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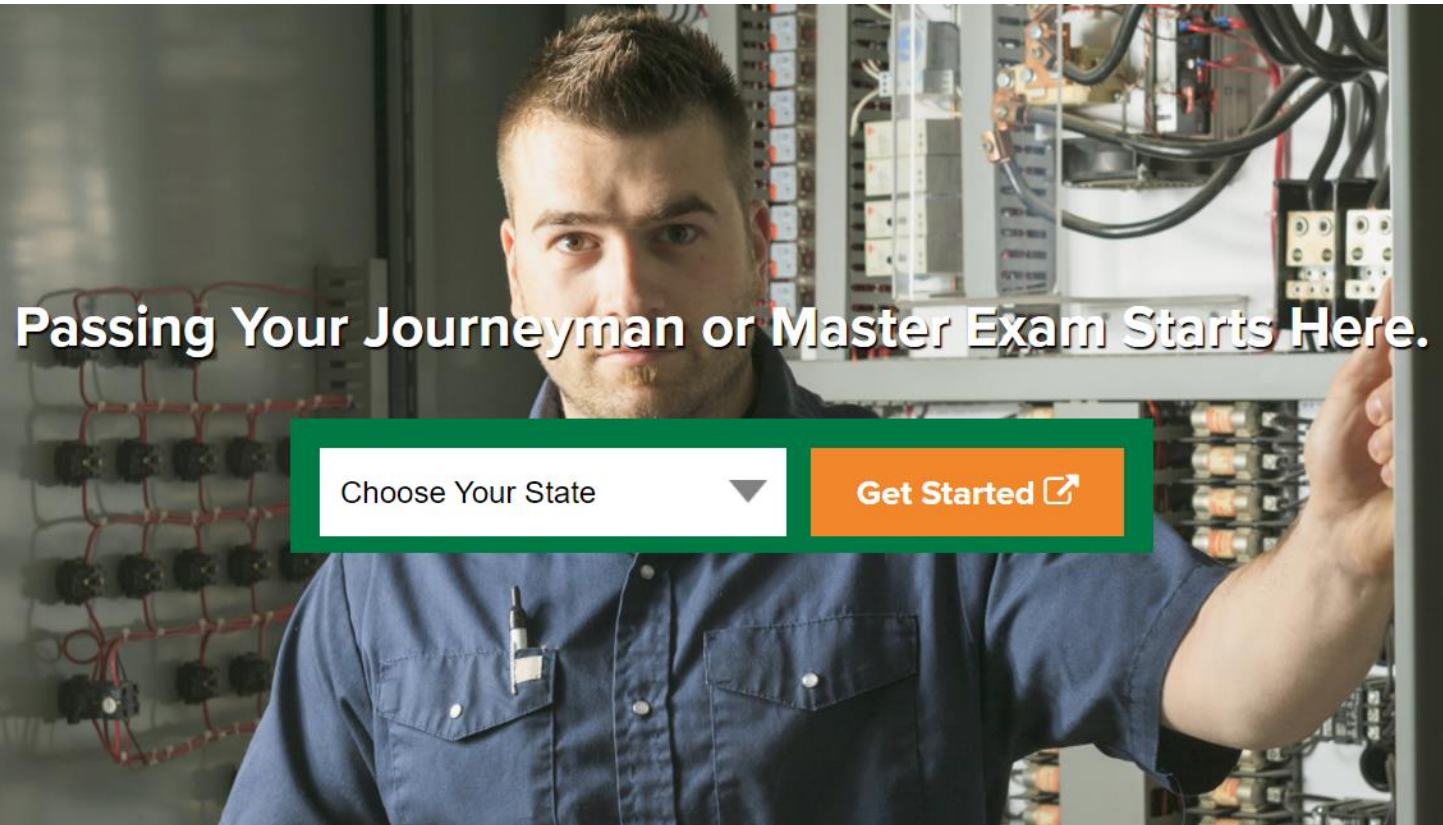
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1(800)443-5233



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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.



2020 NEC Changes

Important Changes from the 2020 NEC

Instructor: Jerry Durham

Common reasons for not seeing your CE units posted (yet) on the Iowa website:

- The electrician didn't provide the correct electrical license number to JADE Learning.
- The electrician didn't use their correct name during the class. Make sure your displayed name during the training session is your legal name.
- The electrician didn't complete and submit the survey at the end of class. Iowa does not give continuing education credit until the survey is completed at the end of each class.
- We can fix any of these issues—DON'T WORRY- JUST LET US KNOW!

Thank you!

Questions? Concerns?

Call the JADE Learning office at 1-800-443-5233

2020 NEC Changes

Covering Important Changes From the 2020 NEC

6:00 PM Eastern Time

5 PM in Iowa

5:45 PM – 6:00 PM	Registration / Check In
6:00 PM – 7:00 PM	NEC Chapter 5 <i>with poll questions</i>
7:00 PM – 7:10 PM	Break
7:10 PM – 7:55 PM	NEC Chapter 5 <i>with poll questions</i>
7:55 PM – 8:00 PM	Questions for the instructor?

2020 NEC Changes

Covering Important Changes From the 2020 NEC

Quick Summary

Instructor: Jerry Durham

- Stay attentive to the VILT session, your activity is being monitored
- Incorrect answers to Poll Questions **do not count against you**, however, participation in each Poll Question is mandatory to receive course credit
- If you have trouble hearing or need assistance, let us know
- Make sure you have paid and provided your electrical license number.
- Be sure to sign-in/check-in and check your registration information.
- You will be emailed a copy of your certificate within 2 business days.

Questions? Concerns?

Call the office at 1-800-443-5233

Iowa



2020 NEC Changes CHAPTER 5

- 2-Hours Credit

Welcome Iowa



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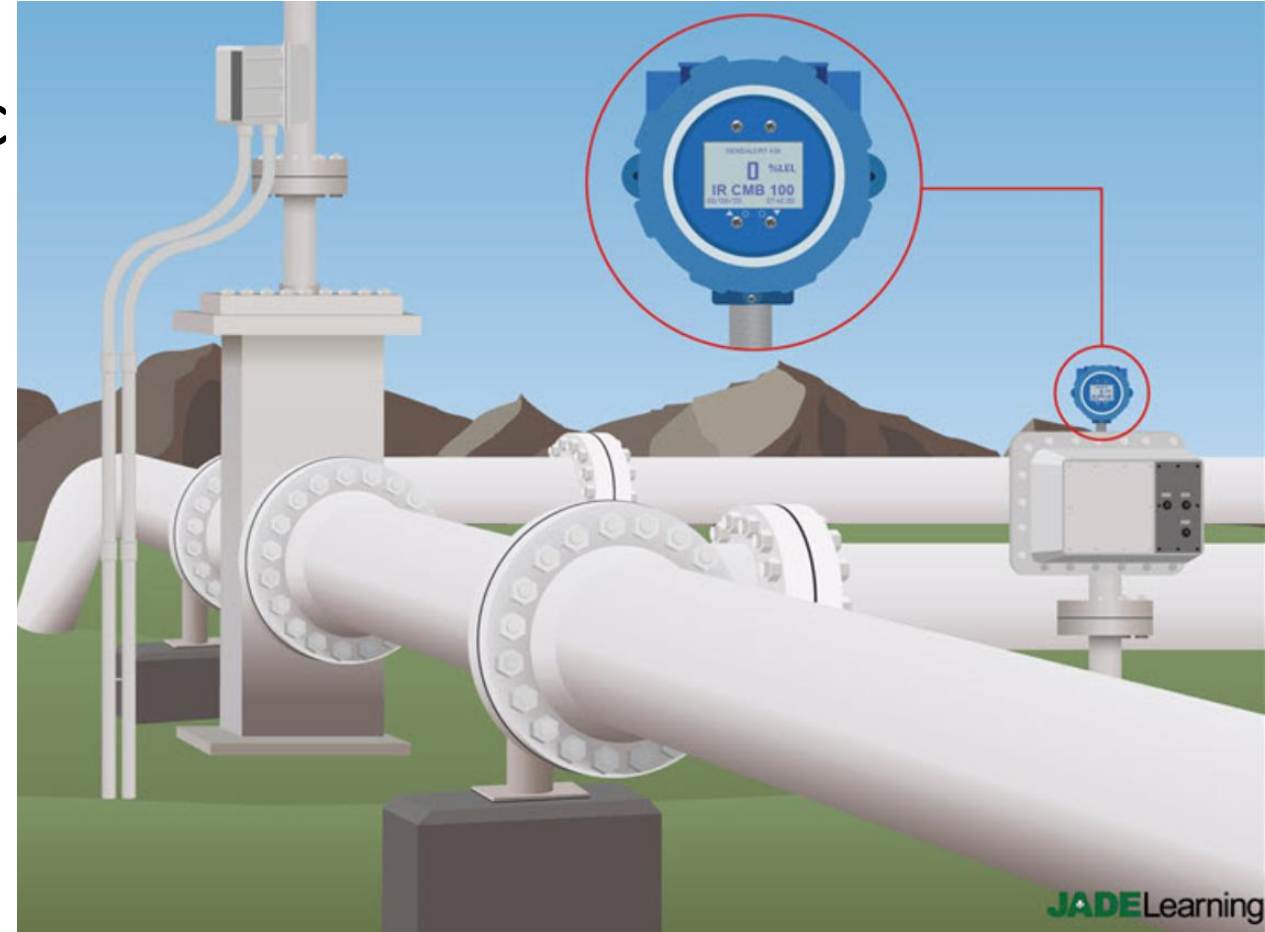


