



National Fire Protection Association

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WORKING DRAFT OF NEC CODE-MAKING **PANEL 12 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 21 - 23, 2024

Panel Activity: Input Stage

This is a working draft, prepared by NFPA staff, to record the output generated at the Code-Making Panel 12 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. 9039-NFPA 70-2024 [Global Input]**

**[New article 627 after existing article 626, see attached word document
NEC_Article_627_FR-9039.docx]**

Article 627 Electric Self-Propelled Vehicle Power Transfer System**Part I. General****627.1 Scope.**

This article covers the electrical conductors and equipment connecting an electric self-propelled vehicle (ESV) to premises wiring for the purposes of charging, power export, or bidirectional current flow.

627.2 Listed.

Electric Self-Propelled Vehicle Supply Equipment (ESVSE) including power supply cords for the purposes of charging, power export, or bidirectional current flow shall be listed.

627.4 Voltages.

Unless other voltages are specified, the nominal ac system voltages of 120, 120/240, 208Y/120, 240, 480Y/277, 480, 600Y/347, 600, or 1000 volts or dc system input voltages of up to 1000 volts shall be used to supply equipment covered by this article. Output voltages to the ESV are not specified.

Part II. Equipment Construction**627.17 Cords and Cables.****(A) Power-Supply Cord.**

The cable for cord-connected ESVSE shall comply with all of the following:

- (1) Be any of the types specified in 627.17(B)(1) or hard service cord, junior hard service cord, or portable power cable types in accordance with Table 400.4. Hard service cord, junior hard service cord, or portable power cable types shall be listed, as applicable, for exposure to oil and damp and wet locations.
- (2) Have an ampacity as specified in Table 400.5(A)(1) or, for 8 AWG and larger, in the 60°C (140°F) columns of Table 400.5(A)(2).
- (3) Have an overall length as specified in either of the following:

a. When the interrupting device of the personnel protection system specified in 627.22 is located within the enclosure of the supply equipment or charging system, the power-supply cord shall be not more than the length indicated in (i) or (ii):

(i) For portable equipment in accordance with 627.44(A), the power-supply cord shall be not more than 300 mm (12 in.) long.

(ii) For fastened-in-place equipment in accordance with 627.44(B), the power-supply cord shall be not more than 1.8 m (6 ft) long and the equipment shall be installed at a height that prevents the power-supply cord from contacting the floor when it is connected to the proper receptacle.

b. When the interrupting device of the personnel protection system specified in 627.22 is located at the attachment plug, or within the first 300 mm (12 in.) of the power-supply cord, the overall cord length shall be not greater than 4.6 m (15 ft).

(B) Output Cable to ESV.

The output cable to an ESV shall be one of the following:

- (1) Listed Type EV, EVJ, EVE, EVJE, EVT, or EVJT flexible cable as specified in Table 400.4
- (2) An integral part of listed ESVSE.

(C) Overall Cord and Cable Length.

The overall usable length shall not exceed 7.5 m (25 ft) unless equipped with a cable management system that is part of the listed ESVSE.

(1) Portable Equipment.

For portable ESVSE, the cord-exposed usable length shall be measured from the face of the attachment plug to the face of the ESV connector.

(2) Fastened-in-Place.

Where the ESVSE is fastened-in-place, the usable length of the output cable to the ESV shall be measured from the cable exit of the ESVSE to the face of the ESV connector.

Where wireless power transfer equipment (WPTE) is fastened-in-place, the output cable to the primary pad shall be measured from the cable exit of the control box to the cable inlet at the primary pad.

(D) Interconnecting Cabling Systems.

Other cabling systems that are integral parts of listed supply equipment and are intended to interconnect pieces of equipment within an ESVSE system using approved installation methods shall be permitted.

627.22 Personnel Protection System.

ESVSE shall have a listed system of protection against electric shock of personnel. Where cord-and-plug-connected equipment is used, the interrupting device of a listed personnel protection system shall be provided according to 627.17(A). A personnel protection system shall not be required for power transfer equipment that supplies less than 60 volts dc.

Part III. Installation**627.40 ESVSE Branch Circuit.**

Each outlet installed for the purpose of supplying ESVSE supply equipment greater than 16 amperes, or 120 volts shall be supplied by an individual branch circuit.

Exception: Branch circuits shall be permitted to feed multiple ESVSE as permitted by 627.42(A) or (B).

627.41 Overcurrent Protection.

Overcurrent protection for feeders and branch circuits supplying ESVSE and WPTE, including bidirectional equipment, shall be sized for continuous duty and shall have a current rating of not less than 125 percent of the maximum load of the equipment. Where noncontinuous loads are supplied from the same feeder, the overcurrent device shall have a current rating of not less than the sum of the noncontinuous loads plus 125 percent of the continuous loads.

627.42 Rating.

The ESVSE shall have sufficient rating to supply the load served. Charging loads shall be considered to be continuous loads for the purposes of this article. Service and feeder shall be sized in accordance with the product ratings, unless the overall rating of the installation can be limited through controls as permitted by 627.42(A) or (B).

(A) Energy Management System (EMS).

Where an EMS in accordance with 750.30 provides load management of ESVSE, the maximum equipment load on a service and feeder shall be the maximum load permitted by the EMS. The EMS shall be permitted to be integral to one piece of equipment or integral to a listed system consisting of more than one piece of equipment. When one or more pieces of equipment are provided with an integral load management control, the system shall be marked to indicate this control is provided.

(B) Supply Equipment with Adjustable Settings.

Supply equipment with restricted access to an ampere adjusting means complying with 750.30(C) shall be permitted. If adjustments have an impact on the rating label, those changes shall be in accordance with manufacturer's instructions, and the adjusted rating shall

appear on the rating label with sufficient durability to withstand the environment involved. Supply equipment as referenced shall be permitted to have ampere ratings that are equal to the adjusted current setting.

627.43 Disconnecting Means.

For supply equipment rated more than 60 amperes or more than 150 volts to ground, the disconnecting means shall be provided and installed in a readily accessible location. If the disconnecting means is installed remote from the equipment, a plaque shall be installed on the equipment denoting the location of the disconnecting means. The disconnecting means shall be lockable open in accordance with 110.25.

627.44 Equipment Connection.

ESVSE and WPTE shall be connected to the premises wiring system in accordance with one of the methods in 627.44(A) through (C).

(A) Portable Equipment.

Portable equipment shall be connected to the premises wiring system by one or more of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 125 volts, single phase, 15 or 20 amperes
- (2) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 250 volts, single phase, 15 or 20 amperes
- (3) A nonlocking, 2-pole, 3-wire or 3-pole, 4-wire grounding-type receptacle outlet rated at 250 volts, single phase, 30 or 50 amperes, or 125/250 volts, single-phase, 30, 50, or 60 amperes
- (4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 volts dc maximum, 15 or 20 amperes

(B) Fastened-in-Place Equipment.

Equipment that is fastened-in-place shall be connected to the premises wiring system by one of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 125 volts or 250 volts, single phase, up to 50 amperes
- (2) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 250 volts, three phase, up to 50 amperes
- (3) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 125/250 volts, single phase, 30, 50, or 60 amperes
- (4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 60 volts dc maximum, 15

or 20 amperes

(C) Fixed-in-Place Equipment.

All other ESVSE and WPTE shall be permanently wired and fixed-in-place to the supporting surface.

627.46 Loss of Primary Source.

Means shall be provided such that, upon loss of voltage from the utility or other electrical system(s), energy cannot be back fed through the ESV and the supply equipment to the premises wiring system unless permitted by 627.48.

627.47 Multiple Feeder or Branch Circuits.

Where equipment is identified for the application, more than one feeder or branch circuit shall be permitted to supply equipment.

627.48 Interactive Equipment.

ESVSE or WPTE that incorporates a power export function and that is part of an interactive system that serves as an optional standby system, an electric power production source, or a bidirectional power feed shall be listed and marked as suitable for that purpose. When used as an optional standby system, the requirements of Parts I and II of Article 702 shall apply; when used as an electric power production source, the requirements of Parts I and II of Article 705 shall apply. EVPE that provides a receptacle outlet as its point of power export shall be in accordance with 627.60.

627.49 Island Mode.

ESVPE and bidirectional ESVSE that incorporate a power export function shall be permitted to be a part of an interconnected power system operating in island mode.

627.50 Location.

The ESVSE shall be located for direct electrical coupling of the ESV connector (conductive or inductive) to the ESV. Unless specifically listed and marked for the location, the coupling means of the ESV shall be stored or located at a height of not less than 450 mm (18 in.) above the floor level for indoor locations or 600 mm (24 in.) above the grade level for outdoor locations. This requirement does not apply to portable ESVSE constructed in accordance with 627.44(A).

627.52 Ventilation.

The ventilation requirement for charging an ESV in an indoor enclosed space shall be determined by 627.52(A) or (B).

(A) Ventilation Not Required.

Where electric vehicle storage batteries are used or where the equipment is listed for charging electric vehicles indoors without ventilation, mechanical ventilation shall not be required.

(B) Ventilation Required.

Where the equipment is listed for charging electric vehicles that require ventilation for indoor charging, mechanical ventilation, such as a fan, shall be provided. The ventilation shall include both supply and exhaust equipment and shall be permanently installed and located to intake from, and vent directly to, the outdoors. Positive-pressure ventilation systems shall be permitted only in vehicle charging buildings or areas that have been specifically designed and approved for that application. Mechanical ventilation requirements shall be determined by one of the methods specified in 627.52(B)(1) through (B)(4).

(1) Table Values.

For supply voltages and currents specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2), the minimum ventilation requirements shall be as specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2) for each of the total number of electric vehicles that can be charged at one time.

Table 627.52(B)(1)(1) Minimum Ventilation Required in Cubic Meters per Minute (m³/min) for Each Number of ESVs That Can Be Charged at One Time

Branch-Circuit Ampere Rating	Branch-Circuit Voltage						
	Single Phase				3 Phase		
	DC ≥ 50 V	120 V	208 V	240 V or 120/240 V	208 V or 208Y/120 V	240 V	480 V or 480Y/277 V
15	0.5	1.1	1.8	2.1	—	—	—
20	0.6	1.4	2.4	2.8	4.2	4.8	9.7
30	0.9	2.1	3.6	4.2	6.3	7.2	15
40	1.2	2.8	4.8	5.6	8.4	9.7	19
50	1.5	3.5	6.1	7.0	10	12	24
60	1.8	4.2	7.3	8.4	13	15	29
100	2.9	7.0	12	14	21	24	48
150	—	—	—	—	31	36	73
200	—	—	—	—	42	48	97
250	—	—	—	—	52	60	120
300	—	—	—	—	63	73	145
350	—	—	—	—	73	85	170

Table 627.52(B)(1)(1) Minimum Ventilation Required in Cubic Meters per Minute (m³/min) for Each Number of ESVs That Can Be Charged at One Time

Branch-Circuit	Branch-Circuit Voltage						
	Single Phase				3 Phase		
	DC	240 V or			208 V or	480 V or	
Ampere Rating	≥ 50 V	120 V	208 V	120/240 V	208Y/120 V	240 V	480Y/277 V
400	—	—	—	—	84	97	195

Table 627.52(B)(1)(2) Minimum Ventilation Required in Cubic Feet per Minute (cfm) for Each of the Electric Vehicles That Can Be Charged at One Time

Branch-Circuit	Branch-Circuit Voltage							
	Single Phase				3 Phase			
	DC	240 V or			208 V or	480 V or		600 V or
Ampere Rating	≥ 50V	120 V	208 V	120/240 V	208Y/120 V	240 V	480Y/277 V	600Y/347 V
15	15.4	37	64	74	—	—	—	—
20	20.4	49	85	99	148	171	342	427
30	30.8	74	128	148	222	256	512	641
40	41.3	99	171	197	296	342	683	854
50	51.3	123	214	246	370	427	854	1066
60	61.7	148	256	296	444	512	1025	1281
100	102.5	246	427	493	740	854	1708	2135
150	—	—	—	—	1110	1281	2562	3203
200	—	—	—	—	1480	1708	3416	4270
250	—	—	—	—	1850	2135	4270	5338
300	—	—	—	—	2221	2562	5125	6406
350	—	—	—	—	2591	2989	5979	7473
400	—	—	—	—	2961	3416	6832	8541

(2) Other Values.

For supply voltages and currents other than specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2), the minimum ventilation requirements shall be calculated by means of the following general formulas, as applicable:

(1) Single-phase ac or dc:

Ventilation single-phase ac or dc in cubic meters per minute $m^3/min = \frac{(volts)(amperes)}{1718}$ [62]

$$\text{Ventilation single - phase ac or dc in cubic meters per minute } \left(\frac{m^3}{min} \right) = \frac{(volts)(amperes)}{1718}$$

Ventilation single-phase ac or dc in cubic feet per minute $cfm = \frac{(volts)(amperes)}{48.7}$ [62]

$$\text{Ventilation single - phase ac or dc in cubic feet per minute (cfm)} = \frac{(volts)(amperes)}{48.7}$$

(2) Three-phase ac:

Ventilation 3-phase ac or dc in cubic meters per minute $m^3/min = \frac{(1.732)(volts)(amperes)}{1718}$ [62]

$$\text{Ventilation 3 - phase ac or dc in cubic meters per minute } \left(\frac{m^3}{min} \right) = \frac{(1.732)(volts)(amperes)}{1718}$$

Ventilation 3-phase ac or dc in cubic feet per minute $cfm = \frac{(1.732)(volts)(amperes)}{48.7}$ [62]

$$\text{Ventilation 3 - phase ac or dc in cubic feet per minute (cfm)} = \frac{(1.732)(volts)(amperes)}{48.7}$$

(3) Engineered Systems.

For an equipment ventilation system designed by a person qualified to perform such calculations as an integral part of a building's total ventilation system, the minimum ventilation requirements shall be permitted to be determined in accordance with calculations specified in the engineering study.

(4) Supply Circuits.

The supply circuit to the mechanical ventilation equipment shall be electrically interlocked with the equipment and shall remain energized during the entire electric vehicle charging cycle. Equipment receptacles rated at 125 volts, single phase, 15 and 20 amperes shall be switched, and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the receptacle. Equipment supplied from less than 50 volts dc shall be switched and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the equipment.

627.54 Ground-Fault Circuit-Interrupter Protection for Personnel.

All receptacles installed for the connection of ESVSE shall have ground-fault circuit-interrupter protection for personnel.

627.56 Receptacle Enclosures.

All receptacles installed in a wet location for electric vehicle charging shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed. An outlet box hood installed for this purpose shall be listed and shall be identified as extra duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood shall not be required to be marked extra duty.

Part IV. Wireless Power Transfer Equipment

627.101 Grounding.

The primary pad base plate shall be of a nonferrous metal and shall be connected to the circuit equipment grounding conductor unless the listed WPTE employs a double-insulation system.

The base plate shall be sized to match the size of the primary pad enclosure.

627.102 Installation.

(A) General.

The control pad, if included in the WPTE configuration, shall comply with 627.102(B). The primary pad shall comply with 627.102(C).

(B) Control Box.

The control box enclosure shall be suitable for the environment and shall be mounted at a height not less than 450 mm (18 in.) above the floor level for indoor locations or 600 mm (24 in.) above grade level for outdoor locations. The control box shall be mounted in one of the following forms:

- (1) Pedestal
- (2) Wall or pole
- (3) Building or structure
- (4) Raised concrete pad

(C) Primary Pad.

The primary pad shall be installed secured to the surface or embedded in the surface of the floor with its top flush with the surface or below the surface, all per manufacturer's instructions and the following:

- (1) If the primary pad is located in an area requiring snow removal, it shall not be located on or above the surface.

Exception: Where installed on private property where snow removal is done manually, the primary pad shall be permitted to be installed on or above the surface.

- (2) The primary pad enclosure shall be suitable for the environment. If the primary pad is located in an area subject to severe climatic conditions (e.g., flooding), the enclosure shall be suitably rated for those conditions.

(D) Protection of Cords and Cables to the Primary Pad.

The output cable to the primary pad shall be secured in place over its entire length for the purpose of restricting its movement and to prevent strain at the connection points. If installed in

conditions where drive-over could occur, the cable shall be provided with supplemental protection.

Where there is no control box, the cord or cable supplying power to the primary pad shall be secured in place to restrict movement and to prevent strain at the connection points. Where subject to vehicular traffic, supplemental protection shall be provided.

(E) Other Wiring Systems.

Other wiring systems and fittings specifically listed for use on the WPTE shall be permitted.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_Article_627_FR-9039.docx	NEC_Article_627_FR-9039.docx	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Wed Jan 24 21:58:56 EST 2024

Committee Statement

Committee Statement: The revision provides requirements to address a gap in the standard and to address new technology regarding electric vehicles that do not meet the definition of Electric Vehicle in Article 100. These other vehicles include but are not limited to electric forklifts, electric ground support equipment found at airports, electric tractor and other similar construction equipment, golf carts, and electric boats and electric ferries. Article 625 is limited only to automotive-type vehicles that are used on-road and does not recognize the many other vehicles. These requirements provide needed guidance for the charging of these vehicles and power export from these vehicles.

Response Message: FR-9039-NFPA 70-2024

Public Input No. 3899-NFPA 70-2023 [New Article after 625]

Article 627 Electric Self-Propelled Vehicle Power Transfer System

Part I. General

627.1 Scope.

This article covers the electrical conductors and equipment connecting an electric self-propelled vehicle (ESV) to premises wiring for the purposes of charging, power export, or bidirectional current flow.

627.2 Listed.

Electric Self-Propelled Vehicle Supply Equipment (ESVSE) including power supply cords for the purposes of charging, power export, or bidirectional current flow shall be listed.

627.4 Voltages.

Unless other voltages are specified, the nominal ac system voltages of 120, 120/240, 208Y/120, 240, 480Y/277, 480, 600Y/347, 600, or 1000 volts or dc system input voltages of up to 1000 volts shall be used to supply equipment covered by this article. Output voltages to the ESV are not specified.

Part II. Equipment Construction

627.17 Cords and Cables.

(A) Power-Supply Cord.

The cable for cord-connected ESVSE shall comply with all of the following:

(1) Be any of the types specified in 627.17(B)(1) or hard service cord, junior hard service cord, or portable power cable types in accordance with Table 400.4. Hard service cord, junior hard service cord, or portable power cable types shall be listed, as applicable, for exposure to oil and damp and wet locations.

(2) Have an ampacity as specified in Table 400.5(A)(1) or, for 8 AWG and larger, in the 60°C (140°F) columns of Table 400.5(A)(2).

(3) Have an overall length as specified in either of the following:

a. When the interrupting device of the personnel protection system specified in 627.22 is located within the enclosure of the supply equipment or charging system, the power-supply cord shall be not more than the length indicated in (i) or (ii):

(i) For portable equipment in accordance with 627.44(A), the power-supply cord shall be not more than 300 mm (12 in.) long.

(ii) For fastened-in-place equipment in accordance with 627.44(B), the power-supply cord shall be not more than 1.8 m (6 ft) long and the equipment shall be installed at a height that prevents the power-supply cord from contacting the floor when it is connected to the proper receptacle.

b. When the interrupting device of the personnel protection system specified in 627.22 is located at the attachment plug, or within the first 300 mm (12 in.) of the power-supply cord, the overall cord length shall be not greater than 4.6 m (15 ft).

(B) Output Cable to ESV.

The output cable to an ESV shall be one of the following:

(1) Listed Type EV, EVJ, EVE, EVJE, EVT, or EVJT flexible cable as specified in Table 400.4

(2) An integral part of listed ESVSE.

(C) Overall Cord and Cable Length.

The overall usable length shall not exceed 7.5 m (25 ft) unless equipped with a cable management system that is part of the listed ESVSE.

(1) Portable Equipment.

For portable ESVSE, the cord-exposed usable length shall be measured from the face of the attachment plug to the face of the ESV connector.

(2) Fastened-in-Place.

Where the ESVSE is fastened-in-place, the usable length of the output cable to the ESV shall be measured from the cable exit of the ESVSE to the face of the ESV connector.

Where wireless power transfer equipment (WPTE) is fastened-in-place, the output cable to the primary pad shall be measured from the cable exit of the control box to the cable inlet at the primary pad.

(D) Interconnecting Cabling Systems.

Other cabling systems that are integral parts of listed supply equipment and are intended to interconnect pieces of equipment within an ESVSE system using approved installation methods shall be permitted.

627.22 Personnel Protection System.

ESVSE shall have a listed system of protection against electric shock of personnel. Where cord-and-plug-connected equipment is used, the interrupting device of a listed personnel protection system shall be provided according to 627.17(A). A personnel protection system shall not be required for power transfer equipment that supplies less than 60 volts dc.

Part III. Installation

627.40 ESVSE Branch Circuit.

Each outlet installed for the purpose of supplying ESVSE supply equipment greater than 16 amperes, or 120 volts shall be supplied by an individual branch circuit.

Exception: Branch circuits shall be permitted to feed multiple ESVSE as permitted by 627.42(A) or (B).

627.41 Overcurrent Protection.

Overcurrent protection for feeders and branch circuits supplying ESVSE and WPTE, including bidirectional equipment, shall be sized for continuous duty and shall have a current rating of not less than 125 percent of the maximum load of the equipment. Where noncontinuous loads are supplied from the same feeder, the overcurrent device shall have a current rating of not less than the sum of the noncontinuous loads plus 125 percent of the continuous loads.

627.42 Rating.

The ESVSE shall have sufficient rating to supply the load served. Charging loads shall be considered to be continuous loads for the purposes of this article. Service and feeder shall be sized in accordance with the product ratings, unless the overall rating of the installation can be limited through controls as permitted by 627.42(A) or (B).

(A) Energy Management System (EMS).

Where an EMS in accordance with 750.30 provides load management of ESVSE, the maximum equipment load on a service and feeder shall be the maximum load permitted by the EMS. The EMS shall be permitted to be integral to one piece of equipment or integral to a listed system consisting of more than one piece of equipment. When one or more pieces of equipment are provided with an integral load management control, the system shall be marked to indicate this control is provided.

(B) Supply Equipment with Adjustable Settings.

Supply equipment with restricted access to an ampere adjusting means complying with 750.30(C) shall be permitted. If adjustments have an impact on the rating label, those changes shall be in accordance with manufacturer's instructions, and the adjusted rating shall appear on the rating label with sufficient durability to withstand the environment involved. Supply equipment as referenced shall be permitted to have ampere ratings that are equal to the adjusted current setting.

627.43 Disconnecting Means.

For supply equipment rated more than 60 amperes or more than 150 volts to ground, the disconnecting means shall be provided and installed in a readily accessible location. If the disconnecting means is installed remote from the equipment, a plaque

shall be installed on the equipment denoting the location of the disconnecting means. The disconnecting means shall be lockable open in accordance with 110.25.

627.44 Equipment Connection.

ESVSE and WPTE shall be connected to the premises wiring system in accordance with one of the methods in 627.44(A) through (C).

(A) Portable Equipment.

Portable equipment shall be connected to the premises wiring system by one or more of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 125 volts, single phase, 15 or 20 amperes
- (2) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 250 volts, single phase, 15 or 20 amperes
- (3) A nonlocking, 2-pole, 3-wire or 3-pole, 4-wire grounding-type receptacle outlet rated at 250 volts, single phase, 30 or 50 amperes, or 125/250 volts, single-phase, 30, 50, or 60 amperes
- (4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 volts dc maximum, 15 or 20 amperes

(B) Fastened-in-Place Equipment.

Equipment that is fastened-in-place shall be connected to the premises wiring system by one of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 125 volts or 250 volts, single phase, up to 50 amperes
- (2) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 250 volts, three phase, up to 50 amperes
- (3) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 125/250 volts, single phase, 30, 50, or 60 amperes
- (4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 60 volts dc maximum, 15 or 20 amperes

(C) Fixed-in-Place Equipment.

All other ESVSE and WPTE shall be permanently wired and fixed-in-place to the supporting surface.

627.46 Loss of Primary Source.

Means shall be provided such that, upon loss of voltage from the utility or other electrical system(s), energy cannot be back fed through the ESV and the supply equipment to the premises wiring system unless permitted by 627.48.

627.47 Multiple Feeder or Branch Circuits.

Where equipment is identified for the application, more than one feeder or branch circuit shall be permitted to supply equipment.

627.48 Interactive Equipment.

ESVSE or WPTE that incorporates a power export function and that is part of an interactive system that serves as an optional standby system, an electric power production source, or a bidirectional power feed shall be listed and marked as suitable for that purpose. When used as an optional standby system, the requirements of Parts I and II of Article 702 shall apply; when used as an electric power production source, the requirements of Parts I and II of Article 705 shall apply. EVPE that provides a receptacle outlet as its point of power export shall be in accordance with 627.60.

627.49 Island Mode.

ESVPE and bidirectional ESVSE that incorporate a power export function shall be permitted to be a part of an interconnected power system operating in island mode.

627.50 Location.

The ESVSE shall be located for direct electrical coupling of the ESV connector (conductive or inductive) to the ESV. Unless specifically listed and marked for the location, the coupling means of the ESV shall be stored or located at a height of not less than 450 mm (18 in.) above the floor level for indoor locations or 600 mm (24 in.) above the grade level for outdoor locations. This requirement does not apply to portable ESVSE constructed in accordance with 627.44(A).

627.52 Ventilation.

The ventilation requirement for charging an ESV in an indoor enclosed space shall be determined by 627.52(A) or (B).

(A) Ventilation Not Required.

Where electric vehicle storage batteries are used or where the equipment is listed for charging electric vehicles indoors without ventilation, mechanical ventilation shall not be required.

(B) Ventilation Required.

Where the equipment is listed for charging electric vehicles that require ventilation for indoor charging, mechanical ventilation, such as a fan, shall be provided. The ventilation shall include both supply and exhaust equipment and shall be permanently installed and located to intake from, and vent directly to, the outdoors. Positive-pressure ventilation systems shall be permitted only in vehicle charging buildings or areas that have been specifically designed and approved for that application. Mechanical ventilation requirements shall be determined by one of the methods specified in 627.52(B)(1) through (B)(4).

(1) Table Values.

For supply voltages and currents specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2), the minimum ventilation requirements shall be as specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2) for each of the total number of electric vehicles that can be charged at one time.

Table 627.52(B)(1)(1) Minimum Ventilation Required in Cubic Meters per Minute (m³/min) for Each of the Total Number of ESVs That Can Be Charged at One Time

Branch-Circuit Ampere Rating	Branch-Circuit Voltage							
	Single Phase				3 Phase			
	DC	240 V or			208 V or	480 V or		
	≥ 50 V	120 V	208 V	120/240 V	208Y/120 V	240 V	480Y/277 V	600Y/347 V
15	0.5	1.1	1.8	2.1	—	—	—	—
20	0.6	1.4	2.4	2.8	4.2	4.8	9.7	12
30	0.9	2.1	3.6	4.2	6.3	7.2	15	18
40	1.2	2.8	4.8	5.6	8.4	9.7	19	24
50	1.5	3.5	6.1	7.0	10	12	24	30

Table 627.52(B)(1)(1) Minimum Ventilation Required in Cubic Meters per Minute (m³/min) for Each of the Total Number of ESVs That Can Be Charged at One Time

Branch-Circuit Ampere Rating	Branch-Circuit Voltage							
	Single Phase				3 Phase			
	DC ≥ 50 V	240 V or 120 V	208 V or 120/240 V	208 V or 120/240 V	208 V or 208Y/120 V	240 V or 240 V	480 V or 480Y/277 V	600 V or 600Y/347 V
60	1.8	4.2	7.3	8.4	13	15	29	36
100	2.9	7.0	12	14	21	24	48	60
150	—	—	—	—	31	36	73	91
200	—	—	—	—	42	48	97	120
250	—	—	—	—	52	60	120	150
300	—	—	—	—	63	73	145	180
350	—	—	—	—	73	85	170	210
400	—	—	—	—	84	97	195	240

Table 627.52(B)(1)(2) Minimum Ventilation Required in Cubic Feet per Minute (cfm) for Each of the Total Number of Electric Vehicles That Can Be Charged at One Time

Branch-Circuit Ampere Rating	Branch-Circuit Voltage							
	Single Phase				3 Phase			
	DC ≥ 50V	240 V or 120 V	208 V or 120/240 V	208 V or 120/240 V	208 V or 208Y/120 V	240 V or 240 V	480 V or 480Y/277 V	600 V or 600Y/347 V
15	15.4	37	64	74	—	—	—	—
20	20.4	49	85	99	148	171	342	427
30	30.8	74	128	148	222	256	512	641
40	41.3	99	171	197	296	342	683	854
50	51.3	123	214	246	370	427	854	1066
60	61.7	148	256	296	444	512	1025	1281
100	102.5	246	427	493	740	854	1708	2135
150	—	—	—	—	1110	1281	2562	3203
200	—	—	—	—	1480	1708	3416	4270
250	—	—	—	—	1850	2135	4270	5338
300	—	—	—	—	2221	2562	5125	6406
350	—	—	—	—	2591	2989	5979	7473
400	—	—	—	—	2961	3416	6832	8541

(2) Other Values.

