

Welcome Iowa Electricians!

What Does Iowa Require?

18-Hours of Continuing Education Required

- The Iowa electrician must complete no less than 18 Continuing Education Units (CEUs) in each three-year license cycle.
- No less than 6 of those 18 CEUs must focus on the most recent Iowa electrical code.
- JADE Learning's two-hour VILT sessions satisfy ALL of Iowa's requirements for electrical continuing education.
- **9 VILT sessions provides you all 18 hours.**



1

2023 NEC Changes

Important Changes from the 2023 NEC

6:00 PM Eastern Time

← 5 PM in Iowa

5:45 PM – 6:00 PM Eastern	Registration / Check In
6:00 PM – 7:00 PM Eastern	NEC Chapter 5 <i>with poll questions</i>
7:00 PM – 7:10 PM Eastern	Break
7:10 PM – 8:00 PM Eastern	NEC Chapter 5 continued <i>with poll questions</i>
8:00 PM Eastern	Questions for the instructor?

2

2023 NEC Changes

Article 500

Hazardous (Classified) Locations, Classes I, II, and III, Divisions

JADE
LEARNING

3

3

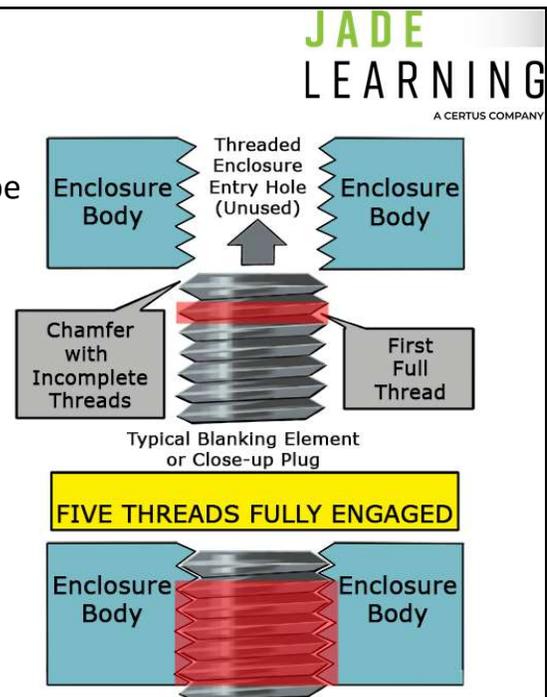
500.8(E)(3) Unused Openings

In **2020 NEC**, 500.8(E)(3) required unused openings in hazardous location enclosures to be closed using listed metal close-up plugs. The plug engagement had to comply with 500.8(E)(1) or (E)(2).

In **2023 NEC**, 500.8(E)(3) says to close these same unused openings using either listed **blanking elements** or close-up plugs. The revised code goes on to say that the **thread engagement** must comply with 500.8(E)(1) or (E)(2).

- 500.8(E)(1) and (E)(2) require 5 threads fully engaged!

2023 NEC Changes



4



5

501.10(A)(2) Flexible Connections

JADE LEARNING
A CERTUS COMPANY

501.10(A)(2) has been revised in 2023 NEC to specify that **vibration of equipment during operation** and **allowing for movement after installation during maintenance** are the only two reasons why flexible connections can be used in a Class I, Div. 1 location.

501.10(A)(2)(3) has been revised to use the newly defined term— **Restricted Industrial Establishment**.

2023 NEC Changes

6

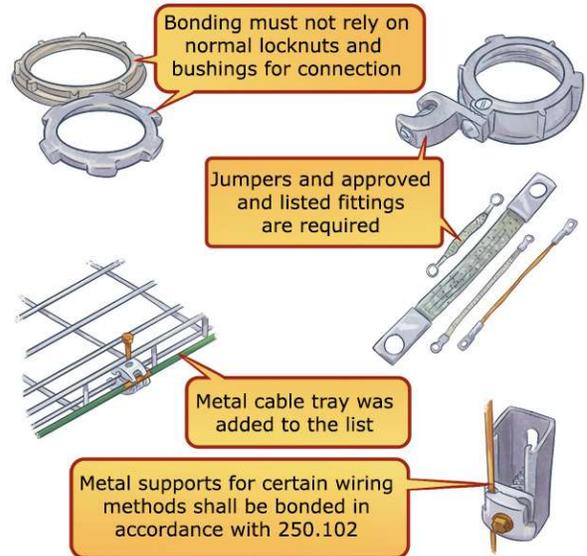
501.30(B) Bonding

In the **2023 NEC**, information on bonding was moved from 501.30(A) to **501.30(B)**

It was also expanded to include:

(1) Specific Bonding Means which includes two requirements for bonding.