2020 NEC Changes Chapter 5

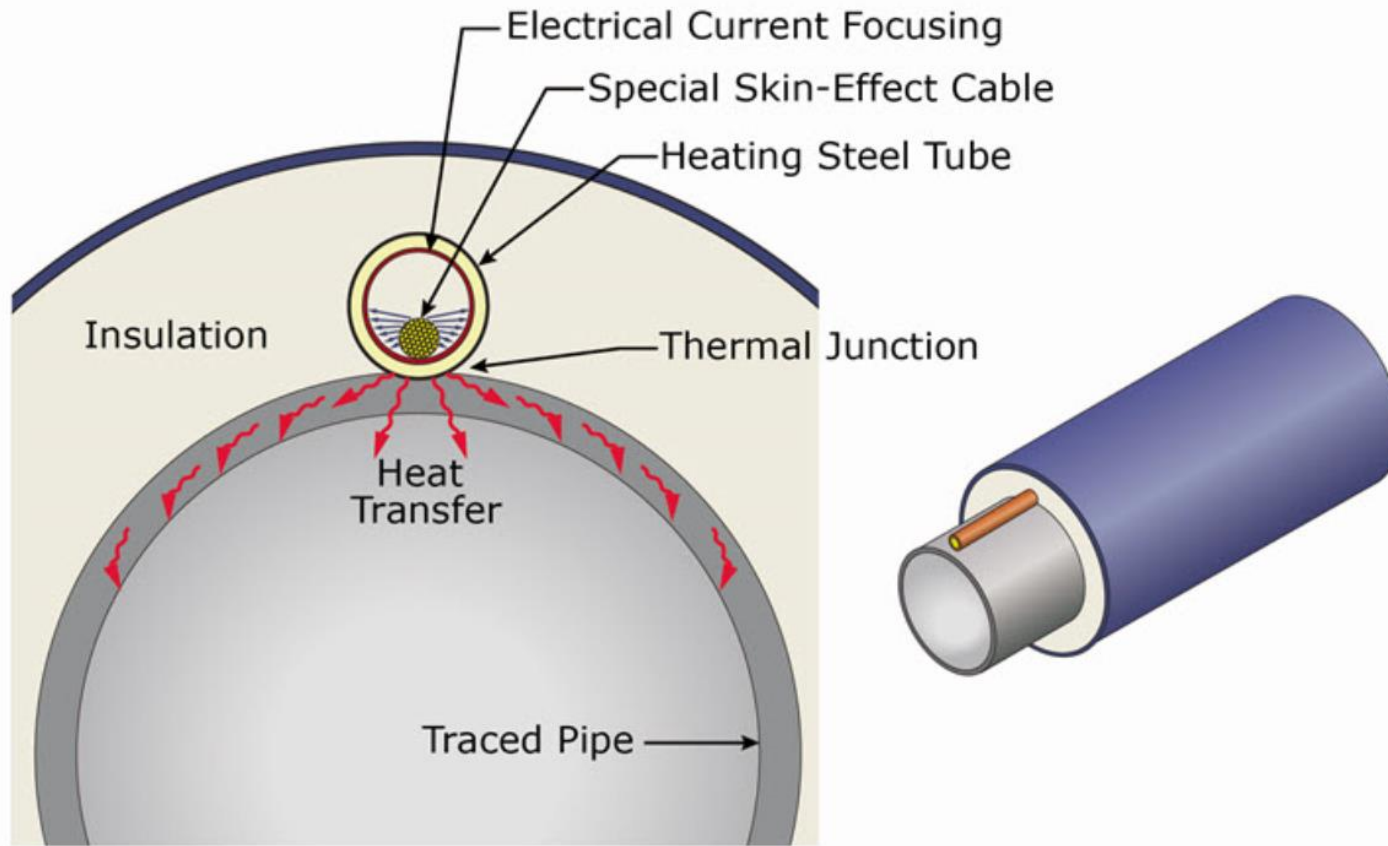
500.7 (L),(M),(N),(O) Hazardous Locations. Protection Techniques.

Four new techniques for protecting electrical and electronic equipment were introduced in the 2020 NEC:

1. Inherently Safe Optical Radiation
2. Protected Optical Radiation
3. Optical System With Interlock
4. Protection by Skin Effect Trace Heating



500.7(O) Hazardous Locations. Protection Techniques.