For supply voltages and currents other than specified in Table 627.52(B)(1)(1) or Table 627.52(B)(1)(2), the minimum ventilation requirements shall be calculated by means of the following general formulas, as applicable:

(1) Single-phase ac or dc:

$$\text{Ventilation single - phase ac or dc in cubic meters per minute } \left(\frac{m^3}{min} \right) = \frac{(volts)(amperes)}{1718} \quad [627.52(B)(2)a]$$

$$\text{Ventilation single - phase ac or dc in cubic feet per minute (cfm)} = \frac{(volts)(amperes)}{48.7} \quad [627.52(B)(2)b]$$

(2) Three-phase ac:

$$\text{Ventilation 3 - phase ac or dc in cubic meters per minute } \left(\frac{m^3}{min} \right) = \frac{(1.732)(volts)(amperes)}{1718} \quad [627.52(B)(2)c]$$

$$\text{Ventilation 3 - phase ac or dc in cubic feet per minute (cfm)} = \frac{(1.732)(volts)(amperes)}{48.7} \quad [627.52(B)(2)d]$$

(3) Engineered Systems.

For an equipment ventilation system designed by a person qualified to perform such calculations as an integral part of a building's total ventilation system, the minimum ventilation requirements shall be permitted to be determined in accordance with calculations specified in the engineering study.

(4) Supply Circuits.

The supply circuit to the mechanical ventilation equipment shall be electrically interlocked with the equipment and shall remain energized during the entire electric vehicle charging cycle. Equipment receptacles rated at 125 volts, single phase, 15 and 20 amperes shall be switched, and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the receptacle. Equipment supplied from less than 50 volts dc shall be switched and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the equipment.

627.54 Ground-Fault Circuit-Interrupter Protection for Personnel.

All receptacles installed for the connection of ESVSE shall have ground-fault circuit-interrupter protection for personnel.

627.56 Receptacle Enclosures.

All receptacles installed in a wet location for electric vehicle charging shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed. An outlet box hood installed for this purpose shall be listed and shall be identified as extra duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood shall not be required to be marked extra duty.

Part IV. Wireless Power Transfer Equipment

627.101 Grounding.

The primary pad base plate shall be of a nonferrous metal and shall be connected to the circuit equipment grounding conductor unless the listed WPTE employs a double-insulation system. The base plate shall be sized to match the size of the primary pad enclosure.

627.102 Installation.

(A) General.

The control pad, if included in the WPTE configuration, shall comply with 627.102(B). The primary pad shall comply with 627.102(C).

(B) Control Box.

The control box enclosure shall be suitable for the environment and shall be mounted at a height not less than 450 mm (18 in.) above the floor level for indoor locations or 600 mm (24 in.) above grade level for outdoor locations. The control box shall be mounted in one of the following forms:

- (1) Pedestal
- (2) Wall or pole
- (3) Building or structure

(4) Raised concrete pad

(C) Primary Pad.

The primary pad shall be installed secured to the surface or embedded in the surface of the floor with its top flush with the surface or below the surface, all per manufacturer's instructions and the following:

(1) If the primary pad is located in an area requiring snow removal, it shall not be located on or above the surface.

Exception: Where installed on private property where snow removal is done manually, the primary pad shall be permitted to be installed on or above the surface.

(2) The primary pad enclosure shall be suitable for the environment. If the primary pad is located in an area subject to severe climatic conditions (e.g., flooding), the enclosure shall be suitably rated for those conditions.

(D) Protection of Cords and Cables to the Primary Pad.

The output cable to the primary pad shall be secured in place over its entire length for the purpose of restricting its movement and to prevent strain at the connection points. If installed in conditions where drive-over could occur, the cable shall be provided with supplemental protection.

Where there is no control box, the cord or cable supplying power to the primary pad shall be secured in place to restrict movement and to prevent strain at the connection points. Where subject to vehicular traffic, supplemental protection shall be provided.

(E) Other Wiring Systems.

Other wiring systems and fittings specifically listed for use on the WPTE shall be permitted.

**First Revision No. 9123-NFPA 70-2024 [Global Input]**

[Renumber sections 620.3 through 620.6, see attached word doc NEC_620_Global_FR-9123]

620.4 ³ Voltage Limitations.

The supply voltage shall not exceed 300 volts between conductors unless otherwise permitted in 620.3 ⁴ (A) through (C).

(A) Power Circuits.

Branch circuits to door operator controllers and door motors and branch circuits and feeders to motor controllers, driving machine motors, machine brakes, and motor-generator sets shall not have a circuit voltage in excess of 1000 volts. Internal voltages of power conversion equipment and functionally associated equipment, and the operating voltages of wiring interconnecting the equipment, shall be permitted to be higher, provided that all such equipment and wiring shall be listed for the higher voltages. Where the voltage exceeds 600 volts, warning labels or signs that read "DANGER — HIGH VOLTAGE" shall be attached to the equipment and shall be plainly visible. The danger sign(s) or label(s) shall comply with 110.21(B).

(B) Lighting Circuits.

Lighting circuits shall comply with the requirements of Article 410.

(C) Heating and Air-Conditioning Circuits.

Branch circuits for heating and air-conditioning equipment located on the elevator car shall not have a circuit voltage in excess of 1000 volts.

620.5 ⁴ Live Parts Enclosed.

All live parts of electrical apparatus in the hoistways, at the landings, in or on the cars of elevators and dumbwaiters, in the wellways or the landings of escalators or moving walks, or in the runways and machinery spaces of platform lifts and stairway chairlifts shall be enclosed to protect against accidental contact.

Informational Note: See 110.27 for guarding of live parts (1000 volts, nominal, or less).

620.6 ⁵ Working Clearances.

Working space shall be provided about controllers, disconnecting means, and other electrical equipment in accordance with 110.26(A).

Where conditions of maintenance and supervision ensure that only qualified persons examine, adjust, service, and maintain the equipment, the clearance requirements of 110.26(A) shall not be required where any of the conditions in 620.5 ⁶ (A) through (D) are met.

(A) Flexible Connections to Equipment.

Electrical equipment in the following is provided with flexible leads to all external connections so that it can be repositioned to meet the clear working space requirements of 110.26:

- (1) Controllers and disconnecting means for dumbwaiters, escalators, moving walks, platform lifts, and stairway chairlifts installed in the same space with the driving machine
- (2) Controllers and disconnecting means for elevators installed in the hoistway or on the car

(3) Controllers for door operators

(4) Other electrical equipment installed in the hoistway or on the car

(B) Guards.

Live parts of the electrical equipment are suitably guarded, isolated, or insulated to reduce the likelihood of inadvertent contact with live parts operating at voltages greater than 30 volts ac rms, 42 volts ac peak, or 60 volts dc, and the equipment can be examined, adjusted, serviced, or maintained while energized without removal of this protection.

(C) Examination, Adjusting, and Servicing.

Electrical equipment is not required to be examined, adjusted, serviced, or maintained while energized.

(D) Low Voltage.

Uninsulated parts are at a voltage not greater than 30 volts rms, 42 volts peak, or 60 volts dc.

620.7.6 Ground-Fault Circuit-Interrupter Protection for Personnel.

(A) Pits, Hoistways, and on Cars.

Each 125-volt, single-phase, 15- and 20-ampere receptacle installed in pits, in hoistways, on the cars of elevators and dumbwaiters associated with wind turbine tower elevators, on the platforms or in the runways and machinery spaces of platform lifts and stairway chairlifts, and in escalator and moving walk wellways shall be a listed Class A ground-fault circuit-interrupter type.

(B) Machine Rooms, Control Spaces, Machinery Spaces, Control Rooms, and Truss Interiors.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in machine rooms, control spaces, machinery spaces, control rooms, and truss interiors shall have listed Class A ground-fault circuit-interrupter protection for personnel.

(C) Sump Pumps.

A permanently installed sump pump shall be permanently wired or shall be supplied by a receptacle that is protected by a listed Class A ground-fault circuit-interrupter.

Supplemental Information

File Name	Description	Approved
NEC_620_Global_FR-9123.docx	NEC_620_Global_FR-9123	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Thu Jan 25 12:41:39 EST 2024

Committee Statement

Committee Statement:	Renumbered 620.3 through 620.6 to comply with the NEC Style Manual Section 2.2 for Numbering Conventions.
Response Message:	FR-9123-NFPA 70-2024

620.43 Voltage Limitations.

The supply voltage shall not exceed 300 volts between conductors unless otherwise permitted in 620.34(A) through (C).

(A) Power Circuits.

Branch circuits to door operator controllers and door motors and branch circuits and feeders to motor controllers, driving machine motors, machine brakes, and motor-generator sets shall not have a circuit voltage in excess of 1000 volts. Internal voltages of power conversion equipment and functionally associated equipment, and the operating voltages of wiring interconnecting the equipment, shall be permitted to be higher, provided that all such equipment and wiring shall be listed for the higher voltages. Where the voltage exceeds 600 volts, warning labels or signs that read "DANGER — HIGH VOLTAGE" shall be attached to the equipment and shall be plainly visible. The danger sign(s) or label(s) shall comply with 110.21(B).

(B) Lighting Circuits.

Lighting circuits shall comply with the requirements of Article 410.

(C) Heating and Air-Conditioning Circuits.

Branch circuits for heating and air-conditioning equipment located on the elevator car shall not have a circuit voltage in excess of 1000 volts.

620.54 Live Parts Enclosed.

All live parts of electrical apparatus in the hoistways, at the landings, in or on the cars of elevators and dumbwaiters, in the wellways or the landings of escalators or moving walks, or in the runways and machinery spaces of platform lifts and stairway chairlifts shall be enclosed to protect against accidental contact.

Informational Note: See 110.27 for guarding of live parts (1000 volts, nominal, or less).

620.65 Working Clearances.

Working space shall be provided about controllers, disconnecting means, and other electrical equipment in accordance with 110.26(A).

Where conditions of maintenance and supervision ensure that only qualified persons examine, adjust, service, and maintain the equipment, the clearance requirements of 110.26(A) shall not be required where any of the conditions in 620.56(A) through (D) are met.

(A) Flexible Connections to Equipment.

Electrical equipment in the following is provided with flexible leads to all external connections so that it can be repositioned to meet the clear working space requirements of 110.26:

1. Controllers and disconnecting means for dumbwaiters, escalators, moving walks, platform lifts, and stairway chairlifts installed in the same space with the driving machine
2. Controllers and disconnecting means for elevators installed in the hoistway or on the car

3. Controllers for door operators
4. Other electrical equipment installed in the hoistway or on the car

(B) Guards.

Live parts of the electrical equipment are suitably guarded, isolated, or insulated to reduce the likelihood of inadvertent contact with live parts operating at voltages greater than 30 volts ac rms, 42 volts ac peak, or 60 volts dc, and the equipment can be examined, adjusted, serviced, or maintained while energized without removal of this protection.

(C) Examination, Adjusting, and Servicing.

Electrical equipment is not required to be examined, adjusted, serviced, or maintained while energized.

(D) Low Voltage.

Uninsulated parts are at a voltage not greater than 30 volts rms, 42 volts peak, or 60 volts dc.

620.76 Ground-Fault Circuit-Interrupter Protection for Personnel.

(A) Pits, Hoistways, and on Cars.

Each 125-volt, single-phase, 15- and 20-ampere receptacle installed in pits, in hoistways, on the cars of elevators and dumbwaiters associated with wind turbine tower elevators, on the platforms or in the runways and machinery spaces of platform lifts and stairway chairlifts, and in escalator and moving walk wellways shall be a listed Class A ground-fault circuit-interrupter type.

(B) Machine Rooms, Control Spaces, Machinery Spaces, Control Rooms, and Truss Interiors.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in machine rooms, control spaces, machinery spaces, control rooms, and truss interiors shall have listed Class A ground-fault circuit-interrupter protection for personnel.

(C) Sump Pumps.

A permanently installed sump pump shall be permanently wired or shall be supplied by a receptacle that is protected by a listed Class A ground-fault circuit-interrupter.

**First Revision No. 9126-NFPA 70-2024 [Global Input]**

[Renumber Article 646 sections, see attached word document NEC_646_Global_FR-9126]

Article 646 Modular Data Centers

Part I. General

646.1 Scope.

This article covers modular data centers.

Informational Note No. 1: Modular data centers include the installed information technology equipment (ITE) and support equipment, electrical supply and distribution, wiring and protection, working space, grounding, HVAC, and the like, that are located in an equipment enclosure.

Informational Note No. 2: See NFPA 75, *Standard for the Fire Protection of Information Technology Equipment*, which covers the requirements for the protection of information technology equipment and systems in an information technology equipment room.

Informational Note No. 3: See UL 60950-1, *Information Technology Equipment — Safety — Part 1: General Requirements*, and UL 62368-1, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for information on listing requirements for both information technology equipment and communications equipment contained within a modular data center.

Informational Note No. 4: *Modular data centers* are sometimes referred to as containerized data centers.

Informational Note No. 5: Equipment enclosures housing only support equipment (e.g., HVAC or power distribution equipment) that are not part of a specific modular data center are not considered a modular data center.

646.4.3 Other Articles.

Circuits and equipment shall comply with 646.4.3 (A) through (M) as applicable. Wherever the requirements of other articles of this *Code* and Article 646 differ, the requirements of Article 646 shall apply.

(A) Spread of Fire or Products of Combustion.

Sections 300.21, 770.26, and 800.26 shall apply to penetrations of a fire-resistant room boundary, if provided.

(B) Wiring and Cabling in Other Spaces Used for Environmental Air (Plenums).

The following sections and tables shall apply to wiring and cabling in other spaces used for environmental air (plenums) within a modular data center space:

- (1) Wiring methods: 300.22(C)(1)
- (2) Class 2, Class 3, and PLTC cables: 722.135(B)
- (3) Fire alarm systems: 760.53(B)(2) and Table 760.154
- (4) Optical fiber cables: 770.113(C) and Table 770.154(a)
- (5) Communications circuits: 800.113(C) and Table 800.154(a)

(6) CATV and radio distribution systems: 800.113(C) and Table 800.154(a)

Informational Note: Environmentally controlled working spaces, aisles, and equipment areas in an MDC are not considered a plenum.

(C) Grounding and Bonding.

The non-current-carrying conductive members of optical fiber cables in an MDC shall be grounded in accordance with 770.114. Grounding and bonding of communications protectors, cable shields, and non-current-carrying metallic members of cable shall comply with Part IV of Article 805.

(D) Electrical Classification of Data Circuits.

Section 725.60(A)(4) shall apply to the electrical classification of listed information technology equipment signaling circuits.

(E) Fire Alarm Equipment.

Parts I, II, and III of Article 760 shall apply to fire alarm systems, cables, and equipment installed in an MDC, where provided. Only fire alarm cables listed in accordance with Part IV of Article 760 and listed fire alarm equipment shall be permitted to be installed in an MDC.

(F) Cable Routing Assemblies and Communications Wires, Cables, Raceways, and Equipment.

Sections 800.110, 800.113, and 800.154 shall apply to cable routing assemblies and communications raceways. Parts I, II, III, IV, and V of Articles 800 and 805 shall apply to communications wires, cables, and equipment installed in an MDC. Only communications wires and cables listed in accordance with 800.179, cable routing assemblies and communications raceways listed in accordance with 800.182, and communications equipment listed in accordance with 800.171 shall be permitted to be installed in an MDC.

Informational Note: See Article 100 for a definition of *communications equipment*.

(G) Community Antenna Television and Radio Distribution Systems Cables and Equipment.

Parts I, II, III, IV, and V of Articles 800 and 820 shall apply to community antenna television and radio distribution systems equipment installed in an MDC. Only community antenna television and radio distribution cables listed in accordance with 800.179 and listed CATV equipment shall be permitted to be installed in an MDC.

(H) Surge-Protective Devices (SPDs).

Where provided, surge-protective devices shall be listed and labeled and installed in accordance with Part II of Article 242.

(I) Lighting.

Lighting shall be installed in accordance with Parts I through XIV of Article 410.

(J) Power Distribution Wiring and Wiring Protection.

Power distribution wiring and wiring protection within an MDC shall comply with Parts I, II, and III of Article 210 for branch circuits.

(K) Wiring Methods and Materials.

Wiring methods and materials shall comply with the following:

- (1) Unless modified elsewhere in this article, wiring methods and materials for power distribution shall comply with Chapter 3. Wiring shall be suitable for its use and installation and shall be listed and labeled.

Exception: This requirement shall not apply to wiring that is part of listed and labeled equipment.

- (1) The following wiring methods shall not be permitted:
 - (a) Integrated gas spacer cable: Type IGS (Article 326)
 - (b) Concealed knob-and-tube wiring (Article 394)
 - (c) Messenger-supported wiring (Article 396)
 - (d) Open wiring on insulators (Article 398)
 - (e) Outdoor overhead conductors over 600 volts (Article 395)
- (2) Wiring in areas under a raised floor that are constructed and used for ventilation as described in 645.5(E) shall be permitted to use the wiring methods described in 645.5(E) if the conditions of 645.4 are met.
- (3) Installation of wiring for remote-control, signaling, and power-limited circuits shall comply with Part II of Article 725.
- (4) Installation of optical fiber cables shall comply with Part V of Article 770.
- (5) Alternate wiring methods as permitted by Article 645 shall be permitted for MDCs, provided that all of the conditions of 645.4 are met.

(L) Service Equipment.

For an MDC that is designed such that it can be powered from a separate electrical service, the service equipment for control and protection of services and their installation shall comply with Parts I, V, VI, and VII of Article 230. The service equipment and their arrangement and installation shall permit the installation of the service-entrance conductors in accordance with Parts I and IV of Article 230. Service equipment shall be listed and labeled and marked as being suitable for use as service equipment.

(M) Disconnecting Means.

An approved means shall be provided to disconnect power to all electronic equipment in the MDC in accordance with 645.10. There shall also be a similar approved means to disconnect the power to all dedicated HVAC systems serving the MDC that shall cause all required fire/smoke dampers to close.

646.5.4 Applicable Requirements.

All MDCs shall be listed and labeled and comply with 646.4.3 (M) and 646.6.5 through 646.10.9 or comply with this article.

Informational Note: See UL Subject 2755, *Outline of Investigation for Modular Data Centers*, for information on listing requirements for MDCs.

646.6.5 Nameplate Data.

A permanent nameplate shall be attached to each equipment enclosure of an MDC and shall be plainly visible after installation. The nameplate shall include the following information, as applicable:

- (1) Supply voltage, number of phases, frequency, and full-load current. The full-load current shown on the nameplate shall not be less than the sum of the full-load currents required for all motors and other equipment that may be in operation at the same time under normal conditions of use. Where unusual type loads, duty cycles, and so forth, require oversized conductors or permit reduced-size conductors, the required capacity shall be included in the marked full-load current. Where more than one incoming supply circuit is to be provided, the nameplate shall state the preceding information for each circuit. For listed equipment, the full-load current shown on the nameplate shall be permitted to be the maximum, measured, 15-minute, average full-load current.

Informational Note No. 1: See 430.22(E) and 430.26 for duty cycle requirements.

- (1) For MDCs powered by a separate service, the short-circuit current rating of the service equipment provided as part of the MDC.

Informational Note No. 2: This rating may be part of the service equipment marking.

- (1) For MDCs powered by a separate service, if the required service as determined by Parts III and IV of Article 220 is less than the rating of the service panel used, the required service shall be included on the nameplate. As an alternative to the feeder and service load calculations required by Parts III and IV of Article 220, feeder and service load calculations for new, future, or existing loads shall be permitted to be used if performed by qualified persons under engineering supervision.

Informational Note No. 3: Branch circuits supplying ITE loads are assumed to be loaded not less than 80 percent of the branch-circuit rating with a 100 percent duty cycle.

- (1) Electrical diagram number(s) or the number of the index to the electrical drawings.
- (2) For MDC equipment enclosures that are not powered by a separate service, feeder, or branch circuit, a reference to the powering equipment.
- (3) Manufacturer's name or trademark.

646.76 Supply Conductors and Overcurrent Protection.

- (A) Size.

The size of the supply conductor shall be such as to have an ampacity not less than 125 percent of the full-load current rating.

Informational Note No. 1: See the 0–2000-volt ampacity tables of Article 310 for ampacity of conductors rated 600 V and below.

Informational Note No. 2: See 430.22(E) and 430.26 for duty cycle requirements.

- (B) Overcurrent Protection.

Where overcurrent protection for supply conductors is furnished as part of the MDC, overcurrent protection for each supply circuit shall comply with 646.76 (B)(1) through (B)(2).

- (1) Service Equipment — Overcurrent Protection.

Service conductors shall be provided with overcurrent protection in accordance with 230.90 through 230.95.

- (2) Taps and Feeders.

Where overcurrent protection for supply conductors is furnished as part of the MDC as permitted by 240.21, the overcurrent protection shall comply with the following:

- (1) The overcurrent protection shall consist of a single circuit breaker or set of fuses.
- (2) The MDC shall be marked "OVERCURRENT PROTECTION PROVIDED AT MDC SUPPLY TERMINALS."
- (3) The supply conductors shall be considered either as feeders or as taps and be provided with overcurrent protection complying with 240.21.

646.87 Short-Circuit Current Rating.

- (A) Service Equipment.

The service equipment of an MDC that connects directly to a service shall have a short-circuit current

rating not less than the available fault current of the service.

(B) MDCs Connected to Branch Circuits and Feeders.

Modular data centers that connect to a branch circuit or a feeder circuit shall have a short-circuit current rating not less than the available fault current of the branch circuit or feeder. The short-circuit current rating of the MDC shall be based on the short-circuit current rating of a listed and labeled MDC or the short-circuit current rating established using an approved method.

Exception: This requirement shall not apply to listed and labeled equipment connected to branch circuits located inside of the MDC equipment enclosure.

Informational Note: See UL 508A-2018, *Standard for Industrial Control Panels, Supplement SB*, for an example of an approved method.

(C) MDCs Powered from Separate MDC System Enclosures.

Modular data center equipment enclosures, powered from a separate MDC system enclosure that is part of the specific MDC system, shall have a short-circuit current rating coordinated with the powering module in accordance with 110.10.

Informational Note: See UL 508A-2018, *Standard for Industrial Control Panels, Supplement SB*, for an example of an approved method for determining short-circuit current ratings.

646.9.8 Field-Wiring Compartments.

A field-wiring compartment in which service or feeder connections are to be made shall be readily accessible and comply with the following:

- (1) Permit the connection of the supply wires after the MDC is installed
- (2) Permit the connection to be introduced and readily connected
- (3) Be located so that the connections may be readily inspected after the MDC is installed

646.10.9 Flexible Power Cords and Cables for Connecting Equipment Enclosures of an MDC System.

(A) Uses Permitted.

Flexible power cords and cables shall be permitted to be used for connections between equipment enclosures of an MDC system where not subject to physical damage.

Informational Note: One example of flexible power cord usage for connections between equipment enclosures of an MDC system is between an MDC enclosure containing only servers and one containing power distribution equipment.

(B) Uses Not Permitted.

Flexible power cords and cables shall not be used for connection to external sources of power.

Informational Note: Examples of external sources of power are electrical services, feeders, and premises branch circuits.

(C) Listing.

Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords and cables shall also be listed as suitable for wet locations and shall be sunlight resistant.

(D) Single-Conductor Cable.

Single-conductor power cable shall be permitted to be used only in sizes 2 AWG or larger.

Part II. Equipment

646.10-20 Electrical Supply and Distribution.

Equipment used for electrical supply and distribution in an MDC, including fittings, devices, luminaires, apparatus, machinery, and the like, shall comply with Parts I and II of Article 110.

646.11-21 Distribution Transformers.

(A) Utility-Owned Transformers.

Utility-owned distribution transformers shall not be permitted in an MDC.

(B) Non-Utility-Owned Premises Transformers.

Non-utility-owned premises distribution transformers installed in the vicinity of an MDC shall be of the dry type or the type filled with a noncombustible dielectric medium. Such transformers shall be installed in accordance with Parts I and II of Article 450. Non-utility-owned premises distribution transformers shall not be permitted in an MDC.

(C) Power Transformers.

Power transformers that supply power only to the MDC shall be permitted to be installed in the MDC equipment enclosure. Only dry-type transformers shall be permitted to be installed in the MDC equipment enclosure. Such transformers shall be installed in accordance with Parts I, II, and III of Article 450.

646.12-22 Receptacles.

At least one 125-volt ac, 15- or 20-ampere-rated duplex convenience outlet shall be provided in each work area of the MDC to facilitate the powering of test and measurement equipment that may be required during routine maintenance and servicing, without having to route flexible power cords through or across doorways or around line-ups of equipment, or the like.

646.13-23 Other Electrical Equipment.

Electrical equipment that is an integral part of the MDC, including information technology equipment, lighting, control, power, HVAC (heating, ventilation, and air-conditioning), emergency lighting, alarm circuits, and so forth, shall comply with the requirements for its use and installation and shall be listed and labeled.

646.14-24 Installation and Use.

Listed and labeled equipment shall be installed and used in accordance with any instructions or limitations included in the listing.

Part III. Lighting

646.15-30 General Illumination.

Illumination shall be provided for all workspaces and areas that are used for exit access and exit discharge. The illumination shall be arranged so that the failure of any single lighting unit does not result in a complete loss of illumination.

Informational Note: See NFPA 101-2018, *Life Safety Code*, Section 7.8, for information on illumination of means of egress.

646.16-31 Emergency Lighting.

Areas that are used for exit access and exit discharge shall be provided with emergency lighting. Emergency lighting systems shall be listed and labeled equipment installed in accordance with the

manufacturer's instructions.

Informational Note: See NFPA 101-2018, *Life Safety Code*, Section 7.9, for information on emergency lighting.

646.17-32 Emergency Lighting Circuits.

No appliances or lamps, other than those specified as required for emergency use, shall be supplied by emergency lighting circuits. Branch circuits supplying emergency lighting shall be installed to provide service from storage batteries, generator sets, UPS, separate service, fuel cells, or unit equipment. No other equipment shall be connected to these circuits unless the emergency lighting system includes a backup system where only the lighting is supplied by battery circuits under power failure conditions. All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be marked to identify them as components of an emergency circuit or system.

Part IV. Workspace

646.18-40 General.

Space about electrical equipment shall comply with 110.26.