(2) Flexible Metal Conduit and Liquidtight Flexible Metal Conduit which includes two requirements for flexible metal conduit and liquidtight flexible metal conduit.



Applies between Class I Locations and the system grounding point

2023 NEC Changes

7

Article 502
Class II Locations
Article 503
Class III Locations

JADE
 LEARNING

8

8

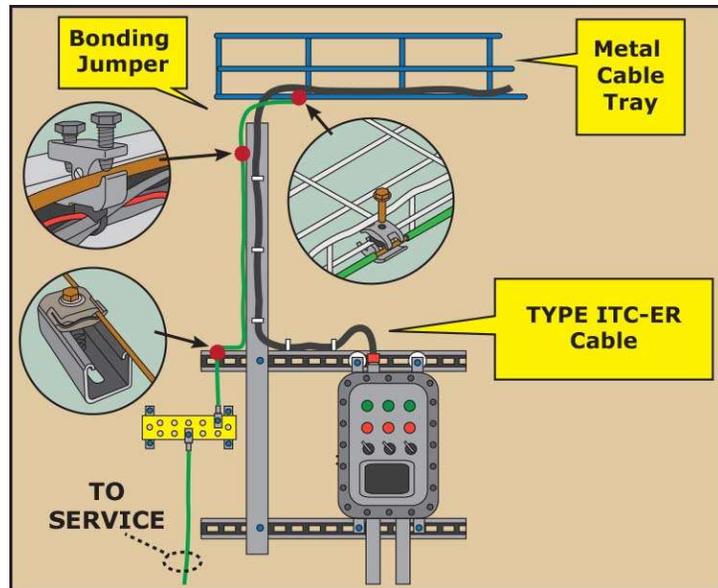
502.30(B), 503.30(B) Bonding

**JADE
LEARNING**
A CERTUS COMPANY

New in 2023 NEC, metal struts, angles, or channels providing any support or offering mechanical or physical protection to cables or conductors as permitted in 335.4(5), 336.10(7)(c), or 722.135(C) shall be bonded in accordance with 250.102!

SUMMARY: Now, metal parts such as Unistrut® require bonding to be applied when the strut supports or protects the wiring.

2023 NEC Changes



9

Article 505 Zone

**JADE
LEARNING**

10

10

505.8 Protection Techniques

JADE
LEARNING
A CERTUS COMPANY

In **2023 NEC**, there are a few changes to Section 505.8, including wording revisions that include the new term: **Restricted Industrial Establishments**.

505.8(I) is retitled as **Detection systems for flammable gases**.

505.8(O)-(Q) are added as acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations:

- **(O) Protection by Impedance Heating "IEEE 844.3"**
- **(P) Pressurized Room "p"**
- **(Q) Special Protection "s"**

Protection from Impedance Heating, Pressurized Room and Special Protection are now approved protection techniques for flammable environments.



2023 NEC Changes

11

505.15(C) Zone 2

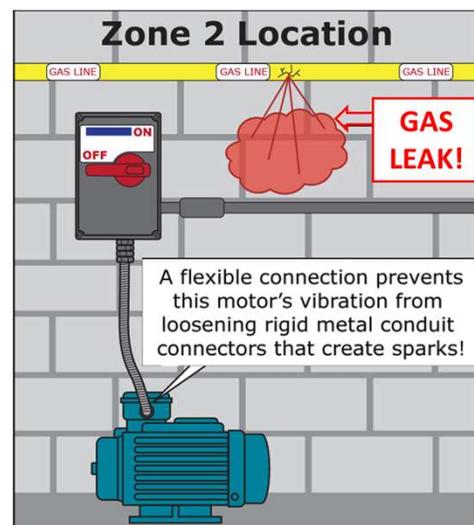
JADE
LEARNING
A CERTUS COMPANY

In **2020 NEC**, 505.15(C) told us: *Where provision must be made for flexibility, one or more of [11 wiring methods] shall be permitted.*

In **2023 NEC**, that code section gets more specific as to when a flexible wiring methods can be used; it states:

Where flexibility is necessary to minimize the transmission of vibration from equipment during operation or to allow for movement after installation during maintenance, one or more of [11 wiring methods] shall be permitted.