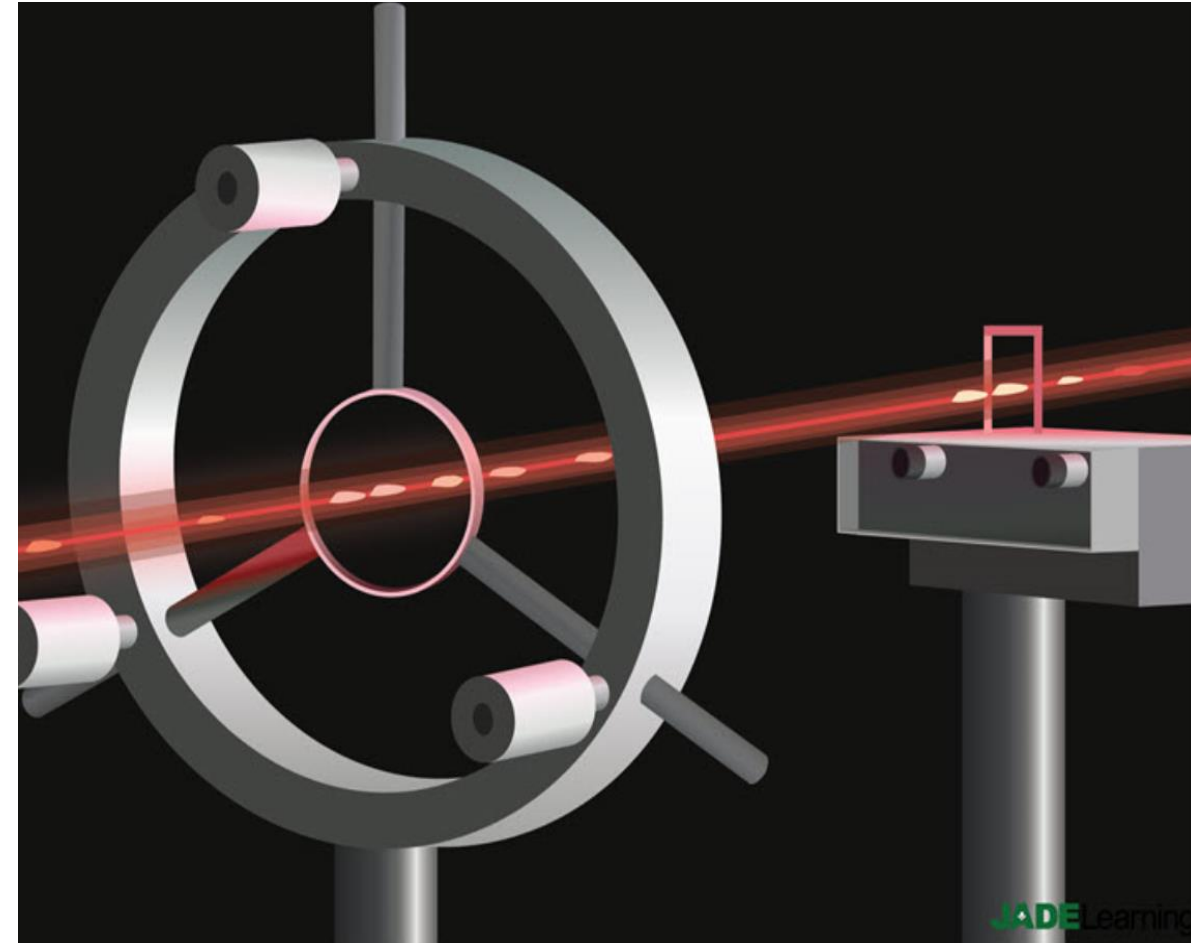
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Skin Effect Trace Heating is now an approved protection technique in the following hazardous locations:

1. Class I Division 2
2. Class II Division 2
3. Class III Division 2

500.8(G) Hazardous (Classified) Locations. Equipment Involving Optical Radiation.

- The risk of ignition must be considered for all electrical parts and circuits that may be exposed to optical radiation, both inside and outside of the optical equipment.
- All luminaires (fixed, portable, transportable, etc.) including LEDs are exempt from this requirement.



501.10(A)(2) Hazardous (Classified) Locations. Class I Division 1 Locations. Flexible Connections.



Type TC-ER-HL Cable

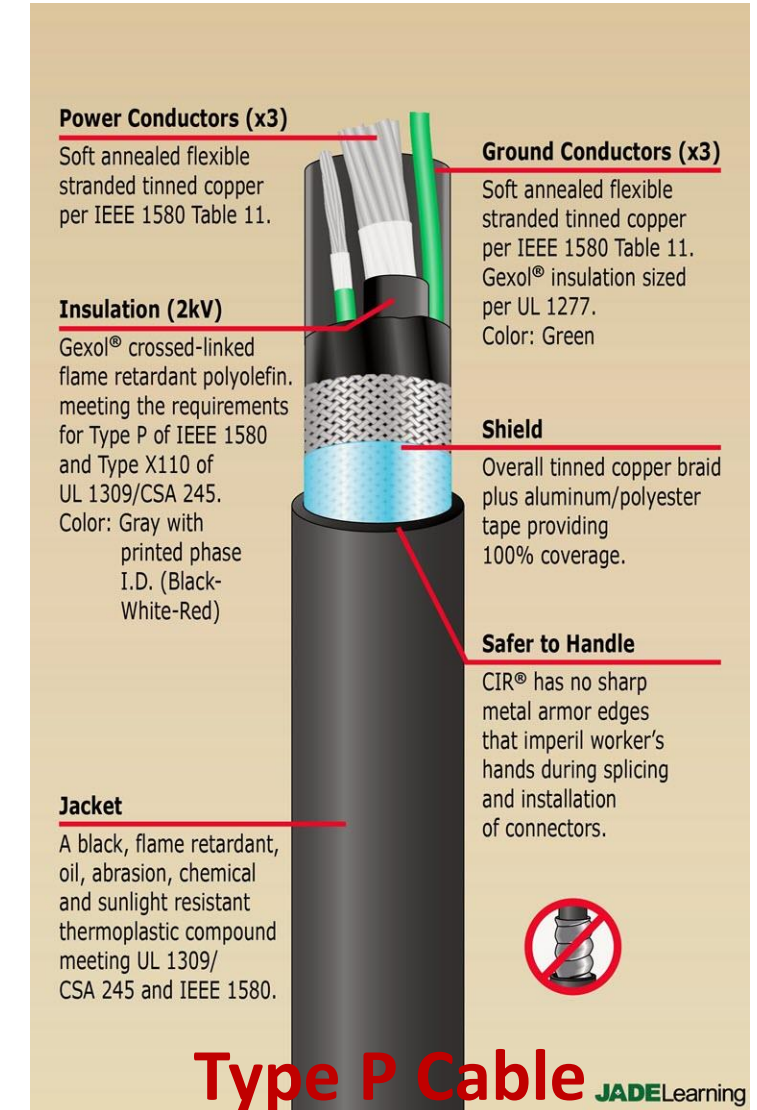


Type P Cable

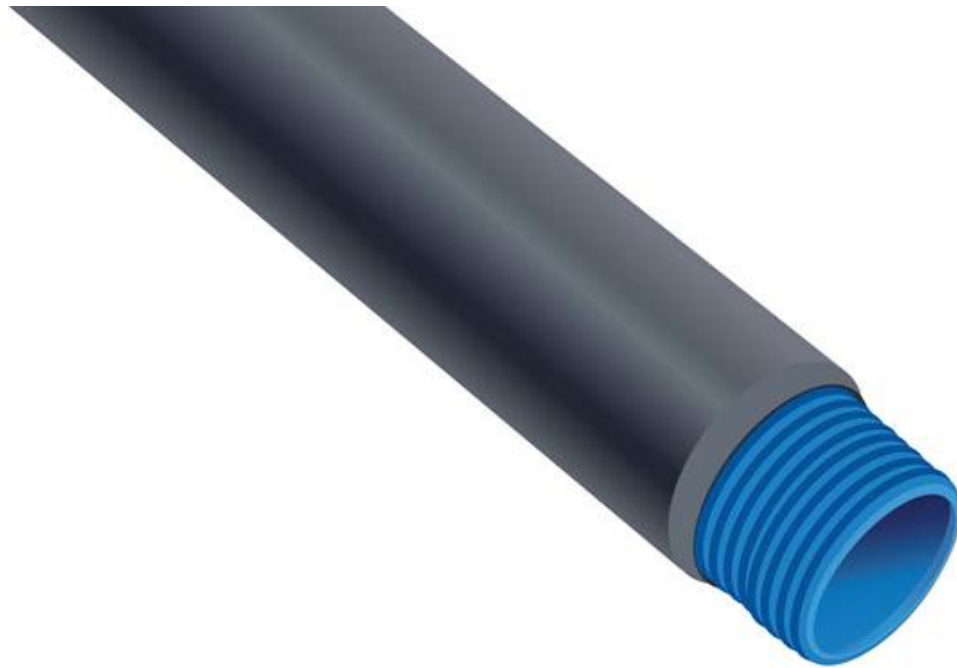
- Type TC-ER-HL is permitted in Class I, Division 1 locations when installed according to Section 336.10.
- Type P Cable is permitted in Class I, Division 1 locations when installed according to Section 337.10.

502.10(A)(2) Class II Locations. Wiring Method. Class II Division 1. Flexible Connections.