646.19-41 Entrance to and Egress from Working Space.

For equipment over 1.8 m (6 ft) wide or deep, there shall be one entrance to and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (6 ½ ft) high at each end of the working space. Doors shall open to the full extent of their designed egress opening and be equipped with listed panic hardware or listed fire exit hardware. A single entrance to and egress from the required working space shall be permitted where either of the conditions in 646.19 41 (A) or (B) is met.

(A) Unobstructed Egress.

Where the location permits a continuous and unobstructed way of egress travel, a single entrance to the working space shall be permitted.

(B) Extra Working Space.

Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located such that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.

646.20-42 Working Space for ITE.

(A) Low-Voltage Circuits.

The working space about ITE where any live parts that may be exposed during routine servicing operate at not greater than 30 volts rms, 42 volts peak, or 60 volts dc shall not be required to comply with the workspace requirements of 646.19 41.

(B) Other Circuits.

Any areas of ITE that require servicing of parts that are greater than 30 volts rms, 42 volts peak, or 60 volts dc shall comply with the workspace requirements of 646.19 41.

Informational Note No. 1: For example, field-wiring compartments for ac mains connections, power distribution units, and so forth.

Informational Note No. 2: It is assumed that ITE operates at voltages not exceeding 1000 volts.

646.21-43 Work Areas and Working Space About Batteries.

Working space about a battery system shall comply with 110.26. Working space shall be measured from the edges of the battery racks, cabinets, or trays.

646.~~22~~-44 Workspace for Routine Service and Maintenance.

Workspace shall be provided to facilitate routine servicing and maintenance (those tasks involving operations that can be accomplished by employees and where extensive disassembly of equipment is not required). Routine servicing and maintenance shall be able to be performed without exposing the worker to a risk of electric shock or personal injury.

Informational Note: An example of such routine maintenance is cleaning or replacing an air filter.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_646_Global_FR-9126.docx	NEC_646_Global_FR-9126	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Thu Jan 25 12:58:50 EST 2024

Committee Statement

Committee Statement: Subparts revised to comply with 2.2.1 and 4.1.3 of the 2023 NEC Style Manual. Changes made to the numbering of sections in each part to allow for expansion.

Response Message: FR-9126-NFPA 70-2024

Article 646 Modular Data Centers

Part I. General

646.1 Scope.

This article covers modular data centers.

Informational Note No. 1: Modular data centers include the installed information technology equipment (ITE) and support equipment, electrical supply and distribution, wiring and protection, working space, grounding, HVAC, and the like, that are located in an equipment enclosure.

Informational Note No. 2: See NFPA 75, *Standard for the Fire Protection of Information Technology Equipment*, which covers the requirements for the protection of information technology equipment and systems in an information technology equipment room.

Informational Note No. 3: See UL 60950-1, *Information Technology Equipment — Safety — Part 1: General Requirements*, and UL 62368-1, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for information on listing requirements for both information technology equipment and communications equipment contained within a modular data center.

Informational Note No. 4: *Modular data centers* are sometimes referred to as containerized data centers.

Informational Note No. 5: Equipment enclosures housing only support equipment (e.g., HVAC or power distribution equipment) that are not part of a specific modular data center are not considered a modular data center.

646.43 Other Articles.

Circuits and equipment shall comply with 646.43(A) through (M) as applicable. Wherever the requirements of other articles of this Code and Article 646 differ, the requirements of Article 646 shall apply.

(A) Spread of Fire or Products of Combustion.

Sections 300.21, 770.26, and 800.26 shall apply to penetrations of a fire-resistant room boundary, if provided.

(B) Wiring and Cabling in Other Spaces Used for Environmental Air (Plenums).

The following sections and tables shall apply to wiring and cabling in other spaces used for environmental air (plenums) within a modular data center space:

1. Wiring methods: 300.22(C)(1)
2. Class 2, Class 3, and PLTC cables: 722.135(B)
3. Fire alarm systems: 760.53(B)(2) and Table 760.154
4. Optical fiber cables: 770.113(C) and Table 770.154(a)
5. Communications circuits: 800.113(C) and Table 800.154(a)

6. CATV and radio distribution systems: 800.113(C) and Table 800.154(a)

Informational Note: Environmentally controlled working spaces, aisles, and equipment areas in an MDC are not considered a plenum.

(C) Grounding and Bonding.

The non-current-carrying conductive members of optical fiber cables in an MDC shall be grounded in accordance with 770.114. Grounding and bonding of communications protectors, cable shields, and non-current-carrying metallic members of cable shall comply with Part IV of Article 805.

(D) Electrical Classification of Data Circuits.

Section 725.60(A)(4) shall apply to the electrical classification of listed information technology equipment signaling circuits.

(E) Fire Alarm Equipment.

Parts I, II, and III of Article 760 shall apply to fire alarm systems, cables, and equipment installed in an MDC, where provided. Only fire alarm cables listed in accordance with Part IV of Article 760 and listed fire alarm equipment shall be permitted to be installed in an MDC.

(F) Cable Routing Assemblies and Communications Wires, Cables, Raceways, and Equipment.

Sections 800.110, 800.113, and 800.154 shall apply to cable routing assemblies and communications raceways. Parts I, II, III, IV, and V of Articles 800 and 805 shall apply to communications wires, cables, and equipment installed in an MDC. Only communications wires and cables listed in accordance with 800.179, cable routing assemblies and communications raceways listed in accordance with 800.182, and communications equipment listed in accordance with 800.171 shall be permitted to be installed in an MDC.

Informational Note: See Article 100 for a definition of *communications equipment*.

(G) Community Antenna Television and Radio Distribution Systems Cables and Equipment.

Parts I, II, III, IV, and V of Articles 800 and 820 shall apply to community antenna television and radio distribution systems equipment installed in an MDC. Only community antenna television and radio distribution cables listed in accordance with 800.179 and listed CATV equipment shall be permitted to be installed in an MDC.

(H) Surge-Protective Devices (SPDs).

Where provided, surge-protective devices shall be listed and labeled and installed in accordance with Part II of Article 242.

(I) Lighting.

Lighting shall be installed in accordance with Parts I through XIV of Article 410.

(J) Power Distribution Wiring and Wiring Protection.

Power distribution wiring and wiring protection within an MDC shall comply with Parts I, II, and III of Article 210 for branch circuits.

(K) Wiring Methods and Materials.

Wiring methods and materials shall comply with the following:

1. Unless modified elsewhere in this article, wiring methods and materials for power distribution shall comply with Chapter 3. Wiring shall be suitable for its use and installation and shall be listed and labeled.

Exception: This requirement shall not apply to wiring that is part of listed and labeled equipment.

2. The following wiring methods shall not be permitted:
 1. Integrated gas spacer cable: Type IGS (Article 326)
 2. Concealed knob-and-tube wiring (Article 394)
 3. Messenger-supported wiring (Article 396)
 4. Open wiring on insulators (Article 398)
 5. Outdoor overhead conductors over 600 volts (Article 395)
3. Wiring in areas under a raised floor that are constructed and used for ventilation as described in 645.5(E) shall be permitted to use the wiring methods described in 645.5(E) if the conditions of 645.4 are met.
4. Installation of wiring for remote-control, signaling, and power-limited circuits shall comply with Part II of Article 725.
5. Installation of optical fiber cables shall comply with Part V of Article 770.
6. Alternate wiring methods as permitted by Article 645 shall be permitted for MDCs, provided that all of the conditions of 645.4 are met.

(L) Service Equipment.

For an MDC that is designed such that it can be powered from a separate electrical service, the service equipment for control and protection of services and their installation shall comply with Parts I, V, VI, and VII of Article 230. The service equipment and their arrangement and installation shall permit the installation of the service-entrance conductors in accordance with Parts I and IV of Article 230. Service equipment shall be listed and labeled and marked as being suitable for use as service equipment.

(M) Disconnecting Means.

An approved means shall be provided to disconnect power to all electronic equipment in the MDC in accordance with 645.10. There shall also be a similar approved means to disconnect the power to all dedicated HVAC systems serving the MDC that shall cause all required fire/smoke dampers to close.

646.54 Applicable Requirements.

All MDCs shall be listed and labeled and comply with 646.43(M) and 646.65 through 646.109 or comply with this article.

Informational Note: See UL Subject 2755, *Outline of Investigation for Modular Data Centers*, for information on listing requirements for MDCs.

646.65 Nameplate Data.

A permanent nameplate shall be attached to each equipment enclosure of an MDC and shall be plainly visible after installation. The nameplate shall include the following information, as applicable:

1. Supply voltage, number of phases, frequency, and full-load current. The full-load current shown on the nameplate shall not be less than the sum of the full-load currents required for all motors and other equipment that may be in operation at the same time under normal conditions of use. Where unusual type loads, duty cycles, and so forth, require oversized conductors or permit reduced-size conductors, the required capacity shall be included in the marked full-load current. Where more than one incoming supply circuit is to be provided, the nameplate shall state the preceding information for each circuit. For listed equipment, the full-load current shown on the nameplate shall be permitted to be the maximum, measured, 15-minute, average full-load current.

Informational Note No. 1: See 430.22(E) and 430.26 for duty cycle requirements.

2. For MDCs powered by a separate service, the short-circuit current rating of the service equipment provided as part of the MDC.

Informational Note No. 2: This rating may be part of the service equipment marking.

3. For MDCs powered by a separate service, if the required service as determined by Parts III and IV of Article 220 is less than the rating of the service panel used, the required service shall be included on the nameplate. As an alternative to the feeder and service load calculations required by Parts III and IV of Article 220, feeder and service load calculations for new, future, or existing loads shall be permitted to be used if performed by qualified persons under engineering supervision.

Informational Note No. 3: Branch circuits supplying ITE loads are assumed to be loaded not less than 80 percent of the branch-circuit rating with a 100 percent duty cycle.

4. Electrical diagram number(s) or the number of the index to the electrical drawings.
5. For MDC equipment enclosures that are not powered by a separate service, feeder, or branch circuit, a reference to the powering equipment.
6. Manufacturer's name or trademark.

646.76 Supply Conductors and Overcurrent Protection.

(A) Size.

The size of the supply conductor shall be such as to have an ampacity not less than 125 percent of the full-load current rating.

Informational Note No. 1: See the 0–2000-volt ampacity tables of Article 310 for ampacity of conductors rated 600 V and below.

Informational Note No. 2: See 430.22(E) and 430.26 for duty cycle requirements.

(B) Overcurrent Protection.

Where overcurrent protection for supply conductors is furnished as part of the MDC, overcurrent protection for each supply circuit shall comply with 646.76(B)(1) through (B)(2).

(1) Service Equipment — Overcurrent Protection.

Service conductors shall be provided with overcurrent protection in accordance with 230.90 through 230.95.

(2) Taps and Feeders.

Where overcurrent protection for supply conductors is furnished as part of the MDC as permitted by 240.21, the overcurrent protection shall comply with the following:

1. The overcurrent protection shall consist of a single circuit breaker or set of fuses.
2. The MDC shall be marked “OVERCURRENT PROTECTION PROVIDED AT MDC SUPPLY TERMINALS.”
3. The supply conductors shall be considered either as feeders or as taps and be provided with overcurrent protection complying with 240.21.

646.87 Short-Circuit Current Rating.

(A) Service Equipment.

The service equipment of an MDC that connects directly to a service shall have a short-circuit current rating not less than the available fault current of the service.

(B) MDCs Connected to Branch Circuits and Feeders.

Modular data centers that connect to a branch circuit or a feeder circuit shall have a short-circuit current rating not less than the available fault current of the branch circuit or feeder. The short-circuit current rating of the MDC shall be based on the short-circuit current rating of a listed and labeled MDC or the short-circuit current rating established using an approved method.

Exception: This requirement shall not apply to listed and labeled equipment connected to branch circuits located inside of the MDC equipment enclosure.

Informational Note: See UL 508A-2018, *Standard for Industrial Control Panels, Supplement SB*, for an example of an approved method.

(C) MDCs Powered from Separate MDC System Enclosures.

Modular data center equipment enclosures, powered from a separate MDC system enclosure that is part of the specific MDC system, shall have a short-circuit current rating coordinated with the powering module in accordance with 110.10.

Informational Note: See UL 508A-2018, *Standard for Industrial Control Panels, Supplement SB*, for an example of an approved method for determining short-circuit current ratings.

646.98 Field-Wiring Compartments.

A field-wiring compartment in which service or feeder connections are to be made shall be readily accessible and comply with the following:

1. Permit the connection of the supply wires after the MDC is installed
2. Permit the connection to be introduced and readily connected
3. Be located so that the connections may be readily inspected after the MDC is installed

646.109 Flexible Power Cords and Cables for Connecting Equipment Enclosures of an MDC System.

(A) Uses Permitted.

Flexible power cords and cables shall be permitted to be used for connections between equipment enclosures of an MDC system where not subject to physical damage.

Informational Note: One example of flexible power cord usage for connections between equipment enclosures of an MDC system is between an MDC enclosure containing only servers and one containing power distribution equipment.

(B) Uses Not Permitted.

Flexible power cords and cables shall not be used for connection to external sources of power.

Informational Note: Examples of external sources of power are electrical services, feeders, and premises branch circuits.

(C) Listing.

Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords and cables shall also be listed as suitable for wet locations and shall be sunlight resistant.

(D) Single-Conductor Cable.

Single-conductor power cable shall be permitted to be used only in sizes 2 AWG or larger.

Part II. Equipment

646.10-20 Electrical Supply and Distribution.

Equipment used for electrical supply and distribution in an MDC, including fittings, devices, luminaires, apparatus, machinery, and the like, shall comply with Parts I and II of Article 110.

646.11-21 Distribution Transformers.

(A) Utility-Owned Transformers.

Utility-owned distribution transformers shall not be permitted in an MDC.

(B) Non-Utility-Owned Premises Transformers.

Non-utility-owned premises distribution transformers installed in the vicinity of an MDC shall be of the dry type or the type filled with a noncombustible dielectric medium. Such transformers shall be installed in accordance with Parts I and II of Article 450. Non-utility-owned premises distribution transformers shall not be permitted in an MDC.

(C) Power Transformers.

Power transformers that supply power only to the MDC shall be permitted to be installed in the MDC equipment enclosure. Only dry-type transformers shall be permitted to be installed in the MDC equipment enclosure. Such transformers shall be installed in accordance with Parts I, II, and III of Article 450.

646.~~12-22~~ Receptacles.

At least one 125-volt ac, 15- or 20-ampere-rated duplex convenience outlet shall be provided in each work area of the MDC to facilitate the powering of test and measurement equipment that may be required during routine maintenance and servicing, without having to route flexible power cords through or across doorways or around line-ups of equipment, or the like.

646.~~13-23~~ Other Electrical Equipment.

Electrical equipment that is an integral part of the MDC, including information technology equipment, lighting, control, power, HVAC (heating, ventilation, and air-conditioning), emergency lighting, alarm circuits, and so forth, shall comply with the requirements for its use and installation and shall be listed and labeled.

646.~~14-24~~ Installation and Use.

Listed and labeled equipment shall be installed and used in accordance with any instructions or limitations included in the listing.

Part III. Lighting

646.~~15-30~~ General Illumination.

Illumination shall be provided for all workspaces and areas that are used for exit access and exit discharge. The illumination shall be arranged so that the failure of any single lighting unit does not result in a complete loss of illumination.

Informational Note: See NFPA 101-2018, *Life Safety Code*, Section 7.8, for information on illumination of means of egress.

646.~~16-31~~ Emergency Lighting.

Areas that are used for exit access and exit discharge shall be provided with emergency lighting. Emergency lighting systems shall be listed and labeled equipment installed in accordance with the manufacturer's instructions.

Informational Note: See NFPA 101-2018, *Life Safety Code*, Section 7.9, for information on emergency lighting.

646.~~17~~-32 Emergency Lighting Circuits.

No appliances or lamps, other than those specified as required for emergency use, shall be supplied by emergency lighting circuits. Branch circuits supplying emergency lighting shall be installed to provide service from storage batteries, generator sets, UPS, separate service, fuel cells, or unit equipment. No other equipment shall be connected to these circuits unless the emergency lighting system includes a backup system where only the lighting is supplied by battery circuits under power failure conditions. All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be marked to identify them as components of an emergency circuit or system.

Part IV. Workspace

646.~~18~~-40 General.

Space about electrical equipment shall comply with 110.26.

646.~~19~~-41 Entrance to and Egress from Working Space.

For equipment over 1.8 m (6 ft) wide or deep, there shall be one entrance to and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (6 1/2 ft) high at each end of the working space. Doors shall open to the full extent of their designed egress opening and be equipped with listed panic hardware or listed fire exit hardware. A single entrance to and egress from the required working space shall be permitted where either of the conditions in 646.~~19~~41(A) or (B) is met.

(A) Unobstructed Egress.

Where the location permits a continuous and unobstructed way of egress travel, a single entrance to the working space shall be permitted.

(B) Extra Working Space.

Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located such that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.

646.~~20~~-42 Working Space for ITE.

(A) Low-Voltage Circuits.

The working space about ITE where any live parts that may be exposed during routine servicing operate at not greater than 30 volts rms, 42 volts peak, or 60 volts dc shall not be required to comply with the workspace requirements of 646.~~19~~41.

(B) Other Circuits.

Any areas of ITE that require servicing of parts that are greater than 30 volts rms, 42 volts peak, or 60 volts dc shall comply with the workspace requirements of 646.~~19~~41.

Informational Note No. 1: For example, field-wiring compartments for ac mains connections, power distribution units, and so forth.

Informational Note No. 2: It is assumed that ITE operates at voltages not exceeding 1000 volts.

646.~~21~~43 Work Areas and Working Space About Batteries.

Working space about a battery system shall comply with 110.26. Working space shall be measured from the edges of the battery racks, cabinets, or trays.

646.~~22~~44 Workspace for Routine Service and Maintenance.

Workspace shall be provided to facilitate routine servicing and maintenance (those tasks involving operations that can be accomplished by employees and where extensive disassembly of equipment is not required). Routine servicing and maintenance shall be able to be performed without exposing the worker to a risk of electric shock or personal injury.

Informational Note: An example of such routine maintenance is cleaning or replacing an air filter.

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SUBJECT TO REVISION - NOT FOR PUBLICATION



First Revision No. 8682-NFPA 70-2024 [Detail]

620.51(E)

(E) Surge Protection.

A surge-protective device (SPD) shall be provided as an integral part of the elevator system or installed immediately adjacent to the disconnecting means. ~~Where any of the disconnecting means in 620.51 has been designated as supplying an emergency system load, a legally required system load, or a critical operation power system load, a listed SPD shall be installed.~~

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 11:13:35 EST 2024

Committee Statement

Committee Statement: This revision specifies that the surge protection is as required in article 242, Part I. The listing requirement is removed because it is redundant to Section 242.6 which requires SPDs to be listed. Surge protection is most effective when it is located as close as possible to the equipment and is not allowed upstream of the disconnect.

Response Message: FR-8682-NFPA 70-2024

Public Input No. 3428-NFPA 70-2023 [Section No. 620.51(E)]



First Revision No. 8429-NFPA 70-2024 [Definition: Electric Vehicle Power Export Equipment (EVPE).]

Electric Vehicle Power Export Equipment (EVPE).

The equipment, including the outlet on the electric vehicle, that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the electric vehicle, using the electric vehicle as the source of supply. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric vehicle supply equipment (EVSE) or bidirectional wireless power transfer equipment (WPTE).

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 10:15:05 EST 2024

Committee Statement

Committee Statement: This revision adds the term 'electric' for clarity and to ensure that the definition pertains only to electric vehicles, which are defined in Article 100.

Response Message: FR-8429-NFPA 70-2024

Public Input No. 2580-NFPA 70-2023 [Definition: Electric Vehicle Power Export Equipment (EVPE).]



First Revision No. 8588-NFPA 70-2024 [Definition: Information Technology Equipment (ITE).]

Information Technology Equipment (ITE).

Equipment and systems rated 1000 volts or less, normally found in offices or other business establishments and similar environments classified as ordinary locations, that are used for creation and manipulation of data, voice, video, and similar signals ~~that are not communications equipment and do not process communications circuits~~. (CMP-12)

Informational Note: See UL 60950-1: 2007 , *Information Technology Equipment — Safety — Part 1: General Requirements*, or UL 62368-1: 2019 , *Audio/Video Information and Communication Technology Equipment Part 1: Safety Requirements*, for information on listing requirements for both information technology equipment and communications equipment.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 18:05:24 EST 2024

Committee Statement

Committee Statement: This revision clarifies that communications equipment is information technology equipment and removes the potential for inference by the user that there are differing requirements based on specific usage (e.g., communications/non-communications applications).

Response Message: FR-8588-NFPA 70-2024

[Public Input No. 4292-NFPA 70-2023 \[Definition: Information Technology Equipment \(ITE\).\]](#)

[Public Input No. 4047-NFPA 70-2023 \[Definition: Information Technology Equipment \(ITE\).\]](#)

**First Revision No. 8441-NFPA 70-2024 [Definition: Load Management.]****Load Management.**

The process within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (625) (CMP-12)

~~Informational Note: Load management is sometimes called *demand-side management* (DSM).~~

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 10:57:29 EST 2024

Committee Statement

Committee Statement: This revision removes the informational note since the application of load management is broader than demand side management and inclusion may cause confusion.

Response Message: FR-8441-NFPA 70-2024

[Public Input No. 4295-NFPA 70-2023 \[Definition: Load Management.\]](#)



First Revision No. 8456-NFPA 70-2024 [Definition: Truck Flanged Surface Inlet.]

Truck Flanged Surface Inlet.

The device(s) on the truck into which the connector(s) is inserted to provide electric energy and other services. This device is part of the truck coupler. ~~For the purposes of this article, the~~ The truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment. (626) (CMP-12)

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 11:47:02 EST 2024

Committee Statement

Committee Statement: This revision removes the introductory clause "For the purposes of this article" because it is not necessary. The reference to the article after the definition means that this definition only applies to article 626 in accordance with 2023 NEC Style Manual 2.1.2.6.2.

Response Message: FR-8456-NFPA 70-2024

Public Input No. 992-NFPA 70-2023 [Definition: Truck Flanged Surface Inlet.]

**First Revision No. 8476-NFPA 70-2024 [New Definition after Definition:****Electric Power Production ...]****Electric Self-Propelled Vehicle (ESV).**

A vehicle or marine vessel, other than an EV, such as farm equipment, boats, aircraft, and golf carts, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current.(627) (CMP-12)

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 13:43:45 EST 2024**Committee Statement**

Committee Statement: This revision provides a definition to differentiate vehicles in the new article on Electric Self-Propelled Vehicles from the existing definition of Electric Vehicles.

Response Message: FR-8476-NFPA 70-2024

Public Input No. 3894-NFPA 70-2023 [New Definition after Definition: Electric Power Production ...]

**First Revision No. 8479-NFPA 70-2024 [New Definition after Definition:****Electric Power Production ...]****Electric Self-Propelled Vehicle Power Export Equipment (ESVPE).**

The equipment, including the outlet on the electric self-propelled vehicle (ESV), that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the ESV, using the vehicle as the source of supply. (627) (CMP-12).

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric self-propelled vehicle supply equipment (ESVSE) or bidirectional wireless power transfer equipment (WPTE).

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 13:50:38 EST 2024

Committee Statement

Committee Statement: This revision provides a definition to differentiate vehicle power export equipment in the new article on Electric Self-Propelled Vehicles from the existing definition of Electric Vehicles Power Export Equipment.

Response Message: FR-8479-NFPA 70-2024

Public Input No. 3893-NFPA 70-2023 [New Definition after Definition: Electric Power Production ...]

**First Revision No. 8480-NFPA 70-2024 [New Definition after Definition:****Electric Power Production ...]****Electric Self-Propelled Vehicle Supply Equipment (ESVSE).**

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric self-propelled vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional ESVSE or bidirectional WPTE.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 13:55:22 EST 2024**Committee Statement**

Committee Statement: This revision provides a definition to differentiate vehicle supply equipment in the new article on Electric Self-Propelled Vehicles from the existing definition of Electric Vehicles Supply Equipment.

Response Message: FR-8480-NFPA 70-2024

Public Input No. 3887-NFPA 70-2023 [New Definition after Definition: Electric Power Production ...]



First Revision No. 8727-NFPA 70-2024 [Section No. 610.3]

610.3- 4 _ Special Requirements for Particular Locations.

~~_____ (A) _ Hazardous (Classified) Locations.~~

~~All equipment that operates in a hazardous (classified) location shall conform to Article- 500 .~~

~~(1)- Class I Locations.~~

~~Equipment used in locations that are hazardous because of the presence of flammable gases or vapors shall conform to Article- 501 .~~

~~(2)- Class II Locations.~~

~~Equipment used in locations that are hazardous because of combustible dust shall conform to Article- 502 .~~

~~(3)- Class III Locations.~~

~~Equipment used in locations that are hazardous because of the presence of easily ignitable fibers or flyings shall conform to Article- 503 .~~

~~(B)- Combustible Materials.~~

~~Where a crane, hoist, or monorail hoist operates over readily combustible material, the resistors shall be located as permitted in the following:~~

- ~~(1) -A well-ventilated cabinet composed of noncombustible material constructed so that it does not emit flames or molten metal~~
- ~~(2) -A cage or cab constructed of noncombustible material that encloses the sides of the cage or cab from the floor to a point at least 150 mm (6 in.) above the top of the resistors~~

~~(C B)- Electrolytic Cell Lines.~~

~~See 668.32 .~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8727_610.3.docx		

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 13:31:04 EST 2024

Committee Statement

Committee Statement: Section 4.1.4 of the 2023 NEC Style Manual prohibits referencing the entire article. All hazardous locations have to comply with Chapter 5. In addition, existing section 610.3 was renumbered to 610.4 in accordance with 2.2 of the NEC Style Manual. This is in reference to the Global Public Input 3086.

Response FR-8727-NFPA 70-2024
Message:

[Public Input No. 2988-NFPA 70-2023 \[Section No. 610.3\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

610.3 Special Requirements for Particular Locations. [Renumber as 610.4]

~~(A) Hazardous (Classified) Locations.~~

~~All equipment that operates in a hazardous (classified) location shall conform to Article 500.~~

~~(1) Class I Locations.~~

~~Equipment used in locations that are hazardous because of the presence of flammable gases or vapors shall conform to Article 501.~~

~~(2) Class II Locations.~~

~~Equipment used in locations that are hazardous because of combustible dust shall conform to Article 502.~~

~~(3) Class III Locations.~~

~~Equipment used in locations that are hazardous because of the presence of easily ignitable fibers or flyings shall conform to Article 503.~~

(BA) Combustible Materials.

Where a crane, hoist, or monorail hoist operates over readily combustible material, the resistors shall be located as permitted in the following:

1. A well ventilated cabinet composed of noncombustible material constructed so that it does not emit flames or molten metal
2. A cage or cab constructed of noncombustible material that encloses the sides of the cage or cab from the floor to a point at least 150 mm (6 in.) above the top of the resistors

(CB) Electrolytic Cell Lines.

See 668.32.

**First Revision No. 8730-NFPA 70-2024 [Section No. 610.42(A)]****(A) Fuse or Circuit Breaker Rating.**

Crane, hoist, and monorail hoist motor branch circuits shall be protected by fuses or inverse-time circuit breakers that have a rating in accordance with ~~Table 430.52(C)(1)~~. Where two or more motors operate a single motion, the sum of their nameplate current ratings shall be considered as that of a single motor.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 13:37:14 EST 2024**Committee Statement**

Committee Statement: This revision changes the reference to 430.52 instead of the reference to Table 430.52(C)(1) to allow the user the full application of the applicable exceptions and allowance of that section.

