 530.5(B)]

(B) Communications, Signaling Systems, Data Systems, and Fire Alarm Systems~~, and Systems Less than 120 Volts, Nominal~~ .

Permanent wiring methods for communications, signaling, data, fire alarm systems, and systems operating at less than 120 volts, nominal, shall be in accordance with the following:

(1) Audio signal processing, amplification, and reproduction equipment — 640.9

(2) Communications systems — Article 800, Parts I and IV~~ of Article 800~~ ; ~~Part IV of~~ Article 805, Part IV ; and ~~Part IV of~~ Article 840, Part IV

(3) Class 2 and Class 3 remote control and signaling circuits — ~~Part III of~~ Article 725, Part II

(4) Class 2 circuits that transmit power, data or both to a powered device

Informational Note: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems,* for information on installation of cables for PoE lighting systems. See ~~Part III of~~ Article 760, Part III, for information on fire alarm circuits.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 16:25:23 EST 2024

Committee Statement

Committee Statement: References to articles were corrected to comply with section 4.1.4 of the NEC Style Manual. Incorrect reference to Part III of article 725 in (3) was corrected to Part II.Remove “and systems less than 120 volts, Nominal from (B). This section includes ", and Systems Less Than 120 Volts, Nominal" in the title, yet the list of wiring methods do not include any specific to systems less than 120 volts nominal. Further, the title can

cause confusion as it may appear that the wiring methods listed can be used with higher

Response Message: FR-9193-NFPA 70-2024

Public Input No. 2757-NFPA 70-2023 [Section No. 530.5(B)]

Public Input No. 4303-NFPA 70-2023 [Section No. 530.5(B)]

First Revision No. 9180-NFPA 70-2024 [Section No. 530.21(A)]

(A) Listing.

Portable stage and studio electrical equipment shall be listed or approved. Field-assembled ~~extension cords~~ cord sets and multiconductor cable assemblies consisting of listed connectors and cable shall be permitted in production areas.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 16:01:52 EST 2024

Committee Statement

Committee Statement: The panel changed “extension cords” to the defined term “cord sets”.
Response Message: FR-9180-NFPA 70-2024

Public Input No. 2088-NFPA 70-2023 [Section No. 530.21(A)]

First Revision No. 9185-NFPA 70-2024 [Section No. 530.21(B)]

(B) Outdoor Use.

Portable stage and studio equipment and portable power distribution equipment not identified for outdoor use shall be permitted ~~for temporary use~~ to be deployed outdoors if the equipment is supervised by qualified personnel while energized and barriered from the general public.

Informational Note No. 1: See ANSI/ESTA E1.58-2017 (R2022) , *Electrical Safety Standard for Portable Stage and Studio Equipment Used Outdoors*, for ~~requirements covering temporary outdoor~~ information on hte use of ~~equipment not identified for outdoor use~~ portable stage and studio equipment outdoors .

Informational Note No. 2: See ANSI/ESTA E1.19-~~2015~~ 2021 , *Recommended Practice for the use of Class A Ground-Fault Circuit Interrupters (GFCIs) intended for personnel protection in the Entertainment Industry*, for guidance on the use of GFCIs in wet locations.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 16:10:05 EST 2024

Committee Statement

Committee Statement: Panel statement: “deployed” instead of “temporary” more accurately describes the use of portable equipment in article 530 and avoids misinterpretation with article 590 applications. Informational note 1 was corrected to remove “temporary”. Informational note 2 was corrected to the current version of ANSI/ESTA E1.19. in Informational note 1, ANSI/ESTA E1.58 edition date was updated to 2017(R2022).

Response Message: FR-9185-NFPA 70-2024

Public Input No. 2213-NFPA 70-2023 [Section No. 530.21(B)]

First Revision No. 9195-NFPA 70-2024 [Section No. 530.72]

530.72 Over 1000 Volts, Nominal.

Wiring and equipment of portable substations rated over 1000 volts, nominal, shall comply with the requirements of ~~Part IV of~~ Article 490, Part IV .

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 16:31:36 EST 2024

Committee Statement

Committee Statement: Reference to Article 490 was corrected to comply with section 4.1.4 of the NEC Style Manual.
Response Message: FR-9195-NFPA 70-2024

Public Input No. 2694-NFPA 70-2023 [Section No. 530.72]
Public Input No. 3414-NFPA 70-2023 [Section No. 530.72]
Public Input No. 3800-NFPA 70-2023 [Section No. 530.72]

First Revision No. 9198-NFPA 70-2024 [Section No. 540.10]

540.10 Motion Picture Projection Room Required.

Every professional-type projector shall be located within a projection room. Every projection room shall be of permanent construction and approved for the type of building in which it is located. All projection ports, spotlight ports, viewing ports, and similar openings shall be provided with glass or other approved material to completely close the opening. Such rooms shall not be considered hazardous (classified) locations as defined in ~~Article 500~~ . 501.5, 505.5, or 506.5 .