- Motors in hazardous locations may need a flexible cable to avoid premature loosening or damage to electrical equipment.
- Just like Class I, Division 1 locations, Type TC-ER-HL and Type P cables are also permitted in Class II, Division 1 locations.
- Additional installation requirements are listed in Section 502.10(A)(2).



502.10(B)(1) Hazardous (Classified) Locations. Class II, Division 2 Locations. Wiring Methods. General.



Three new wiring methods for Class II, Division 2 locations have been added to the 2020 NEC when metal conduit will not provide acceptable corrosion-resistance:

1. PVC-coated RMC
2. PVC-coated IMC
3. Type P cable

503.10(A) Hazardous (Classified) Locations. Class III Locations. Wiring Methods.

- Section 503.10(A) now requires EGCs for several types of Class III approved cables even when a drain (shield) wire is present.
- A drain wire cannot serve as an EGC because it is not connected at both ends.
- EGCs are now required for PLTC and PLTC-ER, ITC and ITC-ER, MV, TC, and TC-ER cable types.



505.9(C)(2) Zone 0, 1, and 2 Locations. Equipment Marking. Zone Equipment.

TABLE 505.9(C) MARKING OF EQUIPMENT IN HAZARDOUS LOCATION

TYPE OF PROTECTION	MARKING	PERMITTED LOCATION
Associated Apparatus for Zone 0	[ia]	Unclassified ¹
Associated Apparatus for Zone 1	[ib]	Unclassified ¹
Associated Apparatus for Zone 2	[ic]	Unclassified ¹
Associated Pressurization Equipment	[p]	Unclassified ¹
Equipment Suitable for Use in Zone 0		
Equipment Suitable for Use in Class I, Division 1		
Flameproof Enclosure	d; db	
Intrinsic Safety	ib	
Increased Safety	e; eb	
Pressurized Enclosure	p; px, pxb, py, pyb	
Powder Filling	m; mb	Zone 1
Liquid Immersion	q; qb	
Electrical Resistance Trace Heating	o; ob	
Skin Effect Trace Heating	60079-30-1, with EPL Gb ²	
Optical Radiation, Inherently Safe	IEEE 844.1, with EPL Gb ²	
Optical Radiation, with Interlock	op is, with EPL Gb ²	
Optical Radiation, Protected	op sh, with EPL Gb ²	
EPL Gb, with Suitable Type of Protection ³	op pr, with EPL Gb ²	

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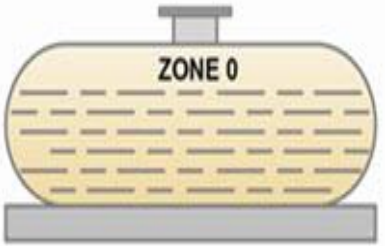
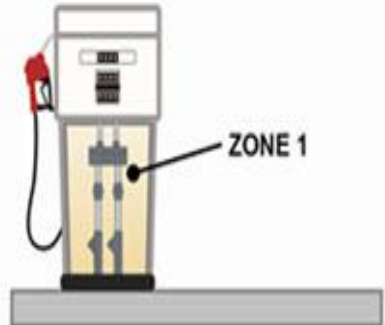
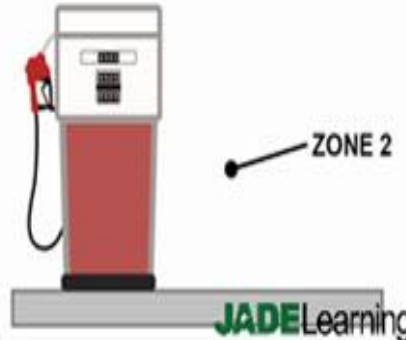
- Zone markings are a legal alternative to the Class and Division marking requirements in Section 500.8(C).
- Zone 0, 1, and 2 locations contain flammable gas, vapors and liquids.
- If a location is a Zone 0, 1, or 2, then it is a Class I location.

506.15(A) Zone 20, 21, and 22 Locations. Wiring Methods. Zone 20.

- Zone 20 locations have concentrations of combustible dust and ignitable fibers for long periods of time.
- Section 506.15(A) was revised to refer to specific NEC sections rather than entire Articles for Zone 20 wiring methods.



511.3 Commercial Garages, Repair and Storage. Area Classification, General.

ZONE - NATURE AND PROBABILITY OF HAZARD MATERIAL		
<p>ZONE 0</p> <p>Ignitable concentrations of flammable gases or vapors which are present continuously or for long periods of time.</p> 	<p>ZONE 1</p> <p>Ignitable concentrations of flammable gases or vapors which are likely to occur under normal operating conditions.</p> 	<p>ZONE 2</p> <p>Ignitable concentrations of flammable gases or vapors which are not likely to occur under normal operating conditions and do so only for a short period of time.</p> 

Zone 0, Zone 1, and Zone 2 only apply to flammable gases, vapors, or liquids so the “Class I” prefix is redundant and has been deleted, except for text that is extracted from other documents or to remain consistent throughout this article.

511.12 Commercial Garages, Repair and Storage. GFCI Protection for Personnel.

- In the 2020 NEC, Section 511.12 (addressing commercial garages) now refers to Section 210.8(B) for GFCI protection requirements.
- Section 210.8(B)(8) requires GFCI protection in garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls.



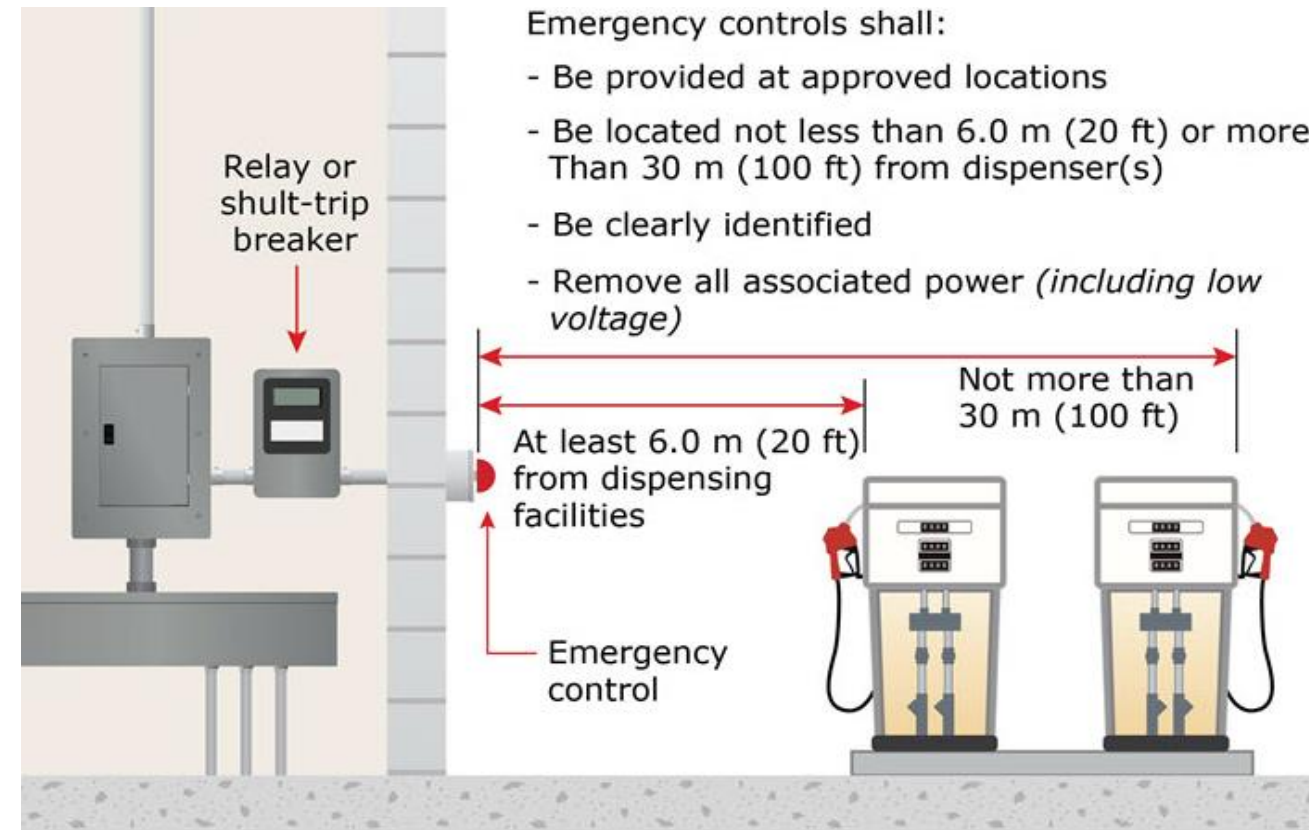
513.3(D) Aircraft Hangars. Classification of Locations.