Response Message: FR-8730-NFPA 70-2024

[Public Input No. 1520-NFPA 70-2023 \[Section No. 610.42\(A\)\]](#)

**First Revision No. 8624-NFPA 70-2024 [Section No. 620.3]****620.3– 3 _ Voltage Limitations.**

The supply voltage shall not exceed 300 volts between conductors unless otherwise permitted in 620.3(A)- through- and (C B).

(A) Power Circuits.

Branch circuits to door operator controllers and door motors and branch circuits and feeders to motor controllers, driving machine motors, machine brakes, and motor-generator sets shall not have a circuit voltage in excess of 1000 volts. Internal voltages of power conversion equipment and functionally associated equipment, and the operating voltages of wiring interconnecting the equipment, shall be permitted to be higher, provided that all such equipment and wiring shall be listed for the higher voltages. Where the voltage exceeds 600 volts, warning labels or signs that read "DANGER — HIGH VOLTAGE" shall be attached to the equipment and shall be plainly visible. The danger sign(s) or label(s) shall comply with 110.21(B).

(B)_

Lighting Circuits.

Lighting circuits shall comply with the requirements of Article 410 .

(C)– Heating and Air Conditioning Circuits.

Branch circuits for heating and air conditioning equipment located on the elevator car shall not have a circuit voltage in excess of 1000 volts.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8624_620.3.docx		

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 08:20:29 EST 2024

Committee Statement

Committee Statement: Requirements for lighting circuits are deleted because they are redundant. 2023 NEC Style Manual 4.1.1 prohibits references to redundant requirements.

Response Message: FR-8624-NFPA 70-2024

Public Input No. 2233-NFPA 70-2023 [Sections 620.3(B), 620.3(C)]

620.3 Voltage Limitations.

The supply voltage shall not exceed 300 volts between conductors unless otherwise permitted in 620.3(A) ~~through and 620.3~~(~~CB~~).

(A) Power Circuits.

Branch circuits to door operator controllers and door motors and branch circuits and feeders to motor controllers, driving machine motors, machine brakes, and motor-generator sets shall not have a circuit voltage in excess of 1000 volts. Internal voltages of power conversion equipment and functionally associated equipment, and the operating voltages of wiring interconnecting the equipment, shall be permitted to be higher, provided that all such equipment and wiring shall be listed for the higher voltages. Where the voltage exceeds 600 volts, warning labels or signs that read "DANGER — HIGH VOLTAGE" shall be attached to the equipment and shall be plainly visible. The danger sign(s) or label(s) shall comply with 110.21(B).

~~**(B) Lighting Circuits.**~~

~~Lighting circuits shall comply with the requirements of Article 410.~~

~~**(CB) Heating and Air-Conditioning Circuits.**~~

Branch circuits for heating and air-conditioning equipment located on the elevator car shall not have a circuit voltage in excess of 1000 volts.

**First Revision No. 8629-NFPA 70-2024 [Section No. 620.6(C)]****(C)– Sump Pumps.**

~~A permanently installed sump pump shall be permanently wired or shall be supplied by a receptacle that is protected by a listed Class A ground-fault circuit-interrupter.~~

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 08:37:24 EST 2024**Committee Statement**

Committee Statement: The revision deletes the requirement for sump pump wiring which is redundant to the GFCI requirements in 422.5(A) which apply to all sump pumps.

Response Message: FR-8629-NFPA 70-2024

Public Input No. 670-NFPA 70-2023 [Section No. 620.6(C)]

**First Revision No. 8634-NFPA 70-2024 [New Section after 620.16]****(C) Available Fault Current Field Marking.**

The elevator control panel shall be legibly marked in the field with the available fault current at its line terminals. The field marking(s) shall include the date the available fault current calculation was performed and shall meet the requirements of 110.21(B). The calculation shall be documented and made available to those authorized to design, install, inspect, maintain, or operate the system.

When modifications to the electrical system occur that affect the available fault current at the elevator control panel, the available fault current shall be verified or recalculated as necessary to ensure the elevator control panel's short-circuit current rating is sufficient for the available fault current at the line terminals of the equipment. The required field marking(s) shall be adjusted to reflect the new level of available fault current.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 08:57:31 EST 2024

Committee Statement

Committee Statement: It is critical that an elevator control panel is rated for the available fault current at its point of supply. Given the design complexity of the elevator control panel, it can often have a low short circuit current rating. This change provides much needed information to aid the AHJ when enforcing 620.16(B). Without this information, it is very difficult for an electrical inspector to verify that the conditions of 620.16(B) are met.

Response Message: FR-8634-NFPA 70-2024

[Public Input No. 3826-NFPA 70-2023 \[New Section after 620.16\]](#)

**First Revision No. 8640-NFPA 70-2024 [Section No. 620.21(A)(1)]****(1) Hoistways and Pits.**

(a) Types CL2P, CL2R, and CL2 cables shall be permitted, provided the cables are supported and protected from physical damage. Substitute cables for Class 2 cables installed in accordance with 722.135(E) shall be permitted.

(b) Types CL4P, CL4R, and CL4 cables shall be permitted, provided the cables are supported and protected from physical damage.

(c) Flexible cords and cables that are components of listed equipment and used in circuits operating at 30 volts rms or less or 42 volts dc or less shall be permitted, provided the cords and cables are supported and protected from physical damage and are of a jacketed and flame-retardant type.

(d) The following wiring methods shall be permitted in the hoistway in lengths not to exceed 1.8 m (6 ft):

(5) Flexible metal conduit.

(6) Liquidtight flexible metal conduit.

(7) Liquidtight flexible nonmetallic conduit.

(8) Flexible cords and cables, or conductors grouped together and taped or corded, shall be permitted to be installed without a raceway. They shall be located to be protected from physical damage, shall be of a flame-retardant type, and shall be part of one of the following:

(9) Listed equipment

(10) Driving machine

(11) Driving machine brake

Exception to 620.21(A)(1)(c)(1), (A)(1)(c)(2), and (A)(1)(c)(3): The conduit length shall not be required to be limited between risers and limit switches, interlocks, operating buttons, and similar devices.

(l) A sump pump or oil recovery pump located in the pit shall be permitted to be cord connected. The cord shall be a hard usage oil-resistant type, of a length not to exceed 1.8 m (6 ft), and shall be located to be protected from physical damage.

(m) Hard-service cords and junior hard-service cords that conform to the requirements of Article 400 (Table 400.4) shall be permitted as flexible connections between the fixed wiring in the hoistway and hoistway access switches when located in the hoistway door sight guard.

Informational Note: See ASME A17.1-2019 2022 /CSA B44-19 :22 , *Safety Code for Elevators and Escalators*.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8640_620.21_A_1_.docx		

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 09:11:39 EST 2024

Committee Statement

Committee Statement: This revision adds Class 4 cables to the list to correct an omission in the 2023 Code. Changing the reference from Article 400 to Table 400.4 complies with the NEC Style Manual Section 4.1.4. The reference date to ASME A17.1 was updated.

Response Message: FR-8640-NFPA 70-2024

[Public Input No. 4346-NFPA 70-2023 \[Section No. 620.21\(A\)\(1\)\]](#)

[Public Input No. 2995-NFPA 70-2023 \[Section No. 620.21\(A\)\(1\)\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

(1) Hoistways and Pits.

1. Types CL2P, CL2R, and CL2 cables shall be permitted, provided the cables are supported and protected from physical damage. Substitute cables for Class 2 cables installed in accordance with 722.135(E) shall be permitted.
2. Types CL4P, CL4R, and CL4 cables shall be permitted, provided the cables are supported and protected from physical damage.
- 2.3. Flexible cords and cables that are components of listed equipment and used in circuits operating at 30 volts rms or less or 42 volts dc or less shall be permitted, provided the cords and cables are supported and protected from physical damage and are of a jacketed and flame-retardant type.
- 3.4. The following wiring methods shall be permitted in the hoistway in lengths not to exceed 1.8 m (6 ft):
 1. Flexible metal conduit.
 2. Liquidtight flexible metal conduit.
 3. Liquidtight flexible nonmetallic conduit.
 4. Flexible cords and cables, or conductors grouped together and taped or cored, shall be permitted to be installed without a raceway. They shall be located to be protected from physical damage, shall be of a flame-retardant type, and shall be part of one of the following:
 1. Listed equipment
 2. Driving machine
 3. Driving machine brake

Exception to 620.21(A)(1)(c)(1), (A)(1)(c)(2), and (A)(1)(c)(3): The conduit length shall not be required to be limited between risers and limit switches, interlocks, operating buttons, and similar devices.
- 4.5. A sump pump or oil recovery pump located in the pit shall be permitted to be cord connected. The cord shall be a hard usage oil-resistant type, of a length not to exceed 1.8 m (6 ft), and shall be located to be protected from physical damage.
- 5.6. Hard-service cords and junior hard-service cords that conform to the requirements of Article 400 (Table 400.4) shall be permitted as flexible connections between the fixed wiring in the hoistway and hoistway access switches when located in the hoistway door sight guard.

Informational Note: See ASME A17.1-~~2019~~2022/CSA B44-~~19~~22, *Safety Code for Elevators and Escalators*.

**First Revision No. 8644-NFPA 70-2024 [Section No. 620.21(A)(2)]****(2) Cars.**

(a) Flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit of metric designator 12 (trade size $\frac{3}{8}$), or larger, not exceeding 1.8 m (6 ft) in length, shall be permitted on cars where so located as to be free from oil and if securely fastened in place.

Exception: Liquidtight flexible nonmetallic conduit (LFNC-B) of metric designator 12 (trade size $\frac{3}{8}$) or larger shall be permitted in lengths in excess of 1.8 m (6 ft).

(b) Hard-service cords and junior hard-service cords that conform to the requirements of Article 400 (Table 400.4) shall be permitted as flexible connections between the fixed wiring on the car and devices on the car doors or gates. Hard-service cords only shall be permitted as flexible connections for the top-of-car operating device or the car-top work light. Devices or luminaires shall be grounded by means of an equipment grounding conductor run with the circuit conductors. Cables with smaller conductors and other types and thicknesses of insulation and jackets shall be permitted as flexible connections between the fixed wiring on the car and devices on the car doors or gates, if listed for this use.

(c) Flexible cords and cables that are components of listed equipment and used in circuits operating at 30 volts rms or less or 42 volts dc or less shall be permitted, provided the cords and cables are supported and protected from physical damage and are of a jacketed and flame-retardant type.

(d) The following wiring methods shall be permitted on the car assembly in lengths not to exceed 1.8 m (6 ft):

(5) Flexible metal conduit

(6) Liquidtight flexible metal conduit

(7) Liquidtight flexible nonmetallic conduit

(8) Flexible cords and cables, or conductors grouped together and taped or cored, shall be permitted to be installed without a raceway. They shall be located to be protected from physical damage and shall be of a flame-retardant type and shall be part of one of the following:

(9) Listed equipment

(10) A driving machine

(11) A driving machine brake

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 09:25:26 EST 2024

Committee Statement

Committee Statement: This revision changes the reference from Article 400 to Table 400.4 to comply with the NEC Style Manual Section 4.1.4, which prohibits referencing entire articles.
Response Message: FR-8644-NFPA 70-2024

[Public Input No. 2996-NFPA 70-2023 \[Section No. 620.21\(A\)\(2\)\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

**First Revision No. 8646-NFPA 70-2024 [Section No. 620.21(A)(3)]****(3) Within Machine Rooms, Control Rooms, and Machinery Spaces and Control Spaces.**

(a) Flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit of metric designator 12 (trade size $\frac{3}{8}$), or larger, not exceeding 1.8 m (6 ft) in length, shall be permitted ~~between control panels and machine motors, machine brakes, motor-generator sets, disconnecting means, and pumping unit motors and valves .~~

Exception: Liquidtight flexible nonmetallic conduit (LFNC-B) metric designator 12 (trade size $\frac{3}{8}$) or larger shall be permitted to be installed in lengths in excess of 1.8 m (6 ft).

(b) Where motor-generators, machine motors, or pumping unit motors and valves are located adjacent to or underneath control equipment and are provided with extra-length terminal leads not exceeding 1.8 m (6 ft) in length, such leads shall be permitted to be extended to connect directly to controller terminal studs without regard to the carrying-capacity requirements of ~~Articles 430 and 445~~ . Auxiliary gutters shall be permitted in machine and control rooms between controllers, starters, and similar apparatus.

(c) Flexible cords and cables that are components of listed equipment and used in circuits operating at 30 volts rms or less or 42 volts dc or less shall be permitted, provided the cords and cables are supported and protected from physical damage and are of a jacketed and flame-retardant type.

(d) On existing or listed equipment, conductors shall also be permitted to be grouped together and taped or corded without being installed in a raceway. Such cable groups shall be supported at intervals not over 900 mm (3 ft) and located so as to be protected from physical damage.

(e) Flexible cords and cables in lengths not to exceed 1.8 m (6 ft) that are of a flame-retardant type and located to be protected from physical damage shall be permitted in these rooms and spaces without being installed in a raceway. They shall be part of one of the following:

- (6) Listed equipment
- (7) A driving machine
- (8) A driving machine brake

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 09:27:05 EST 2024

Committee Statement

Committee Statement: This revision removes the list of components to allow this wiring method to apply to all permitted applications. The word "current" was added to resolve an omission in the 2023 NEC. 2023 NEC Style Manual 4.1.1 prohibits the reference to entire articles.

Response Message: FR-8646-NFPA 70-2024

WORKING DRAFT OF PANEL MEETING OUTPUT
NEC CMP-12, January 21 - 23, 2024, Subject to Revision - Not for Publication

[Public Input No. 2998-NFPA 70-2023 \[Section No. 620.21\(A\)\(3\)\]](#)

[Public Input No. 3362-NFPA 70-2023 \[Section No. 620.21\(A\)\(3\)\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

**First Revision No. 8648-NFPA 70-2024 [Section No. 620.21(B)(3)]****(3) Flexible Cords.**

Hard-service cords that conform to the requirements of ~~Article 400~~ (Table 400.4) shall be permitted as flexible connections on escalators and moving walk control panels and disconnecting means where the entire control panel and disconnecting means are arranged for removal from machine spaces as permitted in 620.5.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 09:34:40 EST 2024**Committee Statement**

Committee Statement: This revision changes the reference to Article 400 to Table 400.4 to comply with 2023 NEC Style Manual 4.1.4, which prohibits referencing entire Articles.

Response Message: FR-8648-NFPA 70-2024

Public Input No. 3037-NFPA 70-2023 [Section No. 620.21(B)(3)]



First Revision No. 8658-NFPA 70-2024 [Section No. 620.22(A)]

(A) Car Light Receptacles, Auxiliary Lighting, and Ventilation.

(1) Separate Branch Circuit.

A separate branch circuit shall supply the car lights in each car . The car lights branch circuit shall be permitted to supply receptacles (alarm devices, emergency responder radio coverage (ERRC), car ventilation purification systems, monitoring the following:

- (1) receptacles for:
 - (2) Alarm devices
 - (3) Monitoring devices not part of the control system

~~), auxiliary~~

- (1)
 - (a)
 - (2) Auxiliary lighting power source

~~, car~~

- (1)
 - (2) Car emergency signaling

~~, communications~~

- (1)
 - (2) Communications devices (including their associated charging circuits)

~~, and ventilation~~

- (1)
 - (2) Ventilation on each elevator car or inside the operation controller

~~.~~

- (1)
 - (2) Overcurrent Protective Device

The overcurrent device protecting the branch circuit shall be located in the elevator machine room, control room, machinery space, or control space. Where there is no machine room, control room, machinery space, or control space outside the hoistway, the overcurrent device shall be located outside the hoistway and accessible to qualified persons only.

Required lighting shall not be connected to the load side of a ground-fault circuit interrupter.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_620.22_FR-8658.docx	NEC_620.22_FR-8658	
NEC_620.22_FR-8658.docx	For prod use	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 09:51:55 EST 2024

Committee Statement

Committee Statement: The revision breaks the section up and provides clearer indication of a requirement that was previously difficult to find. The NFPA Manual of Style referenced by NEC Style Manual 1.2.1 requires that a list format be used for multiple requirements in a single section. Clarifies that a branch circuit is required for each car. Decorative lighting was not included in the permitted branch circuit loads due to the possibility of overloading the circuit.

Response Message: FR-8658-NFPA 70-2024

[Public Input No. 1124-NFPA 70-2023 \[Section No. 620.22\(A\)\]](#)

[Public Input No. 4198-NFPA 70-2023 \[Section No. 620.22\(A\)\]](#)

[Public Input No. 2331-NFPA 70-2023 \[Section No. 620.22\(A\)\]](#)

[Public Input No. 3368-NFPA 70-2023 \[Section No. 620.22\(A\)\]](#)

(A) Car Light Receptacles, Auxiliary Lighting, and Ventilation.

(1) Separate Branch Circuit.

A separate branch circuit shall supply the car lights in each car. The car lights branch circuit shall be permitted to supply the following:

- (1) ~~R~~Receptacles for {
 - a. ~~A~~Alarm devices, ~~emergency responder radio coverage (ERRC), car ventilation purification systems,~~
 - b. ~~M~~Monitoring devices not part of the control system};
 - c. ~~Emergency responder radio coverage (ERRC)~~
- (2) ~~A~~Auxiliary lighting power source;
- (3) ~~C~~Car emergency signaling;
- (4) ~~C~~Communications devices (including their associated charging circuits), ~~and~~
- (5) ~~V~~Ventilation on each elevator car or inside the operation controller.
- (6) ~~Car ventilation purification systems~~

(2) Overcurrent Protective Device.

The overcurrent device protecting the branch circuit shall be located in the elevator machine room, control room, machinery space, or control space. Where there is no machine room, control room, machinery space, or control space outside the hoistway, the overcurrent device shall be located outside the hoistway and accessible to qualified persons only.

Required lighting shall not be connected to the load side of a ground-fault circuit interrupter.

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**First Revision No. 8660-NFPA 70-2024 [Section No. 620.24(C)]****(C) Duplex Receptacle.**

At least one 125-volt, single-phase, 15- or 20-ampere duplex receptacle shall be provided in the hoistway pit.

Informational Note No. 1: See ASME A17.1-2016 2022 /CSA B44-16 :22 , *Safety Code for Elevators and Escalators*, for illumination levels.

Informational Note No. 2: See 620.6 for ground-fault circuit-interrupter requirements.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 10:05:29 EST 2024

Committee Statement

Committee Statement: The revision updates the ASME/CSA reference dates in Informational Note No. 1 to comply with the NFPA Manual of Style as referenced by the NEC Style Manual 1.2.1.

Response Message: FR-8660-NFPA 70-2024

**First Revision No. 8661-NFPA 70-2024 [Section No. 620.32]****620.32 – Metal Wireways and Nonmetallic Wireways.**

The sum of the cross-sectional area of the individual conductors in a wireway shall not be more than 50 percent of the interior cross-sectional area of the wireway.

Vertical runs of wireways shall be securely supported at intervals not exceeding 4.5 m (15 ft) and shall have not more than one joint between supports. Adjoining wireway sections shall be securely fastened together to provide a rigid joint.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 10:10:51 EST 2024

Committee Statement

Committee Statement: This revision deletes this section which conflicts with the rules in 376.22 and 376.30 and the listing requirements for metal wireways and nonmetallic wireways.

Response Message: FR-8661-NFPA 70-2024

[Public Input No. 579-NFPA 70-2023 \[Section No. 620.32\]](#)

**First Revision No. 8663-NFPA 70-2024 [Section No. 620.33]****620.33** – Number of Conductors in Raceways.

The sum of the cross-sectional area of the individual conductors in raceways shall not exceed 40 percent of the interior cross-sectional area of the raceway, except as permitted in 620.32 for wireways.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 10:18:39 EST 2024**Committee Statement**

Committee Statement: This revision deletes this section which conflicts with the general requirements in Chapter 3 for percent fill of conductors in raceway.

Response Message: FR-8663-NFPA 70-2024

[Public Input No. 578-NFPA 70-2023 \[Section No. 620.33\]](#)

**First Revision No. 8830-NFPA 70-2024 [Section No. 620.51]****620.51 Disconnecting Means.**

A single means for disconnecting all ungrounded main power supply conductors for each control system of an elevator, dumbwaiter, escalator, moving walk, platform lift, or stairway chairlift shall be provided and be designed so that no pole can be operated independently. Where multiple driving machines are connected to a single elevator, escalator, moving walk, or pumping unit, there shall be one disconnecting means to disconnect the motor(s) and control valve operating magnets.

The disconnecting means for the main power supply conductors shall not disconnect the branch circuits required in 620.22, 620.23, and 620.24.

(A) Type.

The disconnecting means shall be an enclosed externally operable fused motor circuit switch or circuit breaker that is lockable only in the open position in accordance with 110.25.

The disconnecting means shall be a listed device.

Informational Note No. 1: See ASME A17.1-2019 2022 /CSA B44-19 :22 , *Safety Code for Elevators and Escalators*, for additional information.

Informational Note No. 2: See ASME A18.1-2017 2020 , *Safety Standard for Platform Lifts and Stairway Chairlifts*, for additional information.

Exception No. 1: Where an individual branch circuit supplies a platform lift, the disconnecting means required by 620.51(C)(4) shall be permitted to comply with 430.109(C). This disconnecting means shall be listed and shall be lockable open in accordance with 110.25.

Exception No. 2: Where an individual branch circuit supplies a stairway chairlift or where a stairway chairlift is supplied by batteries as the primary source, the stairway chairlift shall be permitted to be cord-and-plug-connected, provided it complies with 422.16(A) and the cord does not exceed 1.8 m (6 ft) in length.

Exception No. 3: Where an individual branch circuit supplies an elevator control system with an adjustable speed drive, the disconnecting means required by 620.51 (C)(1) shall be permitted to comply with 430.128. This disconnecting means shall be listed and shall be lockable open in accordance with 110.25.

(B) Operation.

No provision shall be made to open or close this disconnecting means from any other part of the premises. If sprinklers are installed in hoistways, machine rooms, control rooms, machinery spaces, or control spaces, the disconnecting means shall be permitted to automatically open the power supply to the affected elevator(s) prior to the application of water. No provision shall be made to automatically close this disconnecting means. Power shall only be restored by manual means.

Informational Note: To reduce hazards associated with water on live elevator electrical equipment.

(C) Location.

The disconnecting means shall be located where it is readily accessible to qualified persons.

(1) On Elevators Without Generator Field Control.

On elevators without generator field control, the disconnecting means shall be located within sight of the motor controller. Where the motor controller is located in the elevator hoistway, the disconnecting means required by 620.51(A) shall be located outside the hoistway and accessible to qualified persons only. An additional fused or non-fused, enclosed, externally operable motor-circuit switch that is lockable open in accordance with 110.25 to disconnect all ungrounded main power-supply conductors shall be located within sight of the motor controller. The additional switch shall be a listed device and shall comply with 620.91(C).

Driving machines or motion and operation controllers not within sight of the disconnecting means shall be provided with a manually operated switch installed in the control circuit to prevent starting. The manually operated switch(es) shall be installed adjacent to this equipment.

Where the driving machine of an electric elevator or the hydraulic machine of a hydraulic elevator is located in a remote machine room or remote machinery space, a single means for disconnecting all ungrounded main power-supply conductors shall be provided and be lockable open in accordance with 110.25.

(2) On Elevators with Generator Field Control.

On elevators with generator field control, the disconnecting means shall be located within sight of the motor controller for the driving motor of the motor-generator set. Driving machines, motor-generator sets, or motion and operation controllers not within sight of the disconnecting means shall be provided with a manually operated switch installed in the control circuit to prevent starting. The manually operated switch(es) shall be installed adjacent to this equipment.

Where the driving machine or the motor-generator set is located in a remote machine room or remote machinery space, a single means for disconnecting all ungrounded main power-supply conductors shall be provided and be lockable open in accordance with 110.25.

(3) On Escalators and Moving Walks.

On escalators and moving walks, the disconnecting means shall be installed in the space where the controller is located.

(4) On Platform Lifts and Stairway Chairlifts.

On platform lifts and stairway chairlifts, the disconnecting means shall be located within sight of the motor controller.

(D) Identification and Signs.**(1) Available Fault Current Field Marking.**

The disconnecting means shall be legibly marked in the field with the available fault current at its line terminals. The field marking(s) shall include the date the available fault current calculation was performed and be of sufficient durability to withstand the environment involved.

When modifications to the electrical installation occur that affect the available fault current at the disconnecting means, the available fault current shall be verified or recalculated as necessary to ensure the elevator equipment's short-circuit current rating is sufficient for the available fault current at the line terminals of the equipment. The required field marking(s) shall be adjusted to reflect the new level of available fault current.

(E) Surge Protection.

Where any of the disconnecting means in 620.51 has been designated as supplying an emergency system load, a legally required system load, or a critical operation power system load, a listed SPD shall be installed.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Wed Jan 24 00:45:11 EST 2024

Committee Statement

Committee Statement: This change specifies the requirement for a disconnecting means for each control system and adds Exception No.# 3 to reflect the unique characteristics of adjustable speed motors in regard to locked-rotor current. This aligns with requirements for the same type motors in Article 430.128. References dates were updated

Response Message: FR-8830-NFPA 70-2024

[Public Input No. 3343-NFPA 70-2023 \[Section No. 620.51\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION



First Revision No. 8703-NFPA 70-2024 [Section No. 620.62]

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

620.62 Selective Coordination.

(A) General.

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

Where more than one driving machine ~~disconnecting means~~ is supplied by the same source, the overcurrent protective devices in ~~each disconnecting means~~ (OCPD) supplying the driving machines shall be selectively coordinated with any other supply-side overcurrent protective devices and load side OCPDs .

Selective coordination shall be selected by a licensed professional engineer or other qualified person engaged primarily in the design, installation, or maintenance of electrical systems. The selection and device settings shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.

(B) Replacements.

Where elevator system(s) OCPDs are replaced, they shall be reevaluated to ensure selective coordination is maintained with all supply-side and load-side OCPDs.

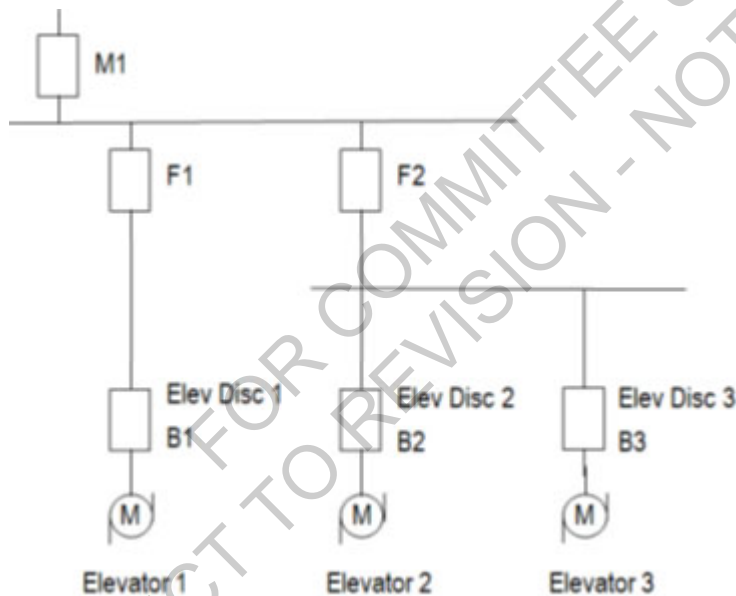
(C) Modifications.

If modifications, additions, or deletions to the elevator system(s) occur, selective coordination of the elevator system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Figure Informational Note Figure 620.62 for an example of how OCPDs supplying elevators selectively coordinate with all supply-side OCPDs.