2023 NEC Changes

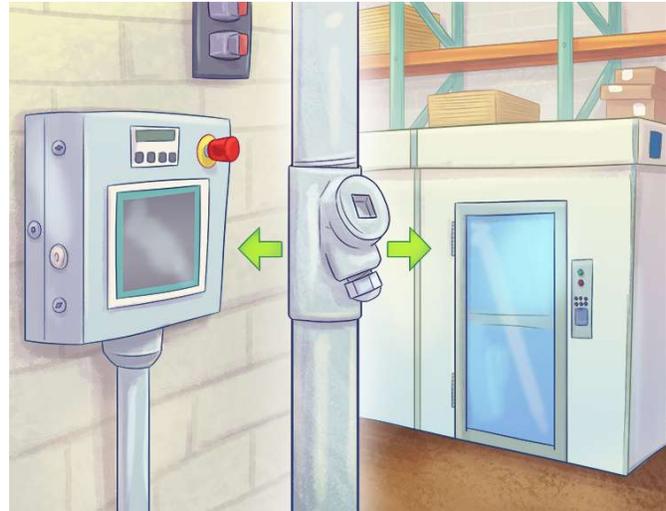


12

505.16(B) Zone 1

In **2023 NEC**, 505.16(B)(3) now applies to **Pressurized Rooms**

- In accordance, the wording is changed to include not only pressurized enclosures as it was in the 2020 NEC, but also **pressurized rooms**.
- Informational Note No. 3 is added and sends Code users to UL 60079-13 for information on explosive atmospheres



JADE
LEARNING
A CERTUS COMPANY

2023 NEC Changes

www.iadlearning.com

13

Article 512

Cannabis Oil Equipment and Cannabis Oil Systems Using Flammable Materials

JADE
LEARNING

14

14

512 Cannabis Oil Equipment and Cannabis Oil Systems Using Flammable Materials.

JADE
LEARNING
A CERTUS COMPANY

NEW in 2023 NEC, Article 512 addressing *Cannabis Oil Equipment & Systems*, covers the following:

512.1 Scope.

This article covers cannabis oil preparatory equipment, extraction equipment, booths, post-processing equipment, and systems using flammable materials (flammable gas, flammable liquid-produced vapor, combustible liquid-produced vapor) in commercial and industrial facilities.

2023 NEC Changes



15

Article 517 Health Care Facilities

JADE
LEARNING

16

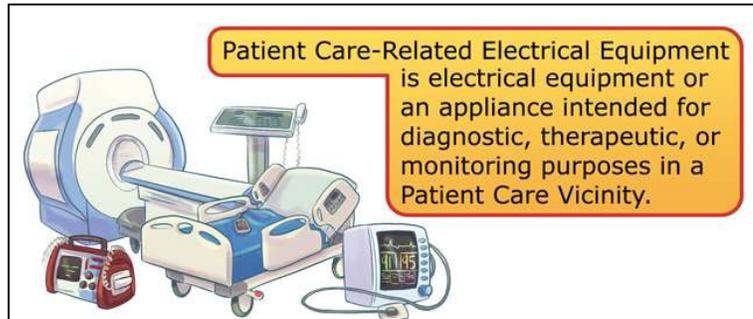
16

517.6 Patient Care-Related. Electrical Equipment

JADE
LEARNING
A CERTUS COMPANY

Section 517.6 is brand-new **in 2023 NEC.**

- It clarifies that the marking, labeling, or other restrictions described in 110.21(A)(2) and imposed on the use of electrical equipment do not apply to patient care-related electrical equipment.
- Provides information on requirements for reconditioning or re-certification in compliance with FDCA when patient care-related electrical equipment is relocated.



2023 NEC Changes

www.iadlearning.com

17

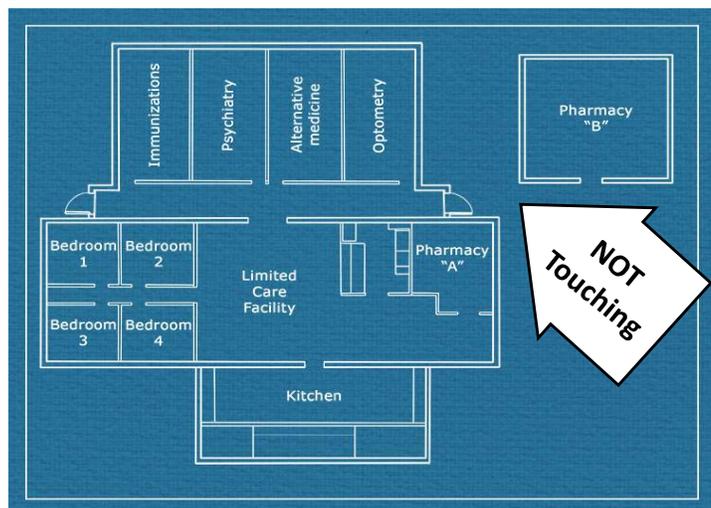
517.10(B) Not Covered

JADE
LEARNING
A CERTUS COMPANY

In **2020 NEC**, Section 517.10(B) declares healthcare locations, such as medical offices and waiting rooms, as being exempt from the strict wiring methods of Article 517.