- 2017: permitted areas adjacent to hangars to be declassified if the area was cut off and adequately ventilated.
- 2020: clarified “adequately ventilated” as *mechanically ventilated at a rate of four or more air changes per hour, or designed with positive air pressure.*

514.11(A) Motor Fuel Dispensing Facilities. Emergency Electrical Disconnects.

- In 2020 NEC, all ungrounded & grounded conductors must now be simultaneously disconnected when the emergency disconnect is activated.
- Conductors must be disconnected from the source of supply.
- EGCs must remain connected.



Applies to both **Attended** and **Unattended** motor fuel dispensing facilities

517.10(B)(3) Health Care Facilities. Applicability. Not Covered.

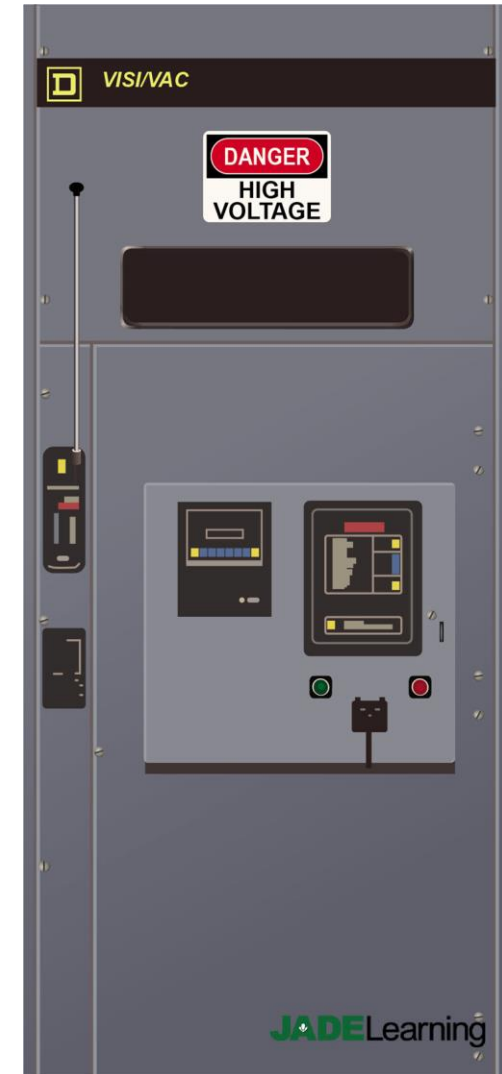


New patient care spaces were added to the 2020 NEC that are **not** required to adhere to Article 517 Part II wiring methods:

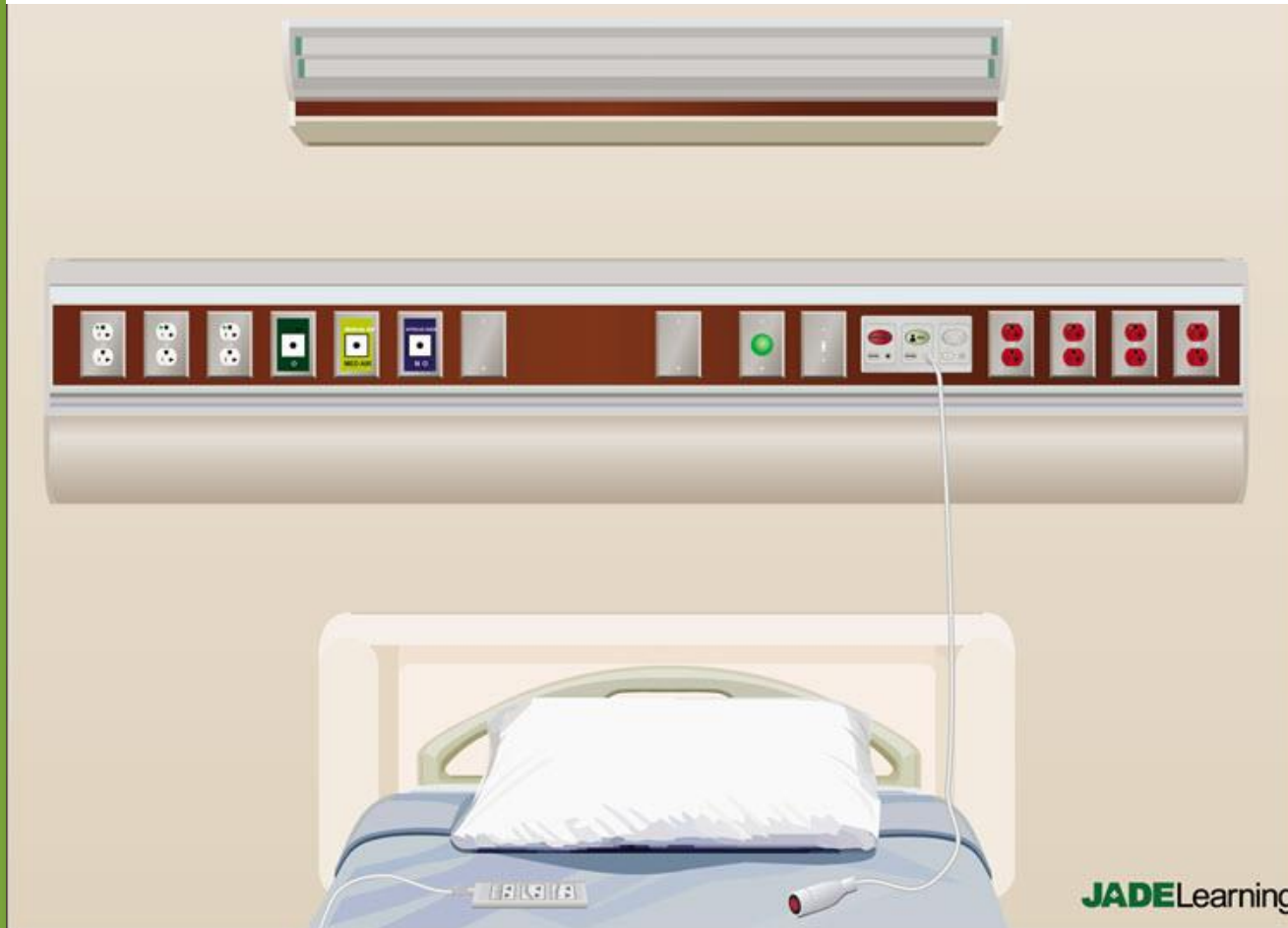
1. Intramuscular Injections (Immunizations)
2. Psychiatry and Psychotherapy
3. Alternative Medicine
4. Optometry

517.17(D) Health Care Facilities. Ground-Fault Protection of Equipment. Testing.