Informational Note Figure 620.62 Selective Coordination for overcurrent protective devices supplying more than one elevator.



In the Informational Note Figure 620.62:

OCPD B1 selectively coordinates with M1

OCPD F1 selectively coordinates with M1

OCPD B2 selectively coordinates with F2

OCPD B2 selectively coordinates with M1

OCPD F2 selectively coordinates with M1

OCPD B3 selectively coordinates with F2

OCPD B3 selectively coordinates with M1

OCPD B1 and F1 are not required to selectively coordinate due to the exception for OCPDs in series.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 12:48:31 EST 2024

Committee Statement

Committee Statement: This revision is necessary to provide clarification that if any component in the system is replaced, the selective coordination needs to be reevaluated. Exception and informational note were added to provide clarity to the requirement for how the devices selectively coordinate with each other.

Response Message: FR-8703-NFPA 70-2024

Public Input No. 1808-NFPA 70-2023 [Section No. 620.62]

Public Input No. 2445-NFPA 70-2023 [Section No. 620.62]

**First Revision No. 8708-NFPA 70-2024 [Section No. 620.84]****620.84** – Escalators, Moving Walks, Platform Lifts, and Stairway Chairlifts.

Escalators, moving walks, platform lifts, and stairway chairlifts shall comply with Article 250 .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 13:02:41 EST 2024**Committee Statement**

Committee Statement: This change complies with 2023 NEC Style Manual 4.1.4 which prohibits the reference to entire articles. The section was removed because these requirements are redundant with general Article 250.

Response Message: FR-8708-NFPA 70-2024

[Public Input No. 3038-NFPA 70-2023 \[Section No. 620.84\]](#)



First Revision No. 8711-NFPA 70-2024 [Section No. 620.91 [Excluding any Sub-Sections]]

Elevators shall be permitted to be powered by an emergency or standby power system.

Informational Note No. 1: See ASME A17.1-2016 2022 /CSA B44-16 :22 , *Safety Code for Elevators and Escalators*, 2.27.2, for additional information.

Informational Note No. 2: When an elevator is classified as a fire service access elevator or occupant evacuation operation elevator, some building codes require the elevator equipment, elevator hoistway lighting, ventilation and cooling equipment for elevator machine rooms, control rooms, machine spaces, and control spaces as well as elevator car lighting to be supplied by legally required standby power ~~systems in compliance with Article 701 system~~ .

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 13:03:43 EST 2024

Committee Statement

Committee Statement: This revision adds 'a legally required' to 'standby system' as 'a legally required stand-by system' is a term that has been used in the Code for many editions. This change complies with NEC Style Manual 4.1.4 prohibiting the reference to entire articles. The reference dates for ASME/CSA were updated.

Response Message: FR-8711-NFPA 70-2024

Public Input No. 3040-NFPA 70-2023 [Section No. 620.91 [Excluding any Sub-Sections]]

**First Revision No. 8307-NFPA 70-2024 [Section No. 625.4]****625.4** Voltages.

Unless other voltages are specified, the nominal ac system voltages of 120, 120/240, 208Y/120, 240, 480Y/277, 480, 600Y/347, 600, or 1000 volts or dc system input voltages of up to ~~1000 volts~~ 1500 volts shall be used to supply equipment covered by this article. Output voltages to the electric vehicle are not specified.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 12:19:52 EST 2024**Committee Statement**

Committee Statement: 625.4 revised to include the same voltage demarcation used in many places throughout the Code. This is also consistent with the product standards associated with EV charging.

Response Message: FR-8307-NFPA 70-2024

**First Revision No. 8240-NFPA 70-2024 [Section No. 625.6]****625.6– Listed 2 _ Listing Requirements .**

Electric vehicle power transfer system equipment for the purposes of charging, power export, or bidirectional current flow shall be listed for EVSE use .

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Sun Jan 21 08:28:26 EST 2024

Committee Statement

Committee Statement: Section 2.2.1 of the 2023 NEC Style Manual requires the XXX.2 section to contain listing requirements. The term listed for EVSE use was added to clarify the listing requirements apply to EVSE as well.

Response Message: FR-8240-NFPA 70-2024

Public Input No. 2803-NFPA 70-2023 [New Section after 625.1]

Public Input No. 2802-NFPA 70-2023 [Section No. 625.6]

**First Revision No. 8276-NFPA 70-2024 [Section No. 625.17(A)]****(A) Power-Supply Cord.**

The cable for cord-connected electric vehicle supply equipment (EVSE) shall comply with all of the following:

- (1) Be any of the types specified in 625.17(B)(1) or hard service cord, junior hard service cord, or portable power cable types in accordance with Table 400.4. Hard service cord, junior hard service cord, or portable power cable types shall be listed, as applicable, for exposure to oil and damp and wet locations.
- (2) ~~Have an~~ Be of a type and ampacity as specified in Table 400.5(A)(1) - or, for 8 AWG - ~~For 8 AWG and larger, in the~~ the cable shall be permitted to be of a type as specified in Table 400.5(A)(2) with an ampacity as specified in ~~60°C (140°F) columns column of~~ Table 400.5(A)(2).
- (3) Have an overall length as specified in either of the following:
 - (4) When the interrupting device of the personnel protection system specified in 625.22 is located within the enclosure of the supply equipment or charging system, the power-supply cord shall be not more than the length indicated in (i) or (ii):
 - (5) For portable equipment in accordance with 625.44(A), the power-supply cord shall be not more than 300 mm (12 in.) long.
 - (6) For fastened-in-place equipment in accordance with 625.44(B), the power-supply cord shall be not more than 1.8 m (6 ft) long and the equipment shall be installed at a height that prevents the power-supply cord from contacting the floor when it is connected to the proper receptacle.
 - (7) When the interrupting device of the personnel protection system specified in 625.22 is located at the attachment plug, or within the first 300 mm (12 in.) of the power-supply cord, the overall cord length shall be not greater than 4.6 m (15 ft).

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Sun Jan 21 10:25:31 EST 2024

Committee Statement

Committee Statement: This revision clarifies that the use of a type of cord only included in Table 400.5(A)(1) with an ampacity specified from Table 400.5(A)(2) is not permitted.

Response Message: FR-8276-NFPA 70-2024

**First Revision No. 8260-NFPA 70-2024 [Section No. 625.22]****625.22 – Personnel Protection System.**

EVSE shall have a listed system of protection against electric shock of personnel. Where cord- and plug-connected equipment is used, the interrupting device of a listed personnel protection system shall be provided according to 625.17(A). A personnel protection system shall not be required for EVSE that supplies less than 60 volts dc.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 09:24:43 EST 2024**Committee Statement**

Committee Statement: This section is superfluous and adds no value to the code. These requirements are outlined in UL 2594, other applicable standards and requirements.

Response Message: FR-8260-NFPA 70-2024

[Public Input No. 1365-NFPA 70-2023 \[Section No. 625.22\]](#)

**First Revision No. 8269-NFPA 70-2024 [Section No. 625.41]****625.41 – Overcurrent Protection 41 _ Continuous Loads .**

Overcurrent protection for feeders and branch circuits supplying EVSE and WPTE, including bidirectional EVSE and WPTE, shall be sized for continuous duty and shall have a current rating of not less than 125 percent of the maximum load of the equipment. Where noncontinuous loads are supplied from the same feeder, the overcurrent device shall have a current rating of not less than the sum of the noncontinuous loads plus 125 percent of the continuous loads considered continuous loads .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 09:52:06 EST 2024**Committee Statement**

Committee Statement: This revision simplifies the section, leaving the overcurrent protection and conductor sizing requirements for services, feeders, and branch circuits in their respective articles.

Response Message: FR-8269-NFPA 70-2024

[Public Input No. 654-NFPA 70-2023 \[Section No. 625.41\]](#)

[Public Input No. 588-NFPA 70-2023 \[Section No. 625.41\]](#)

[Public Input No. 2336-NFPA 70-2023 \[Section No. 625.41\]](#)

**First Revision No. 8304-NFPA 70-2024 [Section No. 625.42]****625.42 Rating.**

The service, feeder, and branch circuit supplying EVSE shall have sufficient rating to supply the load served. Electric vehicle charging loads shall be considered to be continuous loads for the purposes of this article. Service and feeder shall be sized in accordance with the product ratings, unless the overall rating of the installation can be limited through controls as permitted by 625.42(A) or (B).

(A) Energy Management System (EMS).

~~Where an EMS in accordance~~ All EMS used to provide load management of EVSE shall comply with 750.30 provides load management of EVSE, and the maximum equipment load on a service, feeder, and feeder branch circuit shall be the maximum load permitted by the EMS. The EMS shall be permitted to be integral to one piece of equipment or integral to a listed system consisting of more than one piece of equipment. When one or more pieces of equipment are provided with an integral load management control, the system shall be marked to indicate this control is provided.

Network residing software that directs and limits EVSE output shall be permitted to be used as an Energy Management System for fleets of three or more vehicles, provided that the software complies with all of the following:

- (1) Programming shall be based on fleet modeling, including assessments of vehicle loading, travel distance, efficiency, battery degradation, and environment.
- (2) The EMS shall communicate directly with EVSE and include communication failure alarm (s).
- (3) Loss of EMS communication shall not result in an EVSE load greater than the load permitted by the service, feeder, and branch circuit rating.

(B) EVSE with Adjustable Settings.

EVSE with a current adjustment setting shall be permitted if restricted access to ~~an ampere adjusting means complying with~~ the adjustment setting is accomplished by at least one of the methods permitted in 750.30(C) ~~shall be permitted~~. If adjustments have the adjusted current setting has an impact on the rating label, those changes shall be in accordance with manufacturer's instructions, and the adjusted rating current setting shall appear on the field-installed rating label with sufficient durability to withstand the environment involved. EVSE as in accordance with 110.21. EVSE as referenced shall be permitted to have ampere ratings that are a current rating that is equal to the adjusted current setting. For equipment other than self-adjusting, the current adjustment setting shall be set at the time of installation and shall only be readjusted by a qualified person.

Informational Note: An example of a current adjustment setting is an EVSE that has the capability of being set to a maximum of 80A but is adjusted to a 40A maximum output to match the 50A branch circuit supplying the EVSE.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 11:26:06 EST 2024**Committee Statement**

Committee Statement: The continuous loads requirement was moved was moved to 625.41 for simplicity. This revision is rewritten to clarify the service, feeder, and branch circuit shall have sufficient rating to supply the EVSE load. This section was expanded to include software residing on a data network to be recognized as an EMS for controlling EVSE. 625.42(B) was rewritten to clarify language regarding current adjustment in addition to correcting typographical errors. Additional terms were added to require that the field-installed adjusted current rating label be field installed in accordance with 110.21. The informational note provides an example to guide the user.

Response Message: FR-8304-NFPA 70-2024

[Public Input No. 4116-NFPA 70-2023 \[Section No. 625.42\(B\)\]](#)

[Public Input No. 655-NFPA 70-2023 \[Section No. 625.42\(A\)\]](#)

[Public Input No. 2689-NFPA 70-2023 \[Section No. 625.42\(B\)\]](#)

[Public Input No. 3960-NFPA 70-2023 \[Section No. 625.42\(B\)\]](#)

[Public Input No. 1368-NFPA 70-2023 \[Section No. 625.42\]](#)

[Public Input No. 2337-NFPA 70-2023 \[Section No. 625.42 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 743-NFPA 70-2023 \[Section No. 625.42\(B\)\]](#)

**First Revision No. 8317-NFPA 70-2024 [Section No. 625.43]**

[See "FR 8317_ 625. 43" word document for revisions to 625.43]

625. 43 Disconnecting Means.

For

EVSE and WPTE

~~rated more than 60 amperes or more than 150 volts to ground, the~~

~~shall be provided with one or more disconnecting means in accordance with 625.43(A) and 625.43(B).~~

625.43(A) Equipment Disconnects.

~~For permanently connected EVSE and WPTE, a disconnecting means shall be provided and installed in a readily accessible location. If the disconnecting means is installed remote from the equipment, a plaque or directory shall be installed on the equipment denoting the location of the disconnecting means. For cord-and-plug connected EVSE and WPTE, with a rating not exceeding 60 amperes or not exceeding 150 volts to ground, the cord-and-plug shall be permitted to serve as the disconnecting means. The disconnecting means shall be lockable open in accordance with 110.25.~~

625.43(B) Emergency Shutoff.

~~For permanently connected EVSE and WPTE, one or more clearly identified emergency shutoff devices or electrical disconnects shall be provided and shall meet all of the following:~~

- ~~(1) Be installed in a readily accessible location in sight from the equipment~~
- ~~(2) Disconnect power to all EVSE and WPTE within sight of emergency shutoff~~
- ~~(3) Be marked "EVSE EMERGENCY SHUTOFF" in accordance with 110.22(A)~~
- ~~(4) Be a manual reset type~~
- ~~(5) Disconnect all ungrounded conductors of the circuits simultaneously from the source of supply~~

~~The disconnecting means required in accordance with 625.43(A) shall be permitted to serve as the emergency disconnect if it complies with all the requirements of 625.43(B).~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
FR_8317_625.43.docx	FR 8317_625.43.docx	
FR_8317_625.43.docx	For prod use	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Sun Jan 21 13:14:01 EST 2024

Committee Statement

Committee The revision clarifies that permanently installed EVSE and WPTE are required to have a

Statement: disconnecting means and provides a limitation on cord-and-plug connected EVSE and WPTE. The ratings were corrected in accordance with the 2023 NEC Style Manual 3.2.2.

Charging stations supplying power to electric vehicles (EVs) are primarily available along major highways and are also becoming more available in public parking garages and workplace parking lots. When an emergency occurs at one of these EV charging stations, responders need a quick means to disconnect power in order to respond to the emergency safely. Premises was replaced with "within sight" as it a defined term and provides a proximity for the equipment controlled by the emergency shutoff.

Response FR-8317-NFPA 70-2024
Message:

[Public Input No. 3106-NFPA 70-2023 \[Section No. 625.43\]](#)

[Public Input No. 232-NFPA 70-2023 \[Section No. 625.43\]](#)

[Public Input No. 1741-NFPA 70-2023 \[Section No. 625.43\]](#)

[Public Input No. 2057-NFPA 70-2023 \[Section No. 625.43\]](#)

[Public Input No. 1120-NFPA 70-2023 \[Section No. 625.43\]](#)

[Public Input No. 2469-NFPA 70-2023 \[Section No. 625.43\]](#)

625.43 Disconnecting Means.

EVSE and WPTE shall be provided with one or more disconnecting means in accordance with 625.43(A) and 625.43(B).

625.43(A) Equipment Disconnects.

For permanently connected EVSE and WPTE ~~rated more than 60 amperes or more than 150 volts to ground, the~~ disconnecting means shall be provided and installed in a readily accessible location. If the disconnecting means is installed remote from the equipment, a plaque or directory shall be installed on the equipment denoting the location of the disconnecting means. For cord-and-plug connected EVSE and WPTE, with a rating not exceeding 60 amperes or not exceeding 150 volts to ground, the cord-and-plug shall be permitted to serve as the disconnecting means. The disconnecting means shall be lockable open in accordance with 110.25.

625.43(B) Emergency Shutoff.

For permanently connected EVSE and WPTE, one or more clearly identified emergency disconnect devices or electrical disconnects shall be provided and shall meet all of the following:

1. Be installed in a readily accessible location in sight from the equipment
2. Disconnect power to all EVSE and WPTE within sight of emergency shutoff
3. Be marked "EVSE EMERGENCY DISCONNECT" in accordance with 110.22(A)
4. Be a manual reset type
5. Disconnect all ungrounded conductors of the circuits simultaneously from the source of supply

The disconnecting means required in accordance with 625.43(A) shall be permitted to serve as the emergency disconnect if it complies with all the requirements of 625.43(B).

**First Revision No. 8346-NFPA 70-2024 [Sections 625.44(A), 625.44(B)]****Sections 625.44(A), 625.44(B)****(A) Portable Equipment.**

Portable equipment shall be connected to the premises wiring system by one or more of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at ~~125-volts~~ 125 volts or 250 volts , single phase , in accordance with one of the following:
 - (2) 15 or 20 amperes
 - (3) 30 or 50 amperes listed and marked for EVSE and WPTE use
- (4) A nonlocking, ~~2~~ 3 -pole, ~~3~~ 4 -wire grounding-type receptacle outlet rated at 125/ 250 volts, single phase , in accordance with one of the following:
 - (5) 15 or 20 amperes
 - (6) 30, 50, or 60 amperes listed and marked for EVSE and WPTE use
- (7) A nonlocking, 2-pole, 3-wire ~~or 3-pole, 4-wire~~ grounding-type receptacle outlet rated at ~~250-volts~~ 277 volts , single phase , ~~30 or 50 amperes, or 125/250-volts, single-phase, 30, 50, or 60 amperes~~ in accordance with one of the following:
 - (8) 15 or 20 amperes
 - (9) 30 or 50 amperes listed and marked for EVSE and WPTE use
- (10) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 volts dc maximum, 15 or 20 amperes

(B) Fastened-in-Place Equipment.

Equipment that is fastened-in-place shall be connected to the premises wiring system by one of the following methods:

- (1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 125 volts or 250 volts, single phase ,up to 50 amperes in accordance with the following:

(2) 15 or 20 amperes

(3) 30 or 50 amperes listed and marked for EVSE and WPTE use

(4) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 250 volts, three phase ,up to 50 amperes in accordance with one of the following:

(5) 15 or 20 amperes

(6) 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(7) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 125/250 volts, single phase in accordance with one of the following:

(8) 15 or 20 amperes

(9) 30 , 50, or 60 amperes listed and marked for EVSE and WPTE use

(10) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 277 volts, single phase in accordance with one of the following:

(11) 15 or 20 amperes

(12) 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(13) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated at 120/208 volts, three phase in accordance with one of the following:

(14) 15 or 20 amperes

(15) 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(16) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 60 volts dc maximum, 15 or 20 amperes

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8346_625.44_A_.docx		

Submitter Information Verification

Committee: NEC-P12
Submittal Date: Sun Jan 21 15:09:10 EST 2024

Committee Statement

Committee EVSE and WPTE are new and challenging applications for receptacles. This revision

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2/2/2024, 12:59 PM

WORKING DRAFT OF PANEL MEETING OUTPUT
NEC CMP-12, January 21 - 23, 2024, Subject to Revision - Not for Publication

Statement: adds requirements to ensure these receptacles meet certain standards and be listed for the purpose of use with EVSE and WPTE. This section was expanded to include 277-volt receptacles for connecting EVSE and WPTE.

Response FR-8346-NFPA 70-2024
Message:

Public Input No. 2552-NFPA 70-2023 [Sections 625.44(A), 625.44(B)]

Public Input No. 761-NFPA 70-2023 [Sections 625.44(A), 625.44(B)]

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

(A) Portable Equipment.

Portable equipment shall be connected to the premises wiring system by one or more of the following methods:

(1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 125 volts or 250 volts, single phase, ~~15 or 20 amperes~~ in accordance with one of the following:

a. 15 or 20 amperes

b. 30 or 50 amperes listed and marked for EVSE and WPTE use

(2) A nonlocking, ~~23~~-pole, ~~34~~-wire grounding-type receptacle outlet rated at 125/250 volts, single phase, ~~15 or 20 amperes~~ in accordance with one of the following:

a. 15 or 20 amperes

b. 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(3) A nonlocking, 2-pole, 3-wire ~~or 3-pole, 4-wire~~ grounding-type receptacle outlet rated at 250-277 volts, single phase, ~~30 or 50 amperes, or 125/250 volts, single-phase, 30, 50, or 60 amperes~~ in accordance with one of the following:

a. 15 or 20 amperes

b. 30 or 50 amperes listed and marked for EVSE and WPTE use

(4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 volts dc maximum, 15 or 20 amperes

(B) Fastened-in-Place Equipment.

Equipment that is fastened-in-place shall be connected to the premises wiring system by one of the following methods:

(1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 125 volts or 250 volts, single phase, ~~up to 50 amperes~~ in accordance with the following:

a. 15 or 20 amperes

b. 30 or 50 amperes listed and marked for EVSE and WPTE use

(2) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 250 volts, three phase, ~~up to 50 amperes~~ in accordance with one of the following:

a. 15 or 20 amperes

b. 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(3) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated 125/250 volts, single phase, 30, 50, or 60 amperes in accordance with one of the following:

a. 15 or 20 amperes

b. 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 277 volts, single phase in accordance with one of the following:

a. 15 or 20 amperes

b. 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(5) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated at 120/208 volts, three phase in accordance with one of the following:

a. 15 or 20 amperes

b. 30, 50, or 60 amperes listed and marked for EVSE and WPTE use

(46) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated 60 volts dc maximum, 15 or 20 amperes



First Revision No. 8335-NFPA 70-2024 [Section No. 625.44 [Excluding any Sub-Sections]]

EVSE and WPTE ~~shall be that is~~ connected to the premises wiring system ~~shall be connected~~ in accordance with one of the methods in 625.44(A) through (C).

Cord-and-plug connected equipment shall be provided with an attachment plug rated not less than 125 percent of the maximum rating of the equipment.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Sun Jan 21 14:19:28 EST 2024

Committee Statement

Committee Statement: The proposed revision reinforces the cord-and-plug attachment plug rating. The definition of premises wiring includes other isolated installations such as solar, ESS, etc.

Response Message: FR-8335-NFPA 70-2024

Public Input No. 4206-NFPA 70-2023 [Section No. 625.44 [Excluding any Sub-Sections]]

Public Input No. 1940-NFPA 70-2023 [Section No. 625.44 [Excluding any Sub-Sections]]

**First Revision No. 8378-NFPA 70-2024 [Section No. 625.54]****625.54** Ground-Fault Circuit-Interrupter Protection for Personnel.

All receptacles and outlets installed for the connection of electric vehicle charging shall have ground-fault circuit-interrupter protection for personnel.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 16:41:45 EST 2024**Committee Statement****Committee Statement:** This revision extends the personnel protection of GFCI to hardwired EVSE.**Response Message:** FR-8378-NFPA 70-2024Public Input No. 1440-NFPA 70-2023 [Section No. 625.54]

**First Revision No. 8380-NFPA 70-2024 [Section No. 625.56]****625.56 – Receptacle Enclosures.**

All receptacles installed in a wet location for electric vehicle charging shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed. An outlet box hood installed for this purpose shall be listed and shall be identified as extra duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood shall not be required to be marked extra duty.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 16:49:28 EST 2024**Committee Statement**

Committee Statement: Section 90.3 indicates that Chapters 1-4 apply to all electrical installations, therefore repeating these requirements in Article 625 is unnecessary. This section is superfluous and adds no value to the code. The 2023 NEC Manual of Style 4.1.1 states that the use of redundant references shall be avoided.

Response Message: FR-8380-NFPA 70-2024

[Public Input No. 1373-NFPA 70-2023 \[Section No. 625.56\]](#)

[Public Input No. 1904-NFPA 70-2023 \[Section No. 625.56\]](#)

**First Revision No. 8383-NFPA 70-2024 [Section No. 625.102(D)]****(D) Protection of Cords and Cables to the Primary Pad.**

The output cable to the primary pad shall be protected from physical damage and secured in place over its entire length for the purpose of restricting its movement and to prevent strain at the connection points. ~~If installed in conditions where drive-over could occur, the cable shall be provided with supplemental protection. Where~~ _

If there is no control box, the cord or cable supplying power to the primary pad shall be protected from physical damage and secured in place in order to restrict movement and to prevent strain at the connection points. ~~Where subject to vehicular traffic, supplemental protection shall be provided.~~ _

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Sun Jan 21 16:54:46 EST 2024**Committee Statement**

Committee Statement: The section was rewritten to clarify language and the intent to ensure the output cable is protected from physical damage because based on its purpose it is installed in areas where drive-over could occur.

Response Message: FR-8383-NFPA 70-2024

Public Input No. 331-NFPA 70-2023 [Section No. 625.102(D)]

**First Revision No. 8396-NFPA 70-2024 [Section No. 626.3]****626.3 Other Articles.**

~~Wherever the requirements of other articles of this Code and Article 626 differ, the requirements of Article 626 shall apply.~~ Unless electrified truck parking space wiring systems are supported or arranged in such a manner that they cannot be used in or above locations classified in 511.3 or 514.3, or both, they shall comply with 626.3(A) and (B) in addition to the requirements of this article.

(A) Vehicle Repair and Storage Facilities.

Electrified truck parking space electrical wiring systems located at facilities for the repair or storage of self-propelled vehicles that use volatile flammable liquids or flammable gases for fuel or power shall comply with Article 511.

(B) Motor Fuel Dispensing Stations.

Electrified truck parking space electrical wiring systems located at or serving motor fuel dispensing stations shall comply with Article 514.

Informational Note: See NFPA 88A-2019, *Standard for Parking Structures*, and NFPA 30A-2021, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, for additional information.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 08:23:53 EST 2024

Committee Statement

Committee Statement: Section 4.1.4 of the 2023 NEC Style Manual prohibits referencing an entire article other than Article 100 or where required for context. As such, the first sentence is removed. Article 90 states that Chapter 6 is allowed to modify the general requirements.

Response Message: FR-8396-NFPA 70-2024

Public Input No. 3041-NFPA 70-2023 [Section No. 626.3]

**First Revision No. 8399-NFPA 70-2024 [Section No. 626.10]****626.10 – Branch Circuits.**

~~Electrified truck parking space single-phase branch circuits shall be derived from a 208Y/120-volt, 3-phase, 4-wire system or a 120/240-volt, single-phase, 3-wire system.~~

~~*Exception: A 120-volt distribution system shall be permitted to supply existing electrified truck parking spaces.*~~

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 08:30:29 EST 2024

Committee Statement

Committee Statement: This revision deletes this section to not limit the types of systems available to provide power to electrified truck parking spaces. The general branch wiring requirements still apply.

Response Message: FR-8399-NFPA 70-2024

[Public Input No. 2920-NFPA 70-2023 \[Section No. 626.10\]](#)

**First Revision No. 8406-NFPA 70-2024 [New Section after 626.30(B)]****(C) Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection for Personnel.**

The electrified truck parking space equipment intended to supply transport refrigerated units shall be designed and constructed such that all receptacle outlets in 626.30, supplied by branch circuits that are rated more than 150 volts to ground, 100 amperes or less, shall be provided with SPGFCI protection for personnel.

This requirement shall become effective January 1, 2029.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 08:47:14 EST 2024

Committee Statement

Committee Statement: This revision expands Section 626.30 to require SPGFCI protection for personnel for receptacles supplied by branch circuits rated more than 150 volts to ground and 100 amperes or less. GFCI is already covered by Article 210. The requirement may be applied prior to Jan 1, 2029, but is provided to allow for manufacture development of products.

Response Message: FR-8406-NFPA 70-2024

Public Input No. 4480-NFPA 70-2023 [Section No. 626.30]

**First Revision No. 8413-NFPA 70-2024 [Section No. 626.30(B)]****(B) Electrified Truck Parking Space Supply Equipment.**

The electrified truck parking space supply equipment, or portion thereof, providing electric power for the operation of TRUs shall be independent of the loads in ~~Part III of~~ Article 626 , Part III .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 09:10:59 EST 2024**Committee Statement****Committee Statement:** The section was revised to comply with Section 4.1.4 of the NEC Style Manual regarding the use of Parts.**Response Message:** FR-8413-NFPA 70-2024Public Input No. 2770-NFPA 70-2023 [Section No. 626.30(B)]



First Revision No. 8411-NFPA 70-2024 [Section No. 626.30 [Excluding any Sub-Sections]]

Electrified truck parking spaces intended to supply transport refrigerated units (TRUs) shall include an individual branch circuit ~~and receptacle for operation of~~ with a receptacle or cord connector output to supply the refrigeration/heating units. The receptacle or cord connector associated with supplying the TRUs shall be provided in addition to the receptacles required in 626.24(B).