Informational Note: See NFPA *101*-2021, *Life Safety Code*, for further information on protecting openings in projection rooms handling cellulose nitrate motion picture film.

Submitter Information Verification

Committee: NEC-P15

Submittal Date: Thu Jan 25 16:38:11 EST 2024

Committee Statement

Committee Statement: The panel eliminated a reference to a complete article to comply with section 4.1.4 of the NEC Style Manual.

Response Message: FR-9198-NFPA 70-2024

Public Input No. 1150-NFPA 70-2023 [Section No. 540.10]

First Revision No. 9246-NFPA 70-2024 [Section No. 540.11(A)]

(A) Motor Generator Sets, Transformers, Rectifiers, Rheostats, and Similar Equipment.

Motor-generator sets, transformers, rectifiers, rheostats, and similar equipment for the supply or control of current to projection or spotlight equipment shall, where nitrate film is used, be located in a separate room. Where placed in the projection room, they shall be located or guarded so that arcs or sparks cannot come in contact with film, and the commutator end or ends of motor-generator sets shall comply with one of the ~~conditions in~~ ~~540.11(A)(1)~~ ~~through (A)(6).~~ following conditions:

(1) Types.

~~Be of~~ Commutator ends or ends of motor-generator sets shall be of the totally enclosed, enclosed fan-cooled, or enclosed pipe-ventilated type.

(2) Separate Rooms or Housings.

~~Be~~ Commutator ends or ends of motor-generator sets shall be enclosed in separate rooms or housings built of noncombustible material constructed so as to exclude flyings or lint with approved ventilation from a source of clean air.

(3) Solid Metal Covers.

~~Have~~ Commutator ends or ends of motor-generator sets shall have the brush or sliding-contact end of motor-generator enclosed by solid metal covers.

(4) Tight Metal Housings.

~~Have~~ Commutator ends or ends of motor-generator sets shall have brushes or sliding contacts enclosed in tight metal housings.

(5) Upper and Lower Half Enclosures.

~~Have~~ Commutator ends or ends of motor-generator sets shall have the upper half of the brush or sliding-contact end of the motor-generator enclosed by a wire screen or perforated metal and the lower half enclosed by solid metal covers.

(6) Wire Screens or Perforated Metal.

~~Have~~ Commutator ends or ends of motor-generator sets shall have wire screens or perforated metal placed at the commutator of brush ends. No dimension of any opening in the wire screen or perforated metal shall exceed 1.27 mm (0.05 in.), regardless of the shape of the opening and of the material used.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 11:37:26 EST 2024

Committee Statement

Committee Statement: Revisions made to comply with NEC Style Manual.
Response Message: FR-9246-NFPA 70-2024

First Revision No. 9199-NFPA 70-2024 [Section No. 540.20]

~~540.20~~ 2 Listing Requirements.

Projectors and enclosures for arc, xenon, and incandescent lamps and rectifiers, transformers, rheostats, and similar equipment shall be listed.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Thu Jan 25 16:40:04 EST 2024

Committee Statement

Committee Statement: The panel added a new section 540.2 and deleted section 540.20 to comply with the NEC Style Manual section 2.2.1.
Response Message: FR-9199-NFPA 70-2024

Public Input No. 3772-NFPA 70-2023 [Section No. 540.20]

First Revision No. 9252-NFPA 70-2024 [Definition: Patient Care Space Category. [Excluding any Sub...]

Any space of a health care facility wherein patients are intended to be examined or treated. [**99:**3.3.~~140~~ 145] (517) (CMP-15)

Informational Note No. 1: The health care facility's governing body designates patient care space in accordance with the type of patient care anticipated.

Informational Note No. 2: Business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as patient care spaces. [**99:**A.3.3.140]

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 12:14:05 EST 2024

Committee Statement

Committee Statement: NFPA 99 extract reference updated.
Response Message: FR-9252-NFPA 70-2024

First Revision No. 9220-NFPA 70-2024 [Part IV.]

Part IV. Inhalation Anesthetizing Locations

517.60 General.

Inhalation anesthetizing locations shall comply with Part IV of this Article.

Informational Note: See NFPA 99-2021, *Health Care Facilities Code*, for further information regarding safeguards for anesthetizing locations.

Submitter Information Verification

Committee: NEC-P15
Submittal Date: Fri Jan 26 09:54:07 EST 2024

Committee Statement

Committee Statement: Revised per the NEC Style Manual.
Response Message: FR-9220-NFPA 70-2024