- Section 517.17(D) in the 2020 NEC requires the ground-fault protection system to be performance tested when first installed.
- The testing must be performed by qualified person(s) according to the manufacturer's requirements.
- A written record of the test must be made, and must be available to the authority having jurisdiction (AHJ).



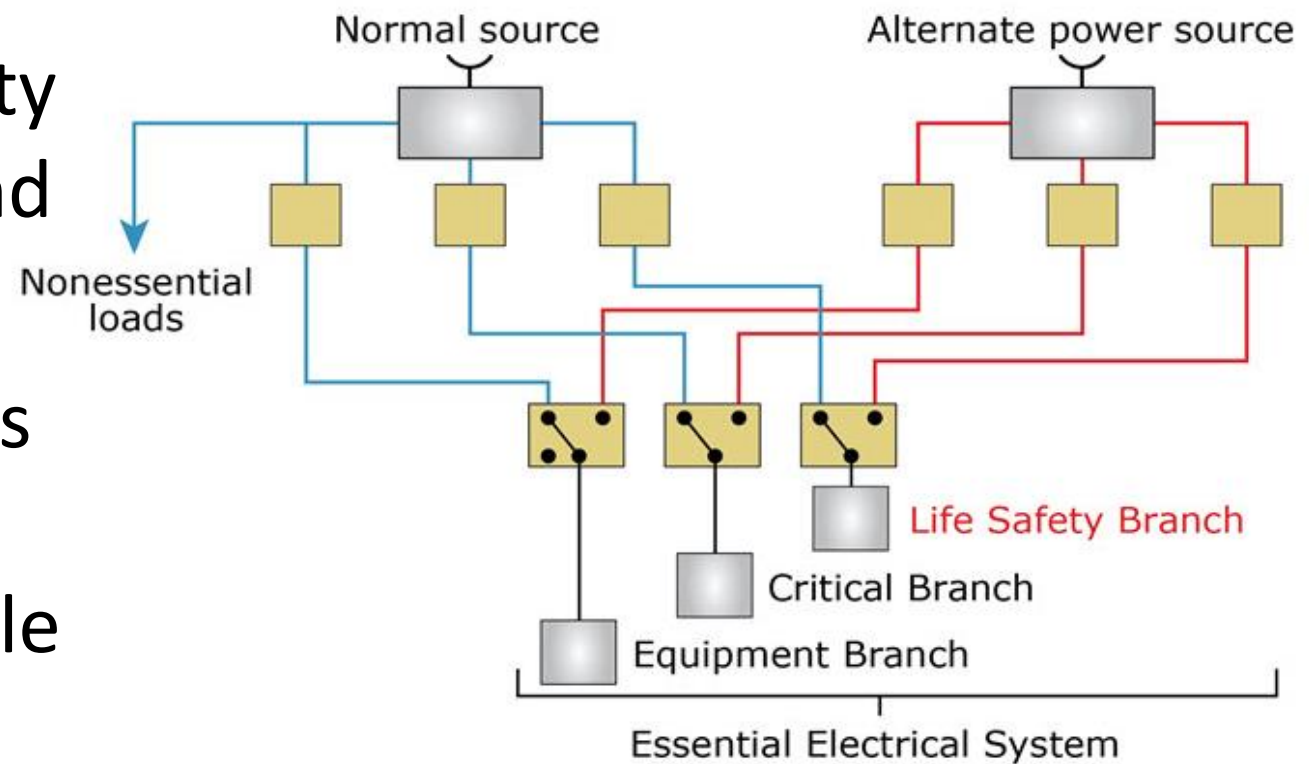
517.21 Health Care Facility. GFCI Protection for Personnel in Category 2 (General Care) and Category 1 (Critical Care) Spaces.



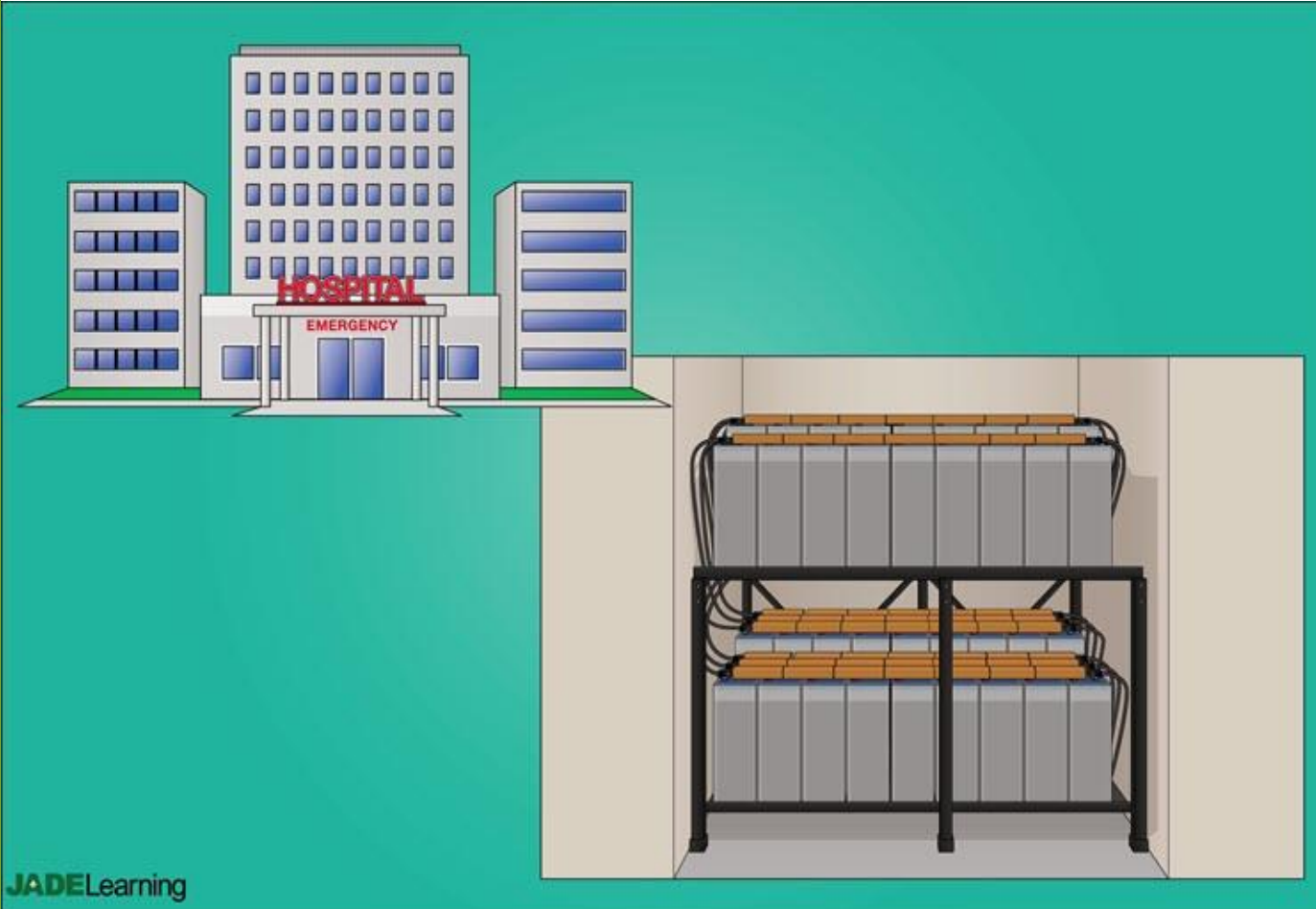
- The permission to forego GFCI protection for receptacles near a patient's bed was moved from Section 210.8(B)(5) to Section 517.21.
- Bathrooms containing receptacles in Category 1 & 2 spaces are **not** exempt from normal GFCI requirements.