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 09:04:38 EST 2024

Committee Statement

Committee Statement: This revision expands this section to include an additional option for supplying electricity to TRUs. There is no safety reason to limit the supply connection to only receptacle and separable power supply cable assembly combination. Disconnect switches with integral cord and connector are readily available and can be installed to satisfy the requirements in sections 626.31(A), 626.31(B), and 626.32.

Response Message: FR-8411-NFPA 70-2024

Public Input No. 962-NFPA 70-2023 [Section No. 626.30]

**First Revision No. 8414-NFPA 70-2024 [Section No. 626.31(B)]****(B) Location.**

The disconnecting means shall be readily accessible, located not more than 750 mm (30 in.) from ~~the receptacle it controls~~ the outlet supplying the receptacle or cord connector , and located in the supply circuit ahead of the outlet supplying the receptacle or cord connector . Circuit breakers or switches located in power outlets complying with this section shall be permitted as the disconnecting means.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 09:13:08 EST 2024**Committee Statement**

Committee Statement: This revision expands this section to include an additional option for supplying electricity to TRUs. There is no safety reason to limit the supply connection to only receptacle and separable power supply cable assembly combination. Disconnect switches with integral cord and connector are readily available and can be installed to satisfy the requirements in sections 626.31(A), 626.31(B), and 626.32.

Response Message: FR-8414-NFPA 70-2024

Public Input No. 963-NFPA 70-2023 [Section No. 626.31(B)]

**First Revision No. 8415-NFPA 70-2024 [Section No. 626.31(C)]****(C) Receptacles and Cord Connectors .**

All receptacles and cord connectors shall be listed and of the grounding type. Every electrified truck parking space intended to provide an electrical supply for TRUs shall be equipped with one or more of the following:

- (1) A 30-ampere, 480-volt, 3-phase, 3-pole, 4-wire receptacle or cord connector
- (2) A 60-ampere, 208-volt, 3-phase, 3-pole, 4-wire receptacle or cord connector
- (3) A 20-ampere, 1000-volt, 3-phase, 3-pole, 4-wire receptacle, pin and sleeve type, or cord connector
- (4) A 60-ampere, 250-volt, 3-phase, 3-pole, 4-wire receptacle or cord connector
- (5) A 60-ampere, 480-volt, 3-phase, 3-pole, 4-wire receptacle or cord connector

Informational Note: See UL 1686-2012, *Pin and Sleeve Configurations*, Figure C2.11, for complete details of the 30-ampere pin and sleeve receptacle configuration for refrigerated containers (TRUs) and for various configurations of 60-ampere pin and sleeve receptacles.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 09:14:45 EST 2024

Committee Statement

Committee Statement: This revision expands this section to include an additional option for supplying electricity to TRUs. There is no safety reason to limit the supply connection to only receptacle and separable power supply cable assembly combination. Disconnect switches with integral cord and connector are readily available and can be installed to satisfy the requirements in sections 626.31(A), 626.31(B), and 626.32.

Response Message: FR-8415-NFPA 70-2024

Public Input No. 964-NFPA 70-2023 [Section No. 626.31(C)]

**First Revision No. 8423-NFPA 70-2024 [Section No. 626.32]****626.32 – Separable- 32 Power Supply Cable Assembly.**

A separable power supply cable assembly, consisting of a cord with an attachment plug and cord connector, shall be one of the types and ratings specified in 626.32(A), (B), and (C). Cords with adapters and pigtail ends, extension cords, and similar items shall not be used.

A permanently connected power supply cable assembly, consisting of a cord with a cord connector, shall be one of the types and rating specified in 626.32 (A) , (B), and (C).

The power supply cable assembly shall be provided with an integral breakaway means that prevents physical damage or rupture, in the event of a drive-away, at the attachment plug's or connector's connection to the respective receptacle or inlet.

(A) Rating(s).

The power supply cable assembly shall be listed and rated in accordance with one of the following:

- (1) A 30-ampere, 480-volt, 3-phase assembly
- (2) A 60-ampere, 208-volt, 3-phase assembly
- (3) A 20-ampere, 1000-volt, 3-phase assembly
- (4) A 60-ampere, 480-volt, 3-phase assembly
- (5) A 60-ampere, 250-volt, 3-phase assembly

(B) Cord Sets or Cable Assemblies.

The cord shall be a listed type with four conductors, for 3-phase connection, one of which shall be identified in accordance with 400.23 for use as the equipment grounding conductor. Extra-hard usage cables rated not less than 90°C (194°F), 600 volts, listed for both wet locations and sunlight resistance, and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals, shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and the inlet(s) on the TRU.

(C) Attachment Plug(s) and Cord Connector(s).

Where a flexible cord is provided with an attachment plug ~~and~~ or cord connector, they shall comply with 250.138(A). The attachment plug(s) ~~and~~ or cord connector(s) shall be listed, by itself or as part of the power-supply ~~cable-cord~~ cord assembly, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug or cord connector. If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord. An attachment plug ~~and~~ or cord connector for the connection of a truck or trailer shall be rated in accordance with one of the following:

- (1) 30-ampere, 480-volt, 3-phase, 3-pole, 4-wire and intended for use with 30-ampere, 480-volt, 3-phase, 3-pole, 4-wire receptacles and inlets, respectively
- (2) 60-ampere, 208-volt, 3-phase, 3-pole, 4-wire and intended for use with 60-ampere, 208-volt, 3-phase, 3-pole, 4-wire receptacles and inlets, respectively
- (3) 20-ampere, 1000-volt, 3-phase, 3-pole, 4-wire and intended for use with 20-ampere, 1000-volt, 3-phase, 3-pole, 4-wire receptacles and inlets, respectively
- (4) 60-ampere, 480-volt, 3-phase, 3-pole, 4-wire and intended for use with 60-ampere, 480-volt, 3-phase, 3-pole, 4-wire receptacles and inlets, respectively
- (5) 60-ampere, 250-volt, 3-phase, 3-pole, 4-wire and intended for use with 60-ampere, 250-volt, 3-phase, 3-pole, 4-wire receptacles and inlets, respectively

Informational Note: See UL 1686-2012, *Pin and Sleeve Configurations*, Figures C2.12 and C2.11, for complete details of the 30-ampere pin and sleeve receptacle configuration for refrigerated containers (TRUs) and for various configurations of 60-ampere pin and sleeve receptacles.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 09:47:19 EST 2024

Committee Statement

Committee Statement: This revision provides additional connection options for electric truck parking and adds requirements to ensure safe break away of the power supply cord in the event of drive-away. This section was rewritten for clarity.

Response Message: FR-8423-NFPA 70-2024

Public Input No. 965-NFPA 70-2023 [Section No. 626.32]

**First Revision No. 8732-NFPA 70-2024 [Section No. 630.6]****630.6– 2** _ Listing.

All welding and cutting power equipment under the scope of this article shall be listed.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 13:40:13 EST 2024**Committee Statement****Committee Statement:** The 630.6 section number was revised to 630.2 in accordance with the 2023 NEC Style Manual regarding parallel construction. XXX.2 is for listing requirements.**Response Message:** FR-8732-NFPA 70-2024[Public Input No. 2804-NFPA 70-2023 \[Section No. 630.6\]](#)[Public Input No. 2805-NFPA 70-2023 \[New Section after 630.1\]](#)

**First Revision No. 8743-NFPA 70-2024 [Section No. 630.15]****630.15** Grounding of Welder Secondary Circuit.

The secondary circuit conductors of an arc welder, consisting of the electrode conductor and the work conductor, shall not be considered as premises wiring for the purpose of applying Article 250 grounding and bonding .

Informational Note: Connecting welder secondary circuits to grounded objects can create parallel paths and can cause objectionable current over equipment grounding conductors.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 14:15:25 EST 2024

Committee Statement

Committee Statement: The reference to article 250 was removed per the requirements of the 2023 NEC Style Manual which prohibits references to an entire article. A reference to grounding and bonding was added.

Response Message: FR-8743-NFPA 70-2024

Public Input No. 3044-NFPA 70-2023 [Section No. 630.15]

**First Revision No. 8483-NFPA 70-2024 [Section No. 640.1(A)]****(A) Covered.**

This article covers equipment and wiring for audio signal generation, recording, processing, amplification, and reproduction; distribution of sound; public address; speech input systems; temporary audio system installations; and electronic organs or other electronic musical instruments. ~~This also includes audio systems subject to Article 517, Part VI, and Articles 518, 520, 525, and 530.~~

Informational Note: Examples of permanently installed distributed audio system locations include, but are not limited to, restaurant, hotel, business office, commercial and retail sales environments, churches, and schools. Both portable and permanently installed equipment locations include, but are not limited to, residences, auditoriums, theaters, stadiums, and movie and television studios. Temporary installations include, but are not limited to, auditoriums, theaters, stadiums (which use both temporary and permanently installed systems), and outdoor events such as fairs, festivals, circuses, public events, and concerts.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:02:38 EST 2024

Committee Statement

Committee Statement: This revision removes the last sentence of the 1st paragraph to comply with the 2023 NEC Style Manual section 4.1.4. The sentence does not supplement or modify anything in Section 640.1(A)

Response Message: FR-8483-NFPA 70-2024

Public Input No. 3063-NFPA 70-2023 [Section No. 640.1(A)]



First Revision No. 8486-NFPA 70-2024 [Section No. 640.3]

640.3 – [See "FR 8486_640.4" word document for revisions to 640.3]

640.4 – Locations and Other Articles.

Circuits and equipment shall comply with 640.3 4 (A) through (N J), as applicable.

(A) Spread of Fire or Products of Combustion.

Section 300.21 shall apply.

(B) Ducts, Plenums, and Other Air-Handling Spaces.

Section 300.22(B) shall apply to circuits and equipment installed in ducts specifically fabricated for environmental air. Section 300.22(C) shall apply to circuits and equipment installed in other spaces used for environmental air (plenums).

Exception No. 1: Class 2 and Class 3 cables installed in accordance with 722.135(B) shall be permitted to be installed in ducts specifically fabricated for environmental air.

Exception No. 2: Class 2 and Class 3 cables installed in accordance with 722.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).

Informational Note: See NFPA 90A-2024 , *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4 8 .3 5 .4 5 .2. 6-5 , which permits loudspeakers, loudspeaker assemblies, and their accessories listed in accordance with UL 2043-2013 2023 , *Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*, to be installed in other spaces used for environmental air (ceiling cavity plenums).

(C) Communications Cables.

Types CMP, CMR, CMG, and CM communications cables shall be permitted to substitute for Class 2 and Class 3 cables in accordance with 722.135(E).

(D) Cable Trays.

Cable trays and cable tray systems shall be installed in accordance with ~~Part II of~~ Article 392, Part II . The installation of Class 2, Class 3, and Type PLTC cables in cable trays shall be in accordance with 722.135(B).

(E) Hazardous (Classified) Locations.

Equipment used in hazardous (classified) locations shall comply with the applicable requirements of Chapter 5.

~~_____ (F)~~

~~Assembly~~

~~Special Occupancies.~~

~~Equipment~~

~~Audio equipment used in~~

~~assembly~~

~~special occupancies shall comply with~~

~~Article 518 .~~

(G) ~~Theaters, Audience Areas of Motion Picture and Television Studios, and Similar Locations.~~

~~Equipment used in theaters, audience areas of motion picture and television studios, and similar locations shall comply with Article 520 .~~

~~(H) Carnivals, Circuses, Fairs, and Similar Events.~~

~~Equipment used in carnivals, circuses, fairs, and similar events shall comply with Article 525 .~~

~~(I) Motion Picture and Television Studios.~~

~~Equipment used in motion picture and television studios shall comply with Article 530 .~~

~~(J) Swimming Pools, Fountains, and Similar Locations.~~

~~Audio equipment used in or near swimming pools, fountains, and similar locations shall comply with Article 680 .~~

~~(K)~~

~~the requirements in the associated special occupancy _____ article in Chapter 5.~~

~~(G) Combination Systems.~~

~~Where the authority having jurisdiction permits audio systems for paging or music, or both, to be combined with fire alarm systems, the wiring shall comply with Article 760.~~

~~Informational Note: See NFPA 72, *National Fire Alarm and Signaling Code*, and NFPA 101, *Life Safety Code*, for installation requirements for such combination systems.~~

~~(L H) Antennas.~~

~~Equipment used in audio systems that contain an audio or video tuner and an antenna input shall comply with Article 810. Wiring other than antenna wiring that connects such equipment to other audio equipment shall comply with this article.~~

~~(M I) Generators.~~

~~Generators shall be installed in accordance with 445.10 through 445.12, 445.14 through 445.16, and 445.18. Grounding of portable and vehicle-mounted generators shall be in accordance with 250.34.~~

~~(N J) Organ Pipes.~~

~~Additions of pipe organ pipes to an electronic organ shall be in accordance with 650.4 through 650.9.~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_640.4_FR-8486.docx	NEC_640.4_FR-8486.docx	
NEC_640.4_FR-8486.docx	For prod use	

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:07:20 EST 2024

Committee Statement

Committee Statement: This revision includes changes to comply with 4.1.1 and 4.1.4 of the NEC Style Manual. The requirements for Assembly Occupancies were change to reference Chapter 5 because they referenced whole articles. The section was renumbered to XXX.4 to allow for parallel construction where XXX.3 applies to reconditioned equipment. Reference dates were updated. There were no technical changes.

Updated the sections referenced in NFPA 90A and UL 2043 to the most current edition

Subpart revised to comply with 4.1.4 of the NEC Style Manual which requires the article number to precede the part number.

Response FR-8486-NFPA 70-2024**Message:**[Public Input No. 3079-NFPA 70-2023 \[Section No. 640.3\]](#)[Public Input No. 14-NFPA 70-2023 \[Section No. 640.3\(B\)\]](#)[Public Input No. 2771-NFPA 70-2023 \[Section No. 640.3\(D\)\]](#)[Public Input No. 3064-NFPA 70-2023 \[Section No. 640.3\(K\)\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

640.3-4 Locations and Other Articles.

Circuits and equipment shall comply with 640.43(A) through ~~(N)(J)~~, as applicable.

(A) Spread of Fire or Products of Combustion.

Section 300.21 shall apply.

(B) Ducts, Plenums, and Other Air-Handling Spaces.

Section 300.22(B) shall apply to circuits and equipment installed in ducts specifically fabricated for environmental air. Section 300.22(C) shall apply to circuits and equipment installed in other spaces used for environmental air (plenums).

Exception No. 1: Class 2 and Class 3 cables installed in accordance with 722.135(B) shall be permitted to be installed in ducts specifically fabricated for environmental air.

Exception No. 2: Class 2 and Class 3 cables installed in accordance with 722.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).

Informational Note: See NFPA 90A-2024, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.11.2.6.5 8.5.5.6, which permits loudspeakers, loudspeaker assemblies, and their accessories listed in accordance with UL 2043-2013-2023, *Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*, to be installed in other spaces used for environmental air (ceiling cavity plenums).

(C) Communications Cables.

Types CMP, CMR, CMG, and CM communications cables shall be permitted to substitute for Class 2 and Class 3 cables in accordance with 722.135(E).

(D) Cable Trays.

Cable trays and cable tray systems shall be installed in accordance with ~~Part II of Article 392~~, Part II. The installation of Class 2, Class 3, and Type PLTC cables in cable trays shall be in accordance with 722.135(B).

(E) Hazardous (Classified) Locations.

Equipment used in hazardous (classified) locations shall comply with the applicable requirements of Chapter 5.

~~(F) Assembly Occupancies.~~ **(F) Special Occupancies. Audio equipment used in special occupancies shall comply with the requirements in the associated special occupancy article in Chapter 5.**

~~Equipment used in assembly occupancies shall comply with Article 518.~~

~~(G) Theaters, Audience Areas of Motion Picture and Television Studios, and Similar Locations.~~

~~Equipment used in theaters, audience areas of motion picture and television studios, and similar locations shall comply with Article 520.~~

~~(H) Carnivals, Circuses, Fairs, and Similar Events.~~

~~Equipment used in carnivals, circuses, fairs, and similar events shall comply with Article 525.~~

~~(I) Motion Picture and Television Studios.~~

~~Equipment used in motion picture and television studios shall comply with Article 530.~~

~~(J) Swimming Pools, Fountains, and Similar Locations.~~

~~Audio equipment used in or near swimming pools, fountains, and similar locations shall comply with Article 680.~~

~~(K)(G) Combination Systems.~~

Where the authority having jurisdiction permits audio systems for paging or music, or both, to be combined with fire alarm systems, the wiring shall comply with ~~Article 760.139(E)~~.

Informational Note: See NFPA 72-20252, *National Fire Alarm and Signaling Code*, and NFPA 101-2024, *Life Safety Code*, for installation requirements for such combination systems.

~~(L)(H) Antennas.~~

Equipment used in audio systems that contain an audio or video tuner and an antenna input shall comply with ~~Article 810~~ the Chapter 8 requirements. Wiring other than antenna wiring that connects such equipment to other audio equipment shall comply with this article.

~~(M)(I) Generators.~~

Generators shall be installed in accordance with 445.10 through 445.12, 445.14 through 445.16, and 445.18. Grounding of portable and vehicle-mounted generators shall be in accordance with 250.34.

~~(N)(J) Organ Pipes.~~

Additions of pipe organ pipes to an electronic organ shall be in accordance with 650.4 through 650.9.

**First Revision No. 8497-NFPA 70-2024 [Section No. 640.5]****640.5** – Access to Electrical Equipment Behind Panels Designed to Allow Access.

Access to equipment shall not be denied by an accumulation of wires and cables that prevents removal of panels, including suspended ceiling panels.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 14:30:55 EST 2024**Committee Statement**

Committee Statement: This revision deletes the section, titled Access to Electrical Equipment Behind Panels Designed to Allow Access to comply with 4.1.1 of the 2023 NEC Style Manual, the requirements are already covered in 300.23.

Response Message: FR-8497-NFPA 70-2024

[Public Input No. 576-NFPA 70-2023 \[Section No. 640.5\]](#)

**First Revision No. 8499-NFPA 70-2024 [Section No. 640.7(C)]****(C) Isolated Ground Receptacles.**

Isolated grounding-type receptacles shall be permitted as described in 250.146(D), and for the implementation of other technical power systems in compliance with Article 250, Part II . For separately derived systems with 60 volts to ground, the branch-circuit equipment grounding conductor shall be terminated as required in 647.6(B).

Informational Note: See 406.3(E) for grounding-type receptacles and required identification.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:32:39 EST 2024

Committee Statement

Committee Statement: This revision deletes the reference to an entire article and changes the text to reference the Article and Part to comply with 4.1.4 of the NEC Style Manual.

Response Message: FR-8499-NFPA 70-2024

Public Input No. 3122-NFPA 70-2023 [Section No. 640.7(C)]

**First Revision No. 8501-NFPA 70-2024 [Section No. 640.9(A)(2)]****(2) Separately Derived Power Systems.**

Separately derived systems shall comply with the applicable articles of this *Code*, except as modified by this article. Separately derived systems with 60 volts to ground shall be permitted for use in audio system installations as specified in ~~Article 647.4~~.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 14:35:56 EST 2024**Committee Statement**

Committee Statement: This revision changes the reference from an entire article to a section to comply with 4.1.4 of the 2023 NEC Style Manual. The title was revised to match the defined term in Article 100.

Response Message: FR-8501-NFPA 70-2024

Public Input No. 3123-NFPA 70-2023 [Section No. 640.9(A)(2)]

**First Revision No. 8502-NFPA 70-2024 [Section No. 640.9(A)(3)]****(3) Other Wiring.**

All wiring not connected to the premises wiring system or to a wiring system separately derived from the premises wiring system shall comply with ~~Part II of~~ Article 725, Part II .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 14:38:41 EST 2024**Committee Statement****Committee Statement:** This revision changes the reference from an entire article to a section to comply with 4.1.4 of the 2023 NEC Style Manual.**Response Message:** FR-8502-NFPA 70-2024Public Input No. 3124-NFPA 70-2023 [Section No. 640.9(A)(3)]Public Input No. 2772-NFPA 70-2023 [Section No. 640.9(A)(3)]Public Input No. 953-NFPA 70-2023 [Section No. 640.9(A)(3)]

**First Revision No. 8504-NFPA 70-2024 [Section No. 640.9(B)]****(B) Auxiliary Power Supply Wiring.**

Equipment that has a separate input for an auxiliary power supply shall be wired in compliance with ~~Article 725~~. ~~Battery installation shall be in accordance with Article 480~~. 724.3. This section shall not apply to the use of uninterruptible power supply (UPS) equipment, or other sources of supply, that are intended to act as a direct replacement for the primary circuit power source and are connected to the primary circuit input.

Informational Note: See *NFPA 72-2019 2025*, *National Fire Alarm and Signaling Code*, where equipment is used for a fire alarm system.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:41:03 EST 2024

Committee Statement

Committee Statement: This revision changes the reference from an entire article to the correct section to comply with 4.1.4 of the 2023 NEC Style Manual and, 90.3. In addition, the informational note was revised to update the NFPA 72 reference to the latest edition.

Response Message: FR-8504-NFPA 70-2024

Public Input No. 3126-NFPA 70-2023 [Section No. 640.9(B)]

**First Revision No. 8506-NFPA 70-2024 [Section No. 640.9(C)]****(C) Output Wiring and Listing of Amplifiers.**

Amplifiers with output circuits carrying audio program signals shall be permitted to employ Class 1, Class 2, or Class 3 wiring where the amplifier is listed and marked for use with the specific class of wiring method. Such listing shall ensure the energy output is equivalent to the shock and fire risk of the same class as stated in Articles 724 ~~and~~ 725, Part II. Overcurrent protection shall be provided and shall be permitted to be inherent in the amplifier.

Audio amplifier output circuits wired using Class 1 wiring methods shall be considered equivalent to Class 1 circuits and shall be installed in accordance with 724.46, where applicable.

Audio amplifier output circuits wired using Class 2 or Class 3 wiring methods shall be considered equivalent to Class 2 or Class 3 circuits, respectively. They shall use conductors insulated at not less than the requirements of 722.179 and shall be installed in accordance with 722.135 and 725.136 through 725.144.

Informational Note No. 1: See UL 1711-2016, *Amplifiers for Fire Protective Signaling Systems*, which contains requirements for the listing of amplifiers used for fire alarm systems in compliance with *NFPA 72-2019 2025*, *National Fire Alarm and Signaling Code*.

Informational Note No. 2: See UL 813-1996, *Commercial Audio Equipment*; UL 1419-2016, *Professional Video and Audio Equipment*; ANSI/UL 1492-1996, *Audio-Video Products and Accessories*; UL 6500-1999, *Audio/Video and Musical Instrument Apparatus for Household, Commercial, and Similar Use*; and UL 62368-1-2014, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for examples of requirements for listing amplifiers used in residential, commercial, and professional use.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:46:39 EST 2024

Committee Statement

Committee Statement: This revision changes the reference from an entire article to a section to comply with 4.1.4 of the 2023 NEC Style Manual and 90.3, and the informational note was revised to update the NFPA 72 reference to the latest edition

Response Message: FR-8506-NFPA 70-2024

Public Input No. 3187-NFPA 70-2023 [Section No. 640.9(C)]

**First Revision No. 8510-NFPA 70-2024 [Section No. 640.21(B)]**

(B) Between Loudspeakers and Amplifiers or Between Loudspeakers.

Cables used to connect loudspeakers to each other or to an amplifier shall comply with Article 722, Part II . Other listed cable types and assemblies ,including optional hybrid communications, signal, and hybrid optical fiber cables, shall be permitted.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:52:58 EST 2024

Committee Statement

Committee Statement: This revision changes the reference from an entire article to a specific Part to comply with 4.1.4 of the 2023 NEC Style Manual. Editorial change to remove redundant cable type because the cable types are covered by 'other listed cable types'.

Response Message: FR-8510-NFPA 70-2024

Public Input No. 3189-NFPA 70-2023 [Section No. 640.21(B)]

**First Revision No. 8511-NFPA 70-2024 [Section No. 640.21(C)]****(C) Between Equipment.**

Cables used for the distribution of audio signals between equipment shall comply with Article 722, Part II . Other listed cable types and assemblies ,including optional hybrid communications, signal, and hybrid optical fiber cables, shall be permitted. - Other cable types and assemblies specified by the equipment manufacturer as acceptable for the use shall be permitted in accordance with 110.3(B) .

Informational Note: See 770.3 for the classification of composite optical fiber cables.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 14:55:44 EST 2024

Committee Statement

Committee Statement: This revision changes the reference from an entire article to a specific Part to comply with 4.1.4 of the 2023 NEC Style Manual. Reference to 110.3 deleted since 90.3 already covers the requirement. Editorial change to remove redundant cable type because the cable types are covered by 'other listed cable types'.

Response Message: FR-8511-NFPA 70-2024

Public Input No. 3192-NFPA 70-2023 [Section No. 640.21(C)]

**First Revision No. 8513-NFPA 70-2024 [Section No. 640.42]****640.42 Use of Flexible Cords and Cables.****(A) Between Equipment and Branch-Circuit Power.**

Power supply cords for audio equipment shall be listed and shall be permitted to be used where the interchange, maintenance, or repair of such equipment is facilitated through the use of a power-supply cord.

(B) Between Loudspeakers and Amplifiers, or Between Loudspeakers.

Installation of flexible cords and cables used to connect loudspeakers to each other or to an amplifier shall comply with ~~Part I of Article 400- and Parts I, II, and III of~~ , Part I and Article 725, respectively Parts I and II . Cords and cables listed for portable use, either hard or extra-hard usage as defined by Article 400, Parts I and II , shall also be permitted. Other listed cable types and assemblies, including optional hybrid communications, signal, and hybrid optical fiber cables, shall be permitted.

(C) Between Equipment and/or Between Equipment Racks.

Installation of flexible cords and cables used for the distribution of audio signals between equipment shall comply with ~~Parts I and II of Article 400- and~~ , Parts I , and II , and III of Article 725, respectively Parts I and II . Cords and cables listed for portable use, either hard or extra-hard service as defined by Article ~~Table 400.4~~ , shall also be permitted. Other listed cable types and assemblies, including optional hybrid communications, signal, and hybrid optical fiber cables, shall be permitted.

(D) Between Equipment, Equipment Racks, and Power Supplies Other Than Branch-Circuit Power.

Wiring between the following power supplies, other than branch-circuit power supplies, shall be installed, connected, or wired in accordance with this *Code* for the voltage and power required:

- (1) Storage batteries
- (2) Transformers
- (3) Transformer rectifiers
- (4) Other ac or dc power supplies

(E) Between Equipment Racks and Branch-Circuit Power.

The supply to a portable equipment rack shall be by means of listed extra-hard usage cords or cables, as defined in Table 400.4. For outdoor portable or temporary use, the cords or cables shall be further listed as being suitable for wet locations and sunlight resistant. Sections 520.5, 520.10, and 525.3 shall apply as appropriate when the following conditions exist:

- (1) Where equipment racks include audio and lighting and/or power equipment
- (2) When using or constructing cable extensions, adapters, and breakout assemblies

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 15:00:16 EST 2024

Committee Statement

Committee Statement: This revision changes the references from an entire article to a specific Part or section to comply with 4.1.4 of the NEC Style Manual.