In **2023 NEC**, a new location within a healthcare facility has been added to that list of exempt areas, as follows:

- *Pharmacy services not contiguous* (meaning not touching or sharing a common border) *to health care facilities.*



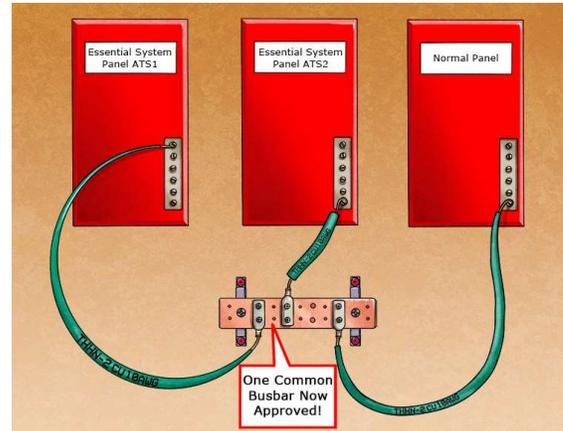
2023 NEC Changes

18

517.14 Panelboard Bonding

In the 2023 NEC, there is a new exception to the requirement to bond healthcare facility panelboards using a continuous conductor between equipment grounding terminal buses inside each panel.

- The new exception *allows for panelboards that are serving the same patient care facility to be bonded together using an accessible busbar installed outside of the panels.*



2023 NEC Changes

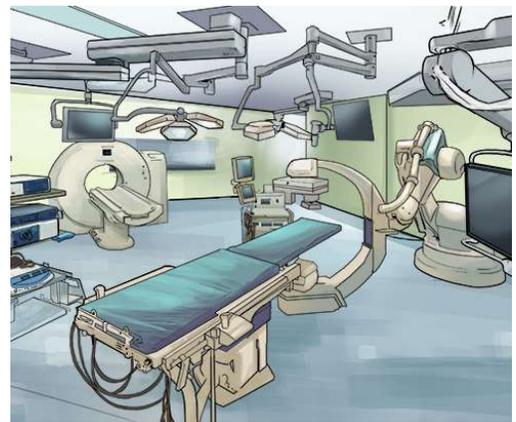
www.jadelearning.com

19

517.20(A) Receptacles and Fixed Equipment

In 2023 NEC, Section 517.20(A) went from requiring BOTH methods of shock protection in wet locations to requiring *one of the two* methods.

- It also adds two new informational notes:
 - Informational Note 1 included in (A)(1) states: *isolated power systems can eliminate the danger of electric shock to patients who might be more susceptible to leakage current and unable to move in their beds*
 - Informational Note 2 included in (A)(2) states: *See Annex E of ANSI/UL 943-2018 and 110.3(B) for more information*



2023 NEC Changes

20

517.22 Demand Factors

Section 517.22 is all new **in the 2023 NEC** and states:

Demand factors for receptacle loads supplied by branch circuits not exceeding 150 volts to ground and installed in Category 1, Category 2, Category 3, and Category 4 patient care spaces shall be in accordance with 220.110.

517.22 gives the electrician permission to use demand factors from **Table 220.110** when calculating healthcare facility receptacles.

Table 220.110(1)&(2)

Demand Factors for Patient Care Spaces			
Category 1	Category 2	Category 3	Category 4
100% of first 5000 Volt-Amperes	100% of first 5000 Volt-Amperes	100% of first 10,000 Volt-Amperes	100% of first 10,000 Volt-Amperes
50% from 5001-10,000 Volt-Amperes	50% from 5001-10,000 Volt-Amperes	50% for over 10,000 Volt-Amperes	50% for over 10,000 Volt-Amperes
25% for over 10,000 Volt-Amperes	25% for over 10,000 Volt-Amperes	—	—

2023 NEC Changes

21

517.30 Healthcare. Sources of Power

In 2020 NEC, 517.30(A) said essential electrical systems (EES) must have a minimum of two independent sources of power: One normal that supplies the entire electrical system, and one alternate for when the normal power source is interrupted.