517.26 Health Care Facilities. Essential Electrical System. Application of Other Articles.

- Essential Electrical Systems (EES) are divided into Life Safety Branches, Critical Branches, and Equipment Branches.
- The Life Safety Branch now has four amendments, which indicate what sections in Article 700 do and do not apply.



517.30(B)(3) Sources of Power. Types of Power Sources. Battery Systems.

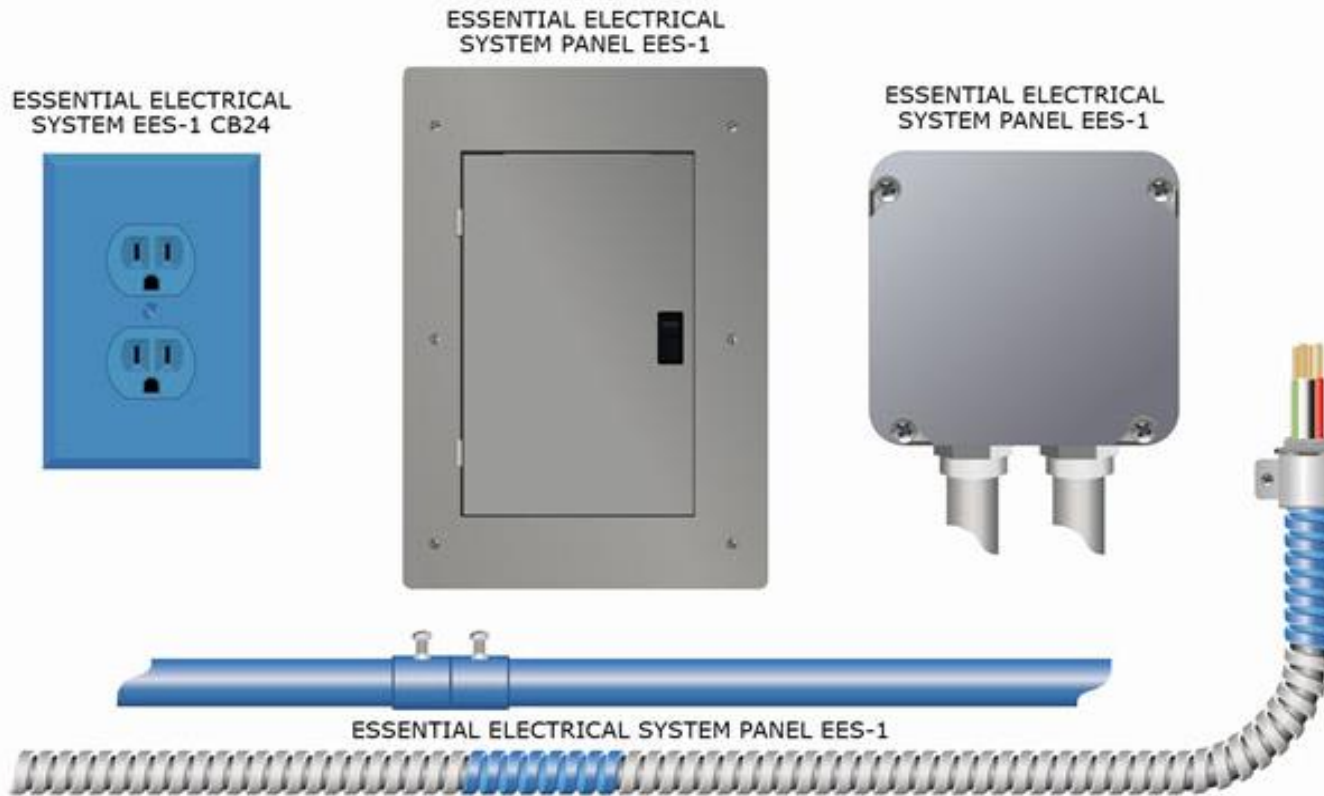


Section 517.30(B)(3) is new for the 2020 Code cycle:

Battery systems shall be permitted to serve as the alternate source for all or part of an essential electrical system.

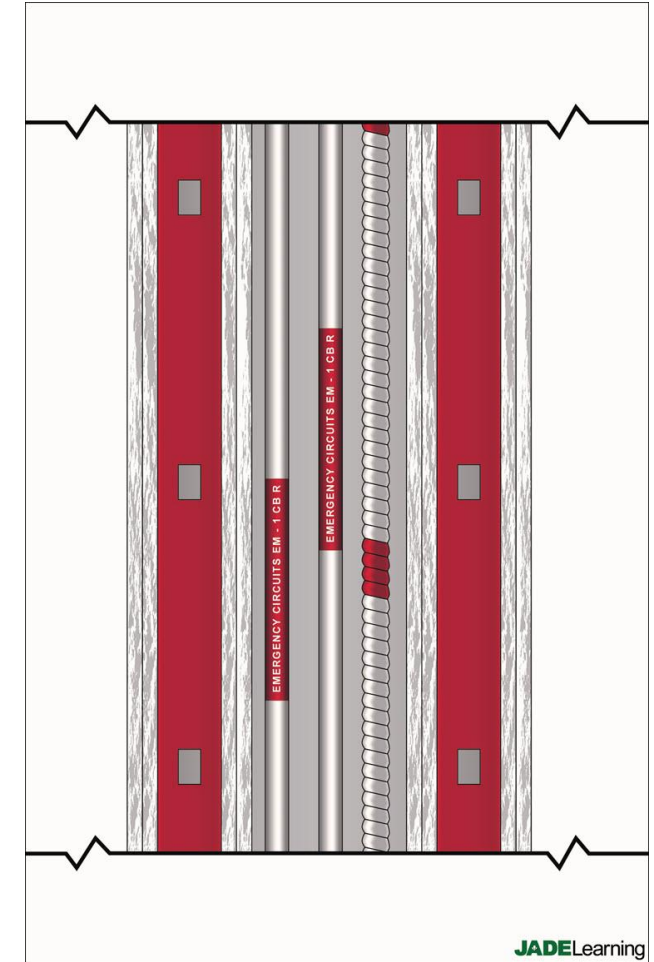
517.31(C)(1) Requirements for the Essential Electrical System. Separation from Other Circuits.

- Section 517.31(C)(1)(b) states that conductors of the life safety branch and critical branch must be separate from other wiring systems.
- In the 2020 NEC, emergency systems were reidentified as essential electrical systems.