Response Message: FR-8513-NFPA 70-2024

[Public Input No. 3194-NFPA 70-2023 \[Section No. 640.42\(C\)\]](#)

[Public Input No. 954-NFPA 70-2023 \[Section No. 640.42\(B\)\]](#)

[Public Input No. 2773-NFPA 70-2023 \[Section No. 640.42\]](#)

[Public Input No. 3193-NFPA 70-2023 \[Section No. 640.42\(B\)\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

**First Revision No. 9271-NFPA 70-2024 [Section No. 645.1]****645.1** Scope.

This article covers equipment, power-supply wiring, equipment interconnecting wiring, and grounding of information technology equipment and systems in an information technology equipment room.

Informational Note: See NFPA 75-2024 , *Standard for the Fire Protection of Information Technology Equipment*, which covers the requirements for the protection of information technology equipment and information technology equipment areas.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Fri Jan 26 14:38:15 EST 2024

Committee Statement

Committee Statement: This revision updates the NFPA 75 reference date.

Response Message: FR-9271-NFPA 70-2024

**First Revision No. 8520-NFPA 70-2024 [Section No. 645.3]****645.3- 4 _ Other Articles.**

Circuits and equipment shall comply with 645.3 4 (A) through (I), as applicable.

(A) Spread of Fire or Products of Combustion.

Sections 300.21, 770.26, and 800.26 shall apply to penetrations of the fire-resistant room boundary.

(B) Wiring and Cabling in Other Spaces Used for Environmental Air (Plenums).

The following sections and tables shall apply to wiring and cabling in other spaces used for environmental air (plenums) above an information technology equipment room:

- (1) Wiring methods: 300.22(C)(1)
- (2) Class 2, Class 3, and ~~PLTC~~ Class 4 cables: 722.135(B)
- (3) Fire alarm systems: 760.53(B)(2) and Table 760.154
- (4) Optical fiber cables: 770.113(C) and Table 770.154(a)
- (5) Communications circuits: 800.133(C) and Table 800.154(a)
- (6) CATV and radio distribution systems: 800.113(C) and Table 800.154(a)

(C) Bonding and Grounding.

The non-current-carrying conductive members of optical fiber cables in an information technology equipment room shall be bonded and grounded in accordance with 770.114.

(D) Electrical Classification of Data Circuits.

Section 725.60(A)(4) shall apply to the electrical classification of listed information technology equipment signaling circuits.

(E) Fire Alarm Cables and Equipment.

Article 760 , Parts I, II, and III of ~~Article 760~~ - shall apply to fire alarm systems cables and equipment installed in an information technology equipment room. Only fire alarm cables listed in accordance with ~~Part IV of Article 760~~ Part IV _ and listed fire alarm equipment shall be permitted to be installed in an information technology equipment room.

(F) Cable Routing Assemblies, Communications Wires, Cables, Raceways, and Equipment.

Sections 800.110, 800.113, and 800.154 shall apply to cable routing assemblies and communications raceways. Article 800 , Parts I, II, III, IV, and V of ~~Articles 800~~ - and Article 805 , ~~Parts I, II, III, IV and V~~ _ shall apply to communications wires, cables, and equipment installed in an information technology equipment room. Only communications wires and cables listed in accordance with 800.179, cable routing assemblies, and communications raceways listed in accordance with 800.182, and communications equipment listed in accordance with 800.171 shall be permitted to be installed in an information technology equipment room. ~~Article 645~~ - This article _ shall apply to the powering of communications equipment in an information technology equipment room.

Informational Note: See Article 100, Definitions, for a definition of *communications equipment*.

(G) Community Antenna Television and Radio Distribution Systems Coaxial Cables and Equipment.

~~Parts Article 800, Parts I, II, III, IV, and V of Articles 800 - and Article 820, Parts I, II, III, IV, and V~~ shall apply to community antenna television and radio distribution systems coaxial cables and equipment installed in an information technology equipment room. Only community antenna television and radio distribution coaxial cables listed in accordance with 800.179 and listed CATV equipment shall be permitted to be installed in an information technology equipment room. ~~Article 645 - This article~~ shall apply to the powering of community antenna television and radio distribution systems equipment installed in an information technology equipment room.

(H) Optical Fiber Cables.

Only optical fiber cables listed in accordance with 770.179 shall be permitted to be installed in an information technology equipment room.

(I) Cables Not in Information Technology Equipment Room.

Cables extending beyond the information technology equipment room shall be subject to the applicable requirements of this *Code*.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 15:16:56 EST 2024

Committee Statement

Committee Statement: This revision changes the references from an entire article to a specific Part to comply with 4.1.4 of the 2023 NEC Style Manual. The section is revised to xxx.4 to comply with the 2023 NEC Style Manual for parallel sections. XXX.3 is for Reconditioned Equipment. PLTC cables were removed because PLTC cables are not listed for use in plenums. Coaxial was added to (G) because the only cables used for CATV are coaxial.

Response Message: FR-8520-NFPA 70-2024

[Public Input No. 3208-NFPA 70-2023 \[Section No. 645.3\(G\)\]](#)

[Public Input No. 932-NFPA 70-2023 \[Section No. 645.3\(F\)\]](#)

[Public Input No. 2774-NFPA 70-2023 \[Section No. 645.3\]](#)

[Public Input No. 931-NFPA 70-2023 \[Section No. 645.3\(E\)\]](#)

[Public Input No. 3914-NFPA 70-2023 \[Section No. 645.3\(B\)\]](#)

[Public Input No. 933-NFPA 70-2023 \[Section No. 645.3\(G\)\]](#)

[Public Input No. 3199-NFPA 70-2023 \[Section No. 645.3\(F\)\]](#)

**First Revision No. 8533-NFPA 70-2024 [Section No. 645.4]**

645.4 – [See "FR 8533_645.5" word document for revisions to 645.4]

645.5 – Special Requirements for Information Technology Equipment Room.

The alternative wiring methods to Chapter 3 and Article 725 , Parts I and II of ~~Article 725~~ - for signaling wiring and Article 770, Parts I and V - of ~~Article 770~~ - for optical fiber cabling shall be permitted where all of the following conditions are met:

- (1) Disconnecting means complying with 645.10 are provided.
- (2) A heating/ventilating/air-conditioning (HVAC) system is provided in one of the methods identified in the following:
 - (3) A separate HVAC system that is dedicated for information technology equipment use and is separated from other areas of occupancy
 - (4) An HVAC system that serves other occupancies and meets all of the following:
 - (5) Also serves the information technology equipment room
 - (6) Provides fire/smoke dampers at the point of penetration of the room boundary
 - (7) Activates the damper operation upon initiation by smoke detector alarms, by operation of the disconnecting means required by 645.10 , or by both

Informational Note No. 1: See NFPA 75-2020 2024 , *Standard for the Fire Protection of Information Technology Equipment*, Chapter 11, Section 11.1, 11.1.1, 11.1.2, and 11.1.3, for further information.

- (8) All information technology and communications equipment installed in the room, including measurement, control, and laboratory equipment is listed.
- (9) The room is occupied by, and accessible to, only those personnel needed for the maintenance and functional operation of the installed information technology equipment.
- (10) The room is separated from other occupancies by fire-resistant-rated walls, floors, and ceilings with protected openings.

Informational Note No. 2: ~~See NFPA 75~~ See NFPA 75 -2020 2024 , *Standard for the Fire Protection of Information Technology Equipment*, Chapter 6, for further information on room construction requirements.

- (11) Only electrical equipment and wiring associated with the operation of the information technology room is installed in the room.

Informational Note No. 3: HVAC systems, communications systems, and monitoring systems such as telephone, fire alarm systems, security systems, water detection systems, and other related protective equipment are examples of equipment associated with the operation of the information technology room.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
FR_8533_645.5.docx		
FR_8533_645.5.docx	For prod use	

Submitter Information Verification

Committee: NEC-P12

Submission Date: Mon Jan 22 15:42:48 EST 2024

Committee Statement

Committee Statement: This section is expanded to keep pace with emerging technology. Quantum computers need test and measurement equipment to operate properly and listed to UL61010-1. The revision changes the order of articles and part references to comply with 4.1.4 of the NEC Style Manual.

Response Message: FR-8533-NFPA 70-2024

[Public Input No. 2485-NFPA 70-2023 \[Section No. 645.4\]](#)

[Public Input No. 2775-NFPA 70-2023 \[Section No. 645.4\]](#)

[Public Input No. 934-NFPA 70-2023 \[Section No. 645.4\]](#)

FOR COMMITTEE USE ONLY
SUBJECT TO REVISION - NOT FOR PUBLICATION

645.45 Special Requirements for Information Technology Equipment Room.

The alternative wiring methods to Chapter 3 and ~~Parts I and II~~ of Article 725, Parts I and II for signaling wiring and ~~Parts I and V~~ of Article 770, Parts I and V for optical fiber cabling shall be permitted where all of the following conditions are met:

- (1) Disconnecting means complying with 645.10 are provided.
- (2) A heating/ventilating/air-conditioning (HVAC) system is provided in one of the methods identified in the following:
 - a. A separate HVAC system that is dedicated for information technology equipment use and is separated from other areas of occupancy
 - b. An HVAC system that serves other occupancies and meets all of the following:
 - (i) Also serves the information technology equipment room
 - (ii) Provides fire/smoke dampers at the point of penetration of the room boundary
 - (iii) Activates the damper operation upon initiation by smoke detector alarms, by operation of the disconnecting means required by 645.10, or by both

Informational Note No. 1: See NFPA 75-2024~~40~~, *Standard for the Fire Protection of Information Technology Equipment*, Chapter 11, Section 11.1, 11.1.1, 11.1.2, and 11.1.3, for further information.

- (3) All information technology and communications equipment installed in the room, including measurement, control, and laboratory equipment test and measurement, is listed.
- (4) The room is occupied by, and accessible to, only those personnel needed for the maintenance and functional operation of the installed information technology equipment.
- (5) The room is separated from other occupancies by fire-resistant-rated walls, floors, and ceilings with protected openings.

Informational Note No. 2: See NFPA 75-2024~~40~~, *Standard for the Fire Protection of Information Technology Equipment*, Chapter 6, for further information on room construction requirements.

- (6) Only electrical equipment and wiring associated with the operation of the information technology room is installed in the room.

Informational Note No. 3: HVAC systems, communications systems, and monitoring systems such as telephone, fire alarm systems, security systems, water detection systems, and other related protective equipment are examples of equipment associated with the operation of the information technology room.

Commented [PB1]: Test and measurement equipment?

**First Revision No. 8538-NFPA 70-2024 [Section No. 645.5(E)(2)]****(2) Installation Requirements for Power-Supply Cords, Data Cables, Interconnecting Cables, and Grounding Conductors Under a Raised Floor.**

The following cords, cables, and conductors shall be permitted to be installed under a raised floor:

- (1) Power-supply cords of listed information technology equipment in accordance with 645.5(B).
- (2) Interconnecting cables enclosed in a raceway.
- (3) Equipment grounding conductors.
- (4) Where the air space under a raised floor is protected by an automatic fire suppression system, in addition to wiring installed in compliance with 722.135(B), Types CL2R, CL3R, CL4R, CL2, and CL3, CL4, and substitute cables, including CMP, CMR, CM, and CMG, installed in accordance with 722.135(E) shall be permitted under raised floors.
- (5) Where the air space under a raised floor is not protected by an automatic fire suppression system, in addition to wiring installed in compliance with 722.135(B), substitute cable Type CMP installed in accordance with 722.135(E) shall be permitted under raised floors.
- (6) Listed Type DP cable having adequate fire-resistant characteristics suitable for use under raised floors of an information technology equipment room.

Informational Note: See CSA "Vertical Flame Test-Cables in Cable Trays" as described in CSA C22.2 No. 0.3, *Test Methods for Electrical Wires and Cables*, for one method of defining resistance to the spread of fire where the damage (char length) of the cable does not exceed 1.5 m (4 ft 11 in.) or "UL Flame Exposure, Vertical Flame Tray Test" in UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test method are not applicable.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:01:10 EST 2024

Committee Statement

Committee Statement: Article 726 was added to the NEC in 2023, therefore this approved wiring method needed to be added to this section. Also updated UL standard to current edition.

Response Message: FR-8538-NFPA 70-2024

Public Input No. 3917-NFPA 70-2023 [Section No. 645.5(E)(2)]

**First Revision No. 8541-NFPA 70-2024 [Section No. 645.10(A)(2)]****(2) Disconnect Identification.**

The remote disconnect means for the control of electronic equipment power and HVAC systems shall be grouped and ~~identified~~ marked . A single means to control both systems shall be permitted.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 16:05:10 EST 2024**Committee Statement**

Committee Statement: Article 100 defines the term "identified" and is not correctly used in the first sentence. This revision changes the term 'identified' to 'marked'.

Response Message: FR-8541-NFPA 70-2024

Public Input No. 2507-NFPA 70-2023 [Section No. 645.10(A)(2)]

**First Revision No. 8544-NFPA 70-2024 [Section No. 645.10(A)(4)]****(4) System Operation Continuity.**

Additional means to prevent unintentional operation of remote disconnect controls shall be permitted.

Informational Note: See NFPA 75-2020 , *Standard for the Fire Protection of Information Technology Equipment*, for further information.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:09:17 EST 2024

Committee Statement

Committee Statement: The NFPA 75 reference date was provided.

Response Message: FR-8544-NFPA 70-2024

**First Revision No. 8547-NFPA 70-2024 [Section No. 645.10(B)]****(B) Critical Operations Data Systems.**

Remote disconnecting controls shall not be required for critical operations data systems when all of the following conditions are met:

- (1) An approved procedure has been established and maintained for removing power and air movement within the room or zone.
- (2) Qualified personnel are continuously available to advise emergency responders and to instruct them of disconnecting methods.
- (3) A smoke-sensing fire detection system is in place.

Informational Note: See *NFPA 72-2025*, *National Fire Alarm and Signaling Code*, for further information.

- (4) An approved fire suppression system suitable for the application is in place.
- (5) Cables installed under a raised floor, other than branch-circuit wiring, and power cords are installed in compliance with 645.5(E)(2) or (E)(3), or in compliance with Table 645.10(B).

Table 645.10(B) Cables Installed Under Raised Floors

<u>Cable Type</u>	<u>Applicable Sections</u>
Branch circuits under raised floors	645.5(E)(1)
Supply cords of listed information technology equipment	645.5(E)(2)(1), 300.22(C)
Class 2 and Class 3 remote control and PLTC <u>Class 4</u> cables in other spaces used for environmental air (plenums)	722.135(B)
Optical fiber cable in other spaces used for environmental air (plenums)	770.113(C) and Table 770.154(a)
Communications wires and cables, cable routing assemblies, and communications raceways in other spaces used for environmental air (plenums)	800.113(C) and Tables 800.154(a), (b), and (c)
Coaxial CATV and radio distribution cables in other spaces used for environmental air (plenums)	800.113(C) and Table 800.154(a)

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:12:56 EST 2024

Committee Statement

Committee Statement: Article 726 was added to the NEC in 2023, therefore this approved wiring method needed to be added to this section. PLTC was also removed since it is not allowed in a plenum. The NFPA 72 reference date was updated.

Response Message: FR-8547-NFPA 70-2024

Public Input No. 3918-NFPA 70-2023 [Section No. 645.10(B)]

**First Revision No. 8549-NFPA 70-2024 [Section No. 645.11]****645.11** Uninterruptible Power Supply (UPS).

UPS systems installed within the information technology equipment room and their supply and output circuits shall comply with 645.10, except for the following installations and constructions:

- (1) Installations complying with ~~Parts~~ Article 685, parts I and II - of ~~Article~~ 685
- (2) Power sources limited to 750 volt-amperes or less derived either from UPS equipment or from battery circuits integral to electronic equipment

The disconnecting means shall also disconnect the battery from its load.

Informational Note: See UL 1778; 2014 , *Uninterruptible Power Systems*, and UL 62368-1; 2019 , *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for information on product listings for electronic equipment disconnecting means and backup battery power sources.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:15:32 EST 2024

Committee Statement

Committee Statement: Subpart revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be references before parts, and updated UL standards to latest edition.

Response Message: FR-8549-NFPA 70-2024

Public Input No. 2776-NFPA 70-2023 [Section No. 645.11]

Public Input No. 936-NFPA 70-2023 [Section No. 645.11]

**First Revision No. 8551-NFPA 70-2024 [Section No. 645.14]****645.14** System Grounding.

Separately derived power systems shall be installed in accordance with Article 250, Parts I and II - ~~of Article 250~~ . Power systems derived within listed information technology equipment that supply information technology systems through receptacles or cable assemblies supplied as part of this equipment shall not be considered separately derived for the purpose of applying 250.30.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 16:19:24 EST 2024**Committee Statement****Committee Statement:** Subpart is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.**Response Message:** FR-8551-NFPA 70-2024[Public Input No. 2777-NFPA 70-2023 \[Section No. 645.14\]](#)

**First Revision No. 8553-NFPA 70-2024 [Section No. 645.15]****645.15** Equipment Grounding and Bonding.

All exposed non-current-carrying metal parts of an information technology system shall be bonded to the equipment grounding conductor in accordance with Article 250, Parts I, V, VI, VII, and VIII of ~~Article 250~~ - or shall be double insulated. Where signal reference structures are installed, they shall be bonded to the equipment grounding conductor provided for the information technology equipment. Any auxiliary grounding electrode(s) installed for information technology equipment shall be installed in accordance with 250.54.

Informational Note: See 250.146(D) and 406.3(E) for information on isolated grounding-type receptacles.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:21:50 EST 2024

Committee Statement

Committee Statement: Subpart is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.

Response Message: FR-8553-NFPA 70-2024

Public Input No. 937-NFPA 70-2023 [Section No. 645.15]

Public Input No. 2778-NFPA 70-2023 [Section No. 645.15]

**First Revision No. 8554-NFPA 70-2024 [Section No. 645.18]****645.18** Surge Protection for Critical Operations Data Systems.

A listed surge-protective device (SPD) shall be installed for critical operations data systems in accordance with ~~Part II of~~ Article 242, Part II .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 16:24:58 EST 2024**Committee Statement**

Committee Statement: Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.

Response Message: FR-8554-NFPA 70-2024

[Public Input No. 2779-NFPA 70-2023 \[Section No. 645.18\]](#)

[Public Input No. 938-NFPA 70-2023 \[Section No. 645.18\]](#)

**First Revision No. 8555-NFPA 70-2024 [Section No. 645.25]****645.25** Engineering Supervision.

As an alternative to the feeder and service load calculations required by ~~Parts~~ Article 220 , Parts III and IV- ~~of Article 220~~ , feeder and service load calculations for new or existing loads shall be permitted to be used if provided by qualified persons under engineering supervision.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 16:26:42 EST 2024**Committee Statement****Committee Statement:** Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be references before Parts.**Response Message:** FR-8555-NFPA 70-2024[Public Input No. 939-NFPA 70-2023 \[Section No. 645.25\]](#)[Public Input No. 2780-NFPA 70-2023 \[Section No. 645.25\]](#)

**First Revision No. 8557-NFPA 70-2024 [Section No. 645.27]****645.27** Selective Coordination.**(A) General.**

Critical operations data system(s) overcurrent protective devices (OCPD) shall be selectively coordinated with all supply-side overcurrent protective devices.

Selective coordination shall be selected by a licensed professional engineer or other qualified persons engaged primarily in the design, installation, or maintenance of electrical systems. The selection shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.

(B) Replacements.

Where critical operations data system(s) OCPDs are replaced, they shall be reevaluated to ensure selective coordination of the critical operations data system(s) is maintained with all supply-side and load-side OCPDs.

(C) Modifications.

If modifications, additions, or deletions to the critical operations data system(s) or the normal system supplying the load(s) occur, selective coordination of the critical operations data system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8557_645.27.docx		

Submitter Information Verification

Committee: NEC-P12
Submittal Date: Mon Jan 22 16:38:00 EST 2024

Committee Statement

Committee Statement: This revision rewords this section to correlate with other sections of the NEC. Two new subparts are added to ensure that selective coordination is maintained when replacement parts are installed or if the system is modified.

Response Message: FR-8557-NFPA 70-2024

Public Input No. 4037-NFPA 70-2023 [Section No. 645.27]

645.27 Selective Coordination. [Move text to (A)]

~~Critical operations data system(s) overcurrent protective devices shall be selectively coordinated with all supply-side overcurrent protective devices.~~

~~Selective coordination shall be selected by a licensed professional engineer or other qualified persons engaged primarily in the design, installation, or maintenance of electrical systems. The selection shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.~~

(A) General.

Critical operations data system(s) overcurrent protective devices (OCPD) shall be selectively coordinated with all supply-side overcurrent protective devices.

Selective coordination shall be selected by a licensed professional engineer or other qualified persons engaged primarily in the design, installation, or maintenance of electrical systems. The selection shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.

(B) Replacements.

Where critical operations data system(s) OCPDs are replaced, they shall be reevaluated to ensure selective coordination of the critical operations data system(s) is maintained with all supply-side and load-side OCPDs.

(C) Modifications.

If modifications, additions, or deletions to the critical operations data system(s) or the normal system supplying the load(s) occur, selective coordination of the critical operations data system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

**First Revision No. 8562-NFPA 70-2024 [Section No. 646.1]****646.1 Scope.**

This article covers modular data centers.

Informational Note No. 1: Modular data centers include the installed information technology equipment (ITE) and support equipment, electrical supply and distribution, wiring and protection, working space, grounding, HVAC, and the like, that are located in an equipment enclosure.

Informational Note No. 2: See NFPA 75-2024 , *Standard for the Fire Protection of Information Technology Equipment*, which covers the requirements for the protection of information technology equipment and systems in an information technology equipment room.

Informational Note No. 3: See UL 60950-1-2007 , *Information Technology Equipment — Safety — Part 1: General Requirements*, and UL 62368-1-2019 , *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, for information on listing requirements for both information technology equipment and communications equipment contained within a modular data center.

Informational Note No. 4: *Modular data centers* are sometimes referred to as containerized data centers.

Informational Note No. 5: Equipment enclosures housing only support equipment (e.g., HVAC or power distribution equipment) that are not part of a specific modular data center are not considered a modular data center.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 16:56:43 EST 2024

Committee Statement

Committee Statement: This revision updates the references in the Informational notes to the latest standards editions.

Response Message: FR-8562-NFPA 70-2024

**First Revision No. 8566-NFPA 70-2024 [Section No. 646.3]****646.3– 4 _ Other Articles.**

Circuits and equipment shall comply with 646.3 4 (A) through (M) as applicable. ~~Wherever the requirements of other articles of this Code and Article 646 differ, the requirements of Article 646 shall apply .~~

(A) Spread of Fire or Products of Combustion.

Sections 300.21, 770.26, and 800.26 shall apply to penetrations of a fire-resistant room boundary, if provided.

(B) Wiring and Cabling in Other Spaces Used for Environmental Air (Plenums).

The following sections and tables shall apply to wiring and cabling in other spaces used for environmental air (plenums) within a modular data center space:

- (1) Wiring methods: 300.22(C)(1)
- (2) Class 2, Class 3, and ~~PLTC~~ Class 4 cables: 722.135(B)
- (3) Fire alarm systems: 760.53(B)(2) and Table 760.154
- (4) Optical fiber cables: 770.113(C) and Table 770.154(a)
- (5) Communications circuits: 800.113(C) and Table 800.154(a)
- (6) CATV and radio distribution systems: 800.113(C) and Table 800.154(a)

Informational Note: Environmentally controlled working spaces, aisles, and equipment areas in an MDC are not considered a plenum.

(C) Grounding and Bonding.

The non-current-carrying conductive members of optical fiber cables in an MDC shall be grounded in accordance with 770.114. Grounding and bonding of communications protectors, cable shields, and non-current-carrying metallic members of cable shall comply with ~~Part IV of Article 805, Part III .~~

(D) Electrical Classification of Data Circuits.

~~Section 725.60(A)(4)~~ shall apply to the electrical classification of listed information technology equipment signaling circuits.

(E) Fire Alarm Equipment.

~~Article 760 , Parts I, II, and III of Article 760 -~~ shall apply to fire alarm systems, cables, and equipment installed in an MDC, where provided. Only fire alarm cables listed in accordance with ~~Part IV of Article 760, Part IV _~~ and listed fire alarm equipment shall be permitted to be installed in an MDC.

(F) Cable Routing Assemblies and Communications Wires, Cables, Raceways, and Equipment.

~~Sections 800.110, 800.113, and 800.154 shall apply to cable routing assemblies and communications raceways. Article 800, Parts I, II, III, and IV and Article 805 , and V of Articles 800 and 805 - Parts I, III, and IV shall apply to communications wires, cables, and equipment installed in an MDC. Only communications wires and cables listed in accordance with 800.179, cable routing assemblies and communications raceways listed in accordance with 800.182, and communications equipment listed in accordance with 800.171 shall be permitted to be installed in an MDC.~~

Informational Note: See Article 100 for a definition of *communications equipment*.

(G) Community Antenna Television and Radio Distribution Systems Cables and Equipment.

Article 800 , Parts I, II, III, and IV and Article 820 , Parts I and V - of ~~Articles 800 and 820~~ shall apply to community antenna television and radio distribution systems equipment installed in an MDC. Only community antenna television and radio distribution coaxial cables listed in accordance with 800.179 and listed CATV equipment shall be permitted to be installed in an MDC.

(H) Surge-Protective Devices (SPDs).

Where provided, surge-protective devices shall be listed and labeled and installed in accordance with ~~Part II of Article 242~~, Part II .

(I) Lighting.

Lighting shall be installed in accordance with Article 410, Parts I through XIV - of ~~Article 410~~ .

(J) Power Distribution Wiring and Wiring Protection.

Power distribution wiring and wiring protection within an MDC shall comply with Article 210 , Parts I , II, and III of ~~Article 210~~ for branch circuits and II .

(K) Wiring Methods and Materials.

Wiring methods and materials shall comply with the following:

- (1) Unless modified elsewhere in this article, wiring methods and materials for power distribution shall comply with Chapter 3. Wiring shall be suitable for its use and installation and shall be listed and labeled.
Exception: This requirement shall not apply to wiring that is part of listed and labeled equipment.
- (2) The following wiring methods shall not be permitted:
 - (3) Integrated gas spacer cable: Type IGS (Article 326)
 - (4) Concealed knob-and-tube wiring (Article 394)
 - (5) Messenger-supported wiring (Article 396)
 - (6) Open wiring on insulators (Article 398)
 - (7) Outdoor overhead conductors over 600 volts (Article 395)
- (8) Wiring in areas under a raised floor that are constructed and used for ventilation as described in 645.5(E) shall be permitted to use the wiring methods described in 645.5(E) if the conditions of 645.4 are met.
- (9) Installation of wiring for remote-control, signaling, and power-limited circuits shall comply with ~~Part II of Article 725~~, Part I and II .
- (10) Installation of optical fiber cables shall comply with ~~Part V of Article 770~~, Part V .
- (11) Alternate wiring methods as permitted by Article 645 shall be permitted for MDCs, provided that all of the conditions of 645.4 are met.

(L) Service Equipment.

For an MDC that is designed such that it can be powered from a separate electrical service, the service equipment for control and protection of services and their installation shall comply with Article 230, Parts I, V, VI, and VII - of ~~Article 230~~ . The service equipment and their arrangement and installation shall permit the installation of the service-entrance conductors in accordance with Article 230, Parts I and IV - of ~~Article 230~~ . Service equipment shall be listed and labeled and marked as being suitable for use as service equipment.

(M) Disconnecting Means.