In 2023 NEC, 517.30(A) says essential electrical systems (EES) shall have two or more independent sources. One on-site source shall be sized to supply the entire EES. The other independent source shall be sized to supply the entire EES and shall be permitted to be located on-site or off-site. Additional sources other than the first two independent sources shall be permitted to be sized to supply the intended load.

In 2020 NEC, 517.30(B) approved of these 3 power sources for EES:

- Generator units
- Fuel cell systems
- Battery systems

In 2023 NEC, 517.30(B) adds 2 more!

- Utility Supply Power **[NEW!]**
- Healthcare Microgrid **[NEW!]**

2023 NEC Changes

www.iadlearning.com

22

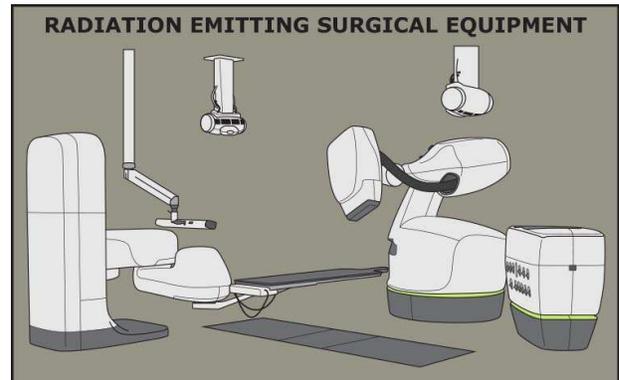
517.70 Applicability

In 2020 NEC: Part V of Article 517 is titled, *517, X-ray Installations*.

In 2023 NEC: Part V has been retitled to say, *517, Diagnostic Imaging and Treatment Equipment*.

Part V was retitled to make clear that Article 517 Part V installation requirements apply to much more than just X-ray machine installations.

In the 2023 NEC, Article 517 Part V rules apply to all types of imaging and treatment equipment that have the potential to produce harmful radiation.



2023 NEC Changes

www.jadelearning.com

23

Article 518 Assembly Occupancies

24

518.5 Supply

In the **2020 NEC**, Section 518.5 said little regarding power supplies inside *Assembly Occupancies*.

In **2023 NEC**, the section expands to 3 new subsections of varying topics.

In **2020 NEC**: Section 518.5 covered various power outlet and power supply rules for equipment inside assembly occupancies.

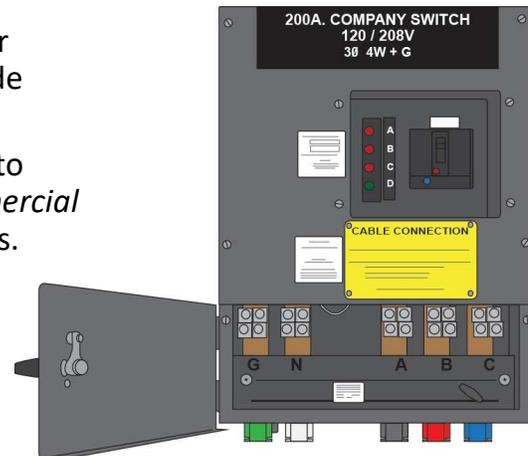
In **2023 NEC**: Section 518.5 has been repurposed to cover rules for installing *Power Outlets and Commercial Appliance Outlet Centers*, in assembly occupancies.

EXAMPLE: A commercial appliance outlet center may contain the power outlets in a building for supplying event-lighting, signs, sound equipment, or the like.

2023 NEC Changes

JADE
LEARNING
A CERTUS COMPANY

Assembly Occupancies include places and businesses where public crowds can gather.