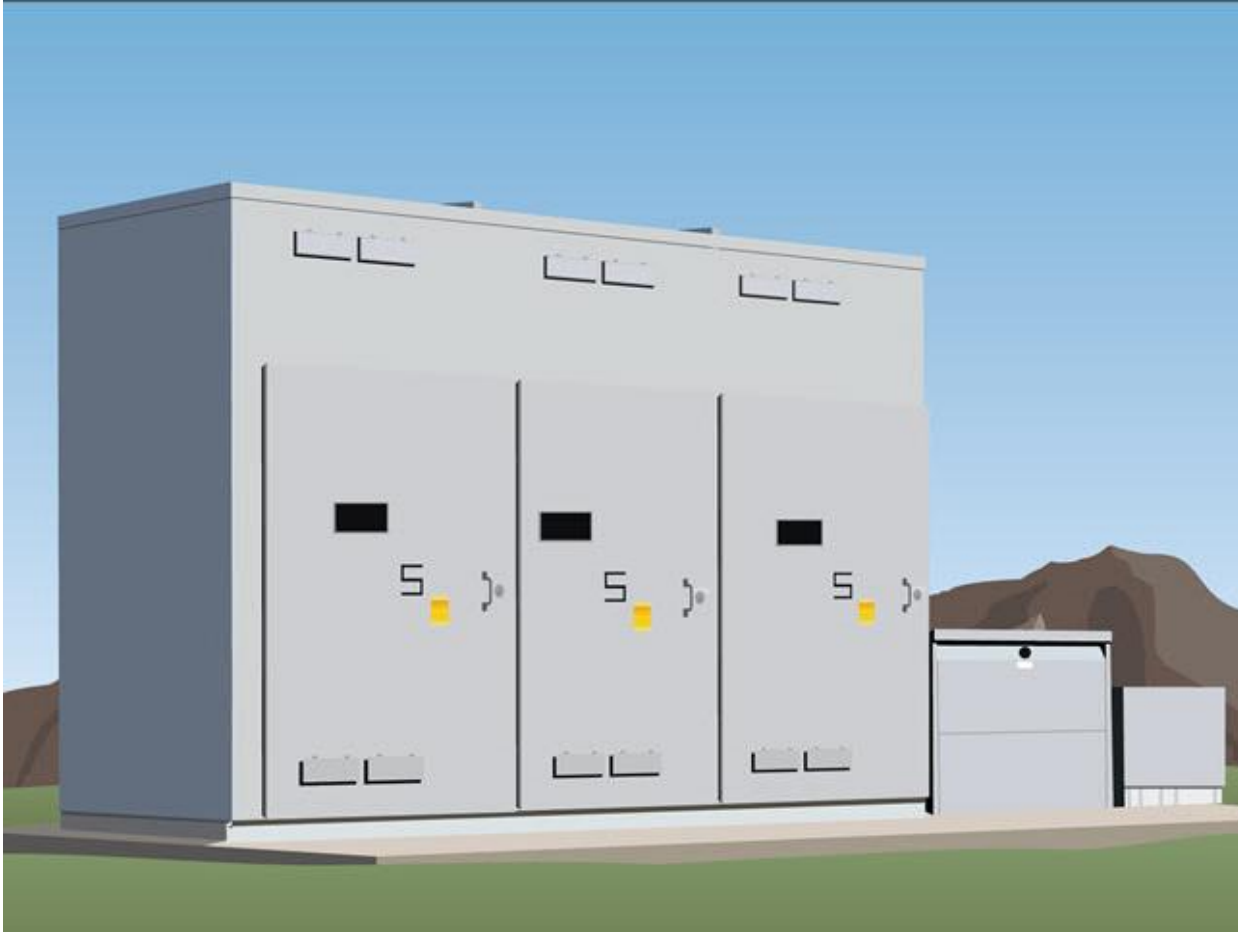


517.31(C)(3) Requirements for the Essential Electrical System. Mechanical Protection of the Essential Electrical System.

- The 2020 NEC now requires life safety and critical branches to be mechanically protected by raceways.
- Several different wiring methods are permitted for this application, including RMC, IMC, EMT, Type MI Cable, RTRC-XW, Schedule 80 PVC, and flexible raceways in locations listed in Section 517.31(C)(3)(3).



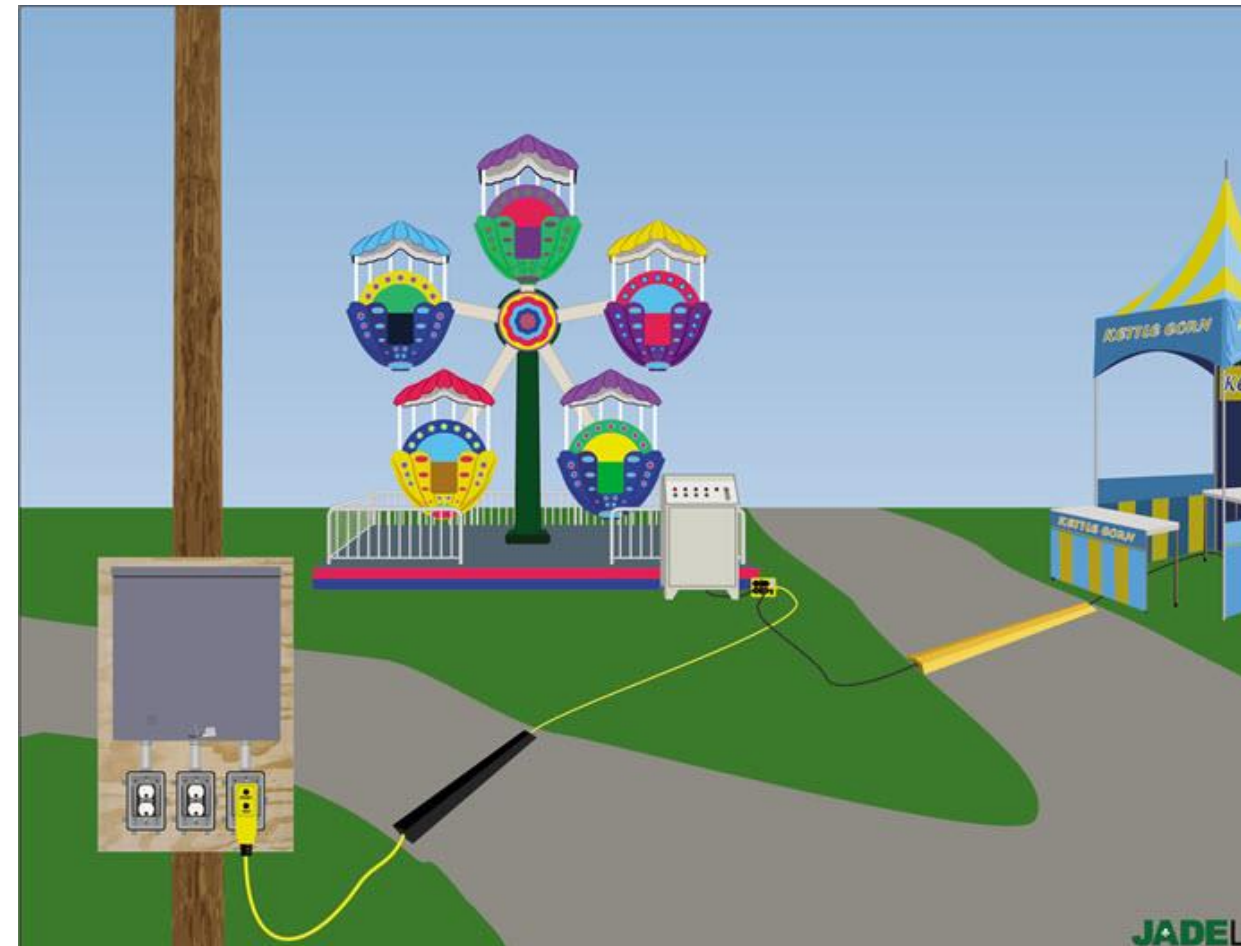
518.6 Assembly Occupancies. Illumination.



- Workspaces for fixed service equipment installed outdoors at “assembly occupancies” must be provided with illumination.
- Control **only** by automatic means is **not** permitted.
- This lighting is not required if illumination comes by an adjacent light source.

525.20(G) Wiring Methods for Carnivals, Circuses, Fairs, Similar. Protection.

- Flexible cables may be buried (with no minimum depth) to keep people from tripping.
- If using a nonconductive matting, it must be secured to the walkway surface.
- Other approved methods may be used to help prevent people from tripping on cables.



545.24(A), (B). Manufactured Buildings and Relocatable Structures. Disconnecting Means and Branch-Circuit Overcurrent Protection.



- A new Part II *Relocatable Structures* has been added to Article 545.
- New Section 545.24 helps distinguish between requirements for mobile homes and other portable buildings.

547.5(G) Agricultural Buildings. Wiring Methods. Receptacles.

At agricultural buildings, GFCI protection is **not** required for receptacles other than the 125-volt, 15- and 20-amp receptacles installed in these areas:

1. Equipotential plane areas
2. Outdoors
3. Damp or wet locations
4. Dirt confinement areas for livestock.



550.13(B) Mobile Homes, Manufactured Homes, Mobile Home Parks. Receptacle Outlets. GFCI.