An approved means shall be provided to disconnect power to all electronic equipment in the MDC in accordance with 645.10. There shall also be a similar approved means to disconnect the power to all dedicated HVAC systems serving the MDC that shall cause all required fire/smoke dampers to close.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 17:03:01 EST 2024**Committee Statement**

Committee Statement: This revision deletes the second sentence in 646.3 since that statement was already in 90.3 and to comply with 4.1.3 and 4.1.4 of the NEC Style Manual which requires articles to be references before Parts. Article 726 was added to the NEC in 2023, therefore the Class 4 wiring method needed to be added to this section. PLTC cables were removed because PLTC cables are not listed for use in plenums. Coaxial was added to (G) because the only cables used for CATV are coaxial. The section is revised to xxx.4 to comply with the 2023 NEC Style Manual for parallel sections. XXX.3 is for Reconditioned Equipment.

Response Message: FR-8566-NFPA 70-2024

[Public Input No. 943-NFPA 70-2023 \[Section No. 646.3\(F\)\]](#)

[Public Input No. 949-NFPA 70-2023 \[Section No. 646.3\(L\)\]](#)

[Public Input No. 947-NFPA 70-2023 \[Section No. 646.3\(J\)\]](#)

[Public Input No. 2782-NFPA 70-2023 \[Section No. 646.3\]](#)

[Public Input No. 944-NFPA 70-2023 \[Section No. 646.3\(G\)\]](#)

[Public Input No. 948-NFPA 70-2023 \[Section No. 646.3\(K\)\]](#)

[Public Input No. 941-NFPA 70-2023 \[Section No. 646.3\(C\)\]](#)

[Public Input No. 3227-NFPA 70-2023 \[Section No. 646.3\]](#)

[Public Input No. 946-NFPA 70-2023 \[Section No. 646.3\(I\)\]](#)

[Public Input No. 940-NFPA 70-2023 \[Section No. 646.3 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 942-NFPA 70-2023 \[Section No. 646.3\(E\)\]](#)

[Public Input No. 3921-NFPA 70-2023 \[Section No. 646.3\(B\)\]](#)

[Public Input No. 2781-NFPA 70-2023 \[Section No. 646.3\]](#)

[Public Input No. 945-NFPA 70-2023 \[Section No. 646.3\(H\)\]](#)

**First Revision No. 8574-NFPA 70-2024 [Section No. 646.5]****646.5– 6** Nameplate Data.

A permanent nameplate shall be attached to each equipment enclosure of an MDC and shall be plainly visible after installation. The nameplate shall include the following information, as applicable:

- (1) Supply voltage, number of phases, frequency, and full-load current. The full-load current shown on the nameplate shall not be less than the sum of the full-load currents required for all motors and other equipment that may be in operation at the same time under normal conditions of use. Where unusual type loads, duty cycles, and so forth, require oversized conductors or permit reduced-size conductors, the required capacity shall be included in the marked full-load current. Where more than one incoming supply circuit is to be provided, the nameplate shall state the preceding information for each circuit. For listed equipment, the full-load current shown on the nameplate shall be permitted to be the maximum, measured, 15-minute, average full-load current.

Informational Note No. 1: See 430.22(E) and 430.26 for duty cycle requirements.

- (2) For MDCs powered by a separate service, the short-circuit current rating of the service equipment provided as part of the MDC.

Informational Note No. 2: This rating may be part of the service equipment marking.

- (3) For MDCs powered by a separate service, if the required service as determined by Article 220, Parts III and IV - of ~~Article 220~~ - is less than the rating of the service panel used, the required service shall be included on the nameplate. As an alternative to the feeder and service load calculations required by Article 220, Parts III and IV of ~~Article 220~~, feeder and service load calculations for new, future, or existing loads shall be permitted to be used if performed by qualified persons under engineering supervision.

Informational Note No. 3: Branch circuits supplying ITE loads are assumed to be loaded not less than 80 percent of the branch-circuit rating with a 100 percent duty cycle.

- (4) Electrical diagram number(s) or the number of the index to the electrical drawings.
- (5) For MDC equipment enclosures that are not powered by a separate service, feeder, or branch circuit, a reference to the powering equipment.
- (6) Manufacturer's name or trademark.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 17:26:06 EST 2024

Committee Statement

Committee Statement: Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.

Response Message: FR-8574-NFPA 70-2024

[Public Input No. 950-NFPA 70-2023 \[Section No. 646.5\]](#)

[Public Input No. 2784-NFPA 70-2023 \[Section No. 646.5\]](#)



First Revision No. 8577-NFPA 70-2024 [Section No. 646.9]

646.9– 10 Flexible Power Cords and Cables for Connecting Equipment Enclosures of an MDC System.

(A) Uses Permitted.

Flexible power cords and cables shall be permitted to be used for connections between equipment enclosures of an MDC system where not subject to physical damage. Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords or cables shall also be listed as suitable for wet locations and shall be sunlight resistant.

Informational Note: One example of flexible power cord usage for connections between equipment enclosures of an MDC system is between an MDC enclosure containing only servers and one containing power distribution equipment.

(B) Uses Not Permitted.

Flexible power cords and cables shall not be used for connection to external sources of power.

Informational Note: Examples of external sources of power are electrical services, feeders, and premises branch circuits.

(C)

Listing.

~~Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords and cables shall also be listed as suitable for wet locations and shall be sunlight resistant.~~

(D) ~~Single-Conductor Cable.~~

~~Single-conductor power cable shall be permitted to be used only in sizes 2 AWG or larger.~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8577_646.9.docx		

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 17:29:19 EST 2024

Committee Statement

Committee Statement: This revision relocated (C) into (A). A separate section is not needed as it would only apply if permitted in subpart A.

Response Message: FR-8577-NFPA 70-2024

Public Input No. 2806-NFPA 70-2023 [Section No. 646.9]

646.9 Flexible Power Cords and Cables for Connecting Equipment Enclosures of an MDC System. [Renumber as 646.10]

(A) Uses Permitted.

Flexible power cords and cables shall be permitted to be used for connections between equipment enclosures of an MDC system where not subject to physical damage. Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords and cables shall also be listed as suitable for wet locations and shall be sunlight resistant.

Informational Note: One example of flexible power cord usage for connections between equipment enclosures of an MDC system is between an MDC enclosure containing only servers and one containing power distribution equipment.

(B) Uses Not Permitted.

Flexible power cords and cables shall not be used for connection to external sources of power.

Informational Note: Examples of external sources of power are electrical services, feeders, and premises branch circuits.

~~(C)~~ Listing. [Move text to end of (A)]

~~Where flexible power cords or cables are used, they shall be listed as suitable for extra-hard usage. Where used outdoors, flexible power cords and cables shall also be listed as suitable for wet locations and shall be sunlight resistant.~~

~~(D)~~ Single-Conductor Cable.

Single-conductor power cable shall be permitted to be used only in sizes 2 AWG or larger.

**First Revision No. 8579-NFPA 70-2024 [Section No. 646.10]**

646.10– 20 _ Electrical Supply and Distribution.

Equipment used for electrical supply and distribution in an MDC, including fittings, devices, luminaires, apparatus, machinery, and the like, shall comply with Article 110, Parts I and II - of Article 110 .

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 17:33:04 EST 2024

Committee Statement

Committee Statement: Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.

Response Message: FR-8579-NFPA 70-2024

Public Input No. 2785-NFPA 70-2023 [Section No. 646.10]

**First Revision No. 8581-NFPA 70-2024 [Section No. 646.11(B)]****(B) Non-Utility-Owned Premises Transformers.**

Non-utility-owned premises distribution transformers installed in the vicinity of an MDC shall be of the dry type or the type filled with a noncombustible dielectric medium. Such transformers shall be installed in accordance with Article 450, Parts I and II - ~~of Article 450~~ . Non-utility-owned premises distribution transformers shall not be permitted in an MDC.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 17:35:55 EST 2024**Committee Statement****Committee Statement:** Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.**Response Message:** FR-8581-NFPA 70-2024[Public Input No. 2786-NFPA 70-2023 \[Section No. 646.11\]](#)[Public Input No. 951-NFPA 70-2023 \[Section No. 646.11\(B\)\]](#)

**First Revision No. 8582-NFPA 70-2024 [Section No. 646.11(C)]****(C) Power Transformers.**

Power transformers that supply power only to the MDC shall be permitted to be installed in the MDC equipment enclosure. Only dry-type transformers shall be permitted to be installed in the MDC equipment enclosure. Such transformers shall be installed in accordance with Article 450, Parts I, II, and III - ~~of Article 450~~ .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Mon Jan 22 17:38:52 EST 2024**Committee Statement****Committee Statement:** Section is revised to comply with 4.1.4 of the 2023 NEC Style Manual which requires articles to be referenced before parts.**Response Message:** FR-8582-NFPA 70-2024Public Input No. 952-NFPA 70-2023 [Section No. 646.11(C)]Public Input No. 3271-NFPA 70-2023 [Section No. 646.11(C)]

**First Revision No. 8584-NFPA 70-2024 [Section No. 646.20(B)]****(B) Other Circuits.**

Any areas of ITE that require servicing of parts that are greater than 30 volts rms, 42 volts peak, or 60 volts dc shall comply with the workspace requirements of 646.19.

~~Informational Note No. 1 : For example, field-wiring compartments for ac mains connections, power distribution units, and so forth.~~

~~Informational Note No. 2: It is assumed that ITE operates at voltages not exceeding 1000 volts.~~

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 17:50:27 EST 2024

Committee Statement

Committee Statement: The informational note is unnecessary and should be deleted. Requirements are revised to include the same voltage demarcation used in many places throughout the Code. This is in reference to Global Public Input 2427.

Response Message: FR-8584-NFPA 70-2024

**First Revision No. 8585-NFPA 70-2024 [Section No. 647.3]****647.3– 4 _ General.**

Use of a separately derived 120-volt single-phase 3-wire system with 60 volts on each of two ungrounded conductors to an equipment grounding conductor shall be permitted for the purpose of reducing objectionable noise in sensitive electronic equipment locations, provided the following conditions apply:

- (1) The system is installed only in commercial or industrial occupancies.
- (2) The system's use is restricted to areas under close supervision by qualified personnel.
- (3) All of the requirements in 647.4 through 647.8 are met.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Mon Jan 22 17:54:25 EST 2024

Committee Statement

Committee Statement: Renumbered Article to meet the requirements of 2.2.1 of the 2023 NEC Style Manual, which requires parallel numbering for the sections regarding the same purposes. Section xxx.3 is for reconditioned equipment. This is in reference to Global Public Input 3086.

Response Message: FR-8585-NFPA 70-2024

**First Revision No. 8716-NFPA 70-2024 [Section No. 650.3]****650.3– 4 _ Other Articles.**

Installations of circuits and equipment shall comply with 650.3(A) and (B) as applicable. Wherever the requirements of other articles in Chapters 1 through 7 of this *Code* and **Article 650 - this article** differ, the requirements of **Article- 650 - this article** shall apply.

(A) Electronic Organ Equipment.

Installations of digital/analog-sampled sound production technology and associated audio signal processing, amplification, reproduction equipment, and wiring installed as part of a pipe organ shall be in accordance with Article 640, Parts I and II .

(B) Optical Fiber Cable.

Installations of optical fiber cables shall be in accordance with Article 770, _ Parts I and V- of Article- 770 .

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 13:09:45 EST 2024

Committee Statement

Committee Statement: These changes will bring this article into compliance with the NEC Style Manual 4.1.4 which prohibits referencing an entire article. The section was renumbered to comply with the 2023 NEC Style Manual for parallel construction. Section XXX.3 is for Reconditioned Equipment.

Response Message: FR-8716-NFPA 70-2024

Public Input No. 929-NFPA 70-2023 [Section No. 650.3(A)]

Public Input No. 930-NFPA 70-2023 [Section No. 650.3 [Excluding any Sub-Sections]]

Public Input No. 927-NFPA 70-2023 [Section No. 650.3(B)]

Public Input No. 3272-NFPA 70-2023 [Section No. 650.3 [Excluding any Sub-Sections]]

Public Input No. 2788-NFPA 70-2023 [Section No. 650.3]

**First Revision No. 8723-NFPA 70-2024 [Section No. 650.6(D)]****(D) Cable Covering.**

Each cable shall be provided with an outer covering, either overall or on each of any subassemblies of grouped conductors. Tape shall be permitted in place of a covering. Where not installed in metal raceway, the covering shall be resistant to flame spread, or the cable or each cable subassembly shall be covered with a closely wound listed fireproof tape.

Informational Note: See UL 2556-2015 2021 , *Wire, Cables and Cable Test Methods*, for one method of determining that cable is resistant to flame spread by testing the cable to the FV-2/VW-1 Test.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 13:20:09 EST 2024

Committee Statement

Committee Statement: The reference to UL 2556 is updated in accordance with the NFPA Manual of Style.

Response Message: FR-8723-NFPA 70-2024

**First Revision No. 8747-NFPA 70-2024 [Section No. 660.4(C)]**

(C)— Over 1000 Volts, Nominal.

Circuits and equipment operated at more than 1000 volts, nominal, shall comply with Article 490.

Submitter Information Verification

Committee: NEC-P12

Submission Date: Tue Jan 23 14:21:15 EST 2024

Committee Statement

Committee Statement: Requirements in 660.4(C) were deleted because the requirements are redundant to Article 495. Chapter 1 through 4 general requirements apply. This is in reference to the Global Public Input 2427.

Response Message: FR-8747-NFPA 70-2024

[Public Input No. 2427-NFPA 70-2023 \[Global Input\]](#)

[Public Input No. 3273-NFPA 70-2023 \[Section No. 660.4\(C\)\]](#)

[Public Input No. 1780-NFPA 70-2023 \[Section No. 660.4\(C\)\]](#)

[Public Input No. 3415-NFPA 70-2023 \[Section No. 660.4\(C\)\]](#)

**First Revision No. 8752-NFPA 70-2024 [Section No. 660.10]**

660.10 – Equipment Installations [Section is relocated to 660.3. Renumber existing 660.3 to 660.4 and subsequent sections by xxx.1]

660.3 – Reconditioned Equipment .

All equipment for new X-ray installations and all used or reconditioned X-ray equipment moved to and reinstalled at a new location shall be of ~~an approved~~ a permitted type.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 14:50:45 EST 2024

Committee Statement

Committee Statement: Section 660.10 was moved to section 660.3 in accordance with the 2023 NEC style manual 2.2.1. The title was changed to reconditioned equipment to clarify the intent of the section. Approved is an action taken by the AHJ, permitted is a term that describes what is allowed.

Response Message: FR-8752-NFPA 70-2024

Public Input No. 2614-NFPA 70-2023 [Section No. 660.10]

**First Revision No. 8751-NFPA 70-2024 [Section No. 660.35]****660.35** General.

Transformers and capacitors that are part of an X-ray equipment shall not be required to comply with ~~Articles- 450.1~~ and ~~460.1~~ .

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 14:37:02 EST 2024**Committee Statement**

Committee Statement: This revision changes the references to Article 450 and 460 to 450.1 and 460.1 to comply with the 2023 NEC Style Manual 4.1.4 which prohibits references to an entire article.

Response Message: FR-8751-NFPA 70-2024

**First Revision No. 8758-NFPA 70-2024 [Section No. 668.3]****668.3– 4 _ Other Articles.****(A) Lighting, Ventilating, Material Handling.**

Chapters 1 through 4 shall apply to services, feeders, branch circuits, and apparatus for supplying lighting, ventilating, material handling, and the like that are outside the electrolytic cell line working zone.

(B) Systems Not Electrically Connected.

Those elements of a cell line power-supply system that are not electrically connected to the cell supply system, such as the primary winding of a two-winding transformer, the motor of a motor-generator set, feeders, branch circuits, disconnecting means, motor controllers, and overload protective equipment, shall be required to comply with all applicable sections of this Code.

(C) Electrolytic Cell Lines.

Electrolytic cell lines shall comply with the provisions of Chapters 1 through 4 except as amended in 668.3 4 (C)(1) through (C)(4).

(1) Conductors.

The electrolytic cell line conductors shall not be required to comply with Articles 110.1 , 210.1 , 215.1 , 220.1 , and 225.1 . See 668.12.

(2) Overcurrent Protection.

Overcurrent protection of electrolytic cell dc process power circuits shall not be required to comply with the requirements of Article 240.1 .

(3) Grounding.

Except as required by this article, equipment located or used within the electrolytic cell line working zone or associated with the cell line dc power circuits shall not be required to comply with Article 250.1 .

(4) Working Zone.

The electrolytic cells, cell line attachments, and the wiring of auxiliary equipment and devices within the cell line working zone shall not be required to comply with Articles 110.1 , 210.1 , 215.1 , 220.1 , and 225.1 . See 668.30.

Informational Note: See 668.15 for equipment, apparatus, and structural component grounding.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:01:47 EST 2024

Committee Statement

Committee Statement: This revision changes existing section 668.3 to 668.4 in accordance with 2.2 of the 2023 NEC Style Manual regarding parallel construction. XXX.3 is for reconditioned equipment. Multiple references to whole articles were revised in this section to comply with the 2023 NEC Style Manual 4.1.4.

Response Message: FR-8758-NFPA 70-2024

**First Revision No. 8756-NFPA 70-2024 [Section No. 668.15]****668.15** Grounding.

For equipment, apparatus, and structural components that are required to be grounded in accordance with ~~Article 668~~ this article , Article 250, Part III, for a local grounding electrode system shall apply, except a water pipe electrode shall not be required to be used. Any electrode or combination of electrodes described in 250.52 shall be permitted.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 15:00:31 EST 2024**Committee Statement**

Committee Statement: This revision changes the reference to article 668 to 'this article' to comply NEC Style Manual 4.1.4 which prohibits the reference to an entire article.

Response Message: FR-8756-NFPA 70-2024

[Public Input No. 3275-NFPA 70-2023 \[Section No. 668.15\]](#)

**First Revision No. 8762-NFPA 70-2024 [Section No. 669.3]****669.3– 4** _ General.

Equipment for use in electroplating processes shall be identified for such service.

Submitter Information Verification**Committee:** NEC-P12**Submittal Date:** Tue Jan 23 15:12:24 EST 2024**Committee Statement****Committee Statement:** This revision changes existing section 669.3 to 669.4 in accordance with 2.2 of the 2023 NEC style manual. The XXX.3 section is for reconditioned equipment.**Response Message:** FR-8762-NFPA 70-2024

**First Revision No. 8765-NFPA 70-2024 [Section No. 670.1]****670.1 Scope.**

This article covers the nameplate data for, ~~overvoltage~~ surge protection for, and the size and overcurrent protection of supply conductors to industrial machinery.

Informational Note No. 1: See NFPA 79-2024 , *Electrical Standard for Industrial Machinery*, for further information.

Informational Note No. 2: See 110.26 for information on the workspace requirements for equipment containing supply conductor terminals.

Informational Note No. 3: See NFPA 79-2024 , *Electrical Standard for Industrial Machinery*, for information on the workspace requirements for machine power and control equipment.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:16:35 EST 2024

Committee Statement

Committee Statement: This revision changes 'overvoltage protection' to 'surge protection' to keep this rule consistent with all other sections of the code covering surge protection. The NFPA reference dates were updated.

Response Message: FR-8765-NFPA 70-2024

Public Input No. 3429-NFPA 70-2023 [Section No. 670.1]

**First Revision No. 8778-NFPA 70-2024 [Section No. 670.3]**

[Relocate existing 670.3–3 to 670.4. Renumber subsequent sections]

670.4 Machine Nameplate Data.

Informational Note: See 430.22(E) and 430.26 for duty cycle requirements.

(A) Permanent Nameplate.

A permanent nameplate shall be attached to the outside of the control equipment enclosure or on the machine immediately adjacent to the main control equipment enclosure that is visible after installation. The nameplate shall include the following information:

- (1) Supply voltage, number of phases, frequency, and full-load current
- (2) Maximum ampere rating of the short-circuit and ground-fault protective device
- (3) Ampere rating of largest motor, from the motor nameplate, or load
- (4) Short-circuit current rating of the machine industrial control panel based on one of the following:
 - (5) Short-circuit current rating of a listed and labeled machine control enclosure or assembly
 - (6) Short-circuit current rating established using an approved method

Informational Note: See UL 508A-

2017

a.

2018 , *Industrial Control Panels* , *Supplement SB* , for an example of an approved method.

- (7) Electrical diagram number(s) or the number of the index to the electrical drawings

The full-load current shown on the nameplate shall not be less than the sum of the full-load currents required for all motors and other equipment that can be in operation at the same time under normal conditions of use. Where unusual type loads, duty cycles, and so forth require oversized conductors or permit reduced-size conductors, the required capacity shall be included in the marked "full-load current." Where more than one incoming supply circuit is to be provided, the nameplate shall state the preceding information for each circuit.

(B) Overcurrent Protection.

Where overcurrent protection is provided in accordance with 670.4(C), the machine shall be marked "overcurrent protection provided at machine supply terminals."

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP12_FR-8778_670.3.docx		

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:36:47 EST 2024

Committee Statement

Committee Statement: Existing section 670.3 was moved to new section 670.4 in accordance with 2.2 of the 2023 NEC Style Manual regarding parallel construction. The XXX.3 section is for reconditioned equipment. The UL 508A reference date was updated.

Response Message: FR-8778-NFPA 70-2024

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SUBJECT TO REVISION - NOT FOR PUBLICATION

670.3-4 Machine Nameplate Data.

Informational Note: See 430.22(E) and 430.26 for duty cycle requirements.

(A) Permanent Nameplate.

A permanent nameplate shall be attached to the outside of the control equipment enclosure or on the machine immediately adjacent to the main control equipment enclosure that is visible after installation. The nameplate shall include the following information:

1. Supply voltage, number of phases, frequency, and full-load current
2. Maximum ampere rating of the short-circuit and ground-fault protective device
3. Ampere rating of largest motor, from the motor nameplate, or load
4. Short-circuit current rating of the machine industrial control panel based on one of the following:
 1. Short-circuit current rating of a listed and labeled machine control enclosure or assembly
 2. Short-circuit current rating established using an approved method

Informational Note: See UL 508A-~~2017~~2018, *Industrial Control Panels, Supplement SB*, for an example of an approved method.

5. Electrical diagram number(s) or the number of the index to the electrical drawings

The full-load current shown on the nameplate shall not be less than the sum of the full-load currents required for all motors and other equipment that can be in operation at the same time under normal conditions of use. Where unusual type loads, duty cycles, and so forth require oversized conductors or permit reduced-size conductors, the required capacity shall be included in the marked "full-load current." Where more than one incoming supply circuit is to be provided, the nameplate shall state the preceding information for each circuit.

(B) Overcurrent Protection.

Where overcurrent protection is provided in accordance with 670.4(C), the machine shall be marked "overcurrent protection provided at machine supply terminals."

**First Revision No. 8781-NFPA 70-2024 [Section No. 670.4]****670.4 Supply Conductors and Overcurrent Protection.****(A) Size.**

The size of the supply conductor shall be such as to have an ampacity not less than 125 percent of the full-load current rating of all resistance heating loads plus 125 percent of the full-load current rating of the highest rated motor plus the sum of the full-load current ratings of all other connected motors and apparatus, based on their duty cycle, that may be in operation at the same time.

Informational Note No. 1: See Table 310.16 through Table 310.20 for ampacity of conductors rated 2000 volts and below.

Informational Note No. 2: See 430.22(E) and 430.26 for duty cycle requirements.

(B) Disconnecting Means.

A machine shall be considered as an individual unit and therefore shall be provided with disconnecting means. The disconnecting means shall be permitted to be supplied by branch circuits protected by either fuses or circuit breakers. The disconnecting means shall not be required to incorporate overcurrent protection.

Informational Note: See NFPA 70E-2024, *Standard for Electrical Safety in the Workplace*, which provides guidance for creating an electrically safe work condition for performing maintenance or other work on the machine.

(C) Overcurrent Protection.

Where furnished as part of the machine, overcurrent protection for each supply circuit shall consist of a single circuit breaker or set of fuses, the machine shall bear the marking required in 670.3, and the supply conductors shall be considered either as feeders or as taps as covered by 240.21.

The rating or setting of the overcurrent protective device for the circuit supplying the machine shall not be greater than the sum of the largest rating or setting of the branch-circuit short-circuit and ground-fault protective device provided with the machine, plus 125 percent of the full-load current rating of all resistance heating loads, plus the sum of the full-load currents of all other motors and apparatus that could be in operation at the same time.

Exception: Where one or more instantaneous trip circuit breakers or motor short-circuit protectors are used for motor branch-circuit short-circuit and ground-fault protection as permitted by 430.52(C), the procedure specified in 670.4(C) for determining the maximum rating of the protective device for the circuit supplying the machine shall apply with the following provision: For the purpose of the calculation, each instantaneous trip circuit breaker or motor short-circuit protector shall be assumed to have a rating not exceeding the maximum percentage of motor full-load current permitted by Table 430.52(C)(1) for the type of machine supply circuit protective device employed.

Where no branch-circuit short-circuit and ground-fault protective device is provided with the machine, the rating or setting of the overcurrent protective device shall be based on 430.52 and 430.53, as applicable.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:41:21 EST 2024

Committee Statement

Committee Statement: This revision adds the date of NFPA 70E.

Response Message: FR-8781-NFPA 70-2024

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**First Revision No. 8773-NFPA 70-2024 [Section No. 670.5(B)]**

(B) Available Short-Circuit-Current- Fault Current Field Marking.

Industrial machinery shall be legibly marked in the field with the available fault current. The field marking(s) shall include ~~the date the available fault current calculation was performed and be of sufficient durability to withstand the environment involved.~~ comply with 110.21(B).

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:29:47 EST 2024

Committee Statement

Committee Statement: This revision changes the title to 'fault current' to align with the rule more closely in section 670.5(B). The revision removed a redundant requirement and points the user to article 110.

Response Message: FR-8773-NFPA 70-2024

Public Input No. 2206-NFPA 70-2023 [Section No. 670.5(B)]

**First Revision No. 8777-NFPA 70-2024 [Section No. 670.6]****670.6** ~~Overvoltage~~ Surge Protection.

Industrial machinery with safety circuits shall have ~~overvoltage~~ surge protection.

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:34:39 EST 2024

Committee Statement

Committee Statement: This revisions changes 'overvoltage protection' to 'surge protection' to keep this rule and title consistent with all other sections of the code covering surge protection.

Response Message: FR-8777-NFPA 70-2024

[Public Input No. 3430-NFPA 70-2023 \[Section No. 670.6\]](#)

[Public Input No. 2162-NFPA 70-2023 \[Section No. 670.6\]](#)

**First Revision No. 8782-NFPA 70-2024 [Section No. 685.3]****685.3– 4 _ Application of Other Articles.**

The articles/sections in Table 685.3 apply to particular cases of installation of conductors and equipment, where there are orderly shutdown requirements that are in addition to those of this article or are modifications of them.

Table 685.3 Application of Other Articles

<u>Conductor/Equipment</u>	<u>Section</u>
More than one building or other structure	225, Part II
Ground-fault protection of equipment	230.95, Exception
Protection of conductors	240.4
Electrical system coordination	240.12
Ground-fault protection of equipment	240.13(1)
Grounding ac systems of 50 volts to less than 1000 volts	250.21
Equipment protection	427.22
Orderly shutdown	430.44
Disconnection	430.75, Exception Nos. 1 and 2
Disconnecting means in sight from controller	430.102(A), Exception No. 2
Energy from more than one source	430.113, Exception Nos. 1 and 2
Disconnecting means	645.10, Exception
Uninterruptible power supplies (UPS)	645.11(1)
Point of connection	705.12

Submitter Information Verification

Committee: NEC-P12

Submittal Date: Tue Jan 23 15:43:04 EST 2024

Committee Statement

Committee Statement: Existing section 685.3 was renumbered to 685.4 in accordance with 2.2 of the 2023 NEC Style Manual. The XXX.3 section is for reconditioned equipment.

Response Message: FR-8782-NFPA 70-2024