25

Article 550

Mobile Homes, Manufactured Homes, and Mobile Home Parks

JADE
LEARNING

26

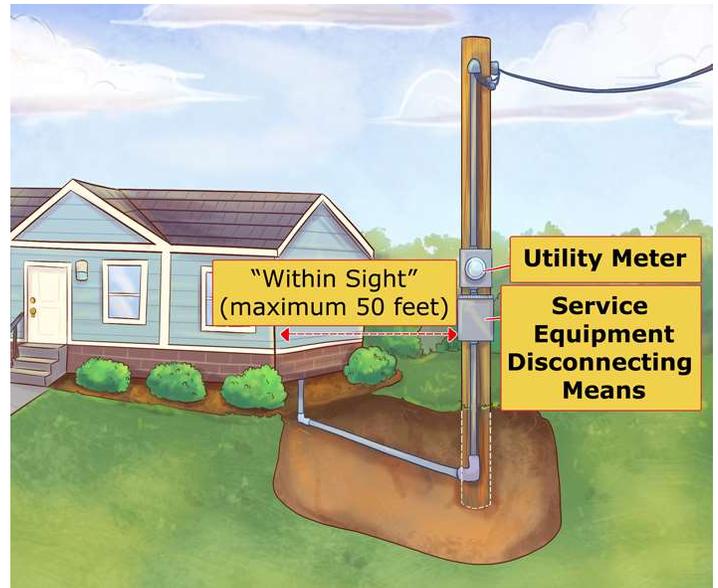
26

550.32 Service Equipment

JADE
LEARNING
A CERTUS COMPANY

In 2023 NEC, Section 550.32 has removed the 30-foot rule, but **now requires service equipment to be "within sight" of the mobile home it serves.**

The service disconnect is now permitted to be used as the emergency disconnect required for all one- and two-family dwellings, per 230.85.



2023 NEC Changes

27

550.33(A) Feeder Equipment

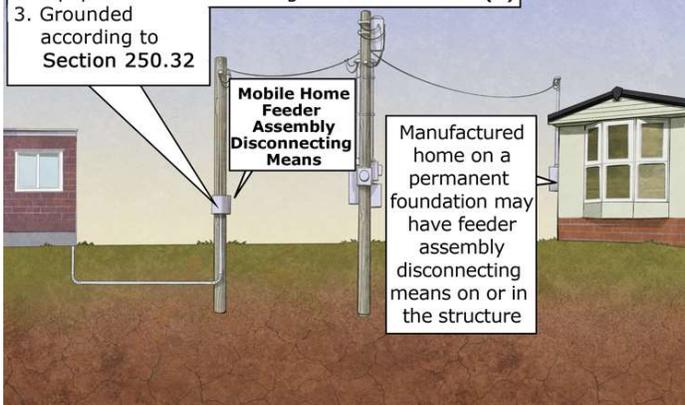
JADE
LEARNING
A CERTUS COMPANY

In 2023 NEC: Section 550.33(A) now fills in some of the previously missing information about the placement of mobile home service equipment when it is fed by feeder conductors.

The text now points code users to specific parts of the NEC that should be applied to this installation.

There are also new rules specific to installing a feeder assembly, including its means of disconnect!

1. Located:
 - in a readily accessible, outdoor location
 - within sight from the mobile home
2. Equipment rated according to Section 550.32(C)
3. Grounded according to Section 250.32



2023 NEC Changes

28

Article 555

Marinas, Boatyards, Floating Buildings, and Commercial and Noncommercial Docking Facilities

JADE LEARNING

29

29

555.15 Replacement of Equipment

555.15 is new **in 2023 NEC**, it requires the following for all **docking facilities**:

- *When modifications or replacements of electrical enclosures, devices, or wiring methods are necessary on a docking facility, they shall be required to comply with the requirements of this Code, and the installation shall require an inspection of the circuit. Existing equipment that has been damaged shall be identified, documented, and repaired by a qualified person to the minimum requirements of the edition of the Code to which it was originally installed.*

2023 NEC Changes

JADE LEARNING
A CERTUS COMPANY

30

555.36(C) Emergency Electrical Disconnect

JADE
LEARNING

555.36(C) is new in 2023 NEC.

It states: *Each marina power outlet or enclosure that provides shore power to boats shall be provided with a listed emergency shutoff device or electrical disconnect that is clearly marked "Emergency Shutoff" in accordance with 110.22(A).*

- *Emergency shutoff must be within sight of the marina power outlet or other enclosure that provides shore power to boats, readily accessible, externally operable, manually resettable, and listed for use in wet locations.*
- *The emergency shutoff device or electrical disconnect shall be de-energize the power supply to all circuits supplied by the marina power outlets or enclosure(s) that provide shore power to boats. A circuit breaker handle shall not be used for this purpose.*

- Clearly Marked
- Within Sight
- Readily Accessible
- Externally Operable
- Manually Resettable
- Listed For Wet Locations
- De-energize All Circuits
- Not a Circuit Breaker Handle



2023 NEC Changes

31

THANK YOU FOR ATTENDING!

Questions?

For additional instructor support, please contact
instructor@jadelearning.com

For questions about your continuing education, please
contact registrar@jadelearning.com

JADE
LEARNING

32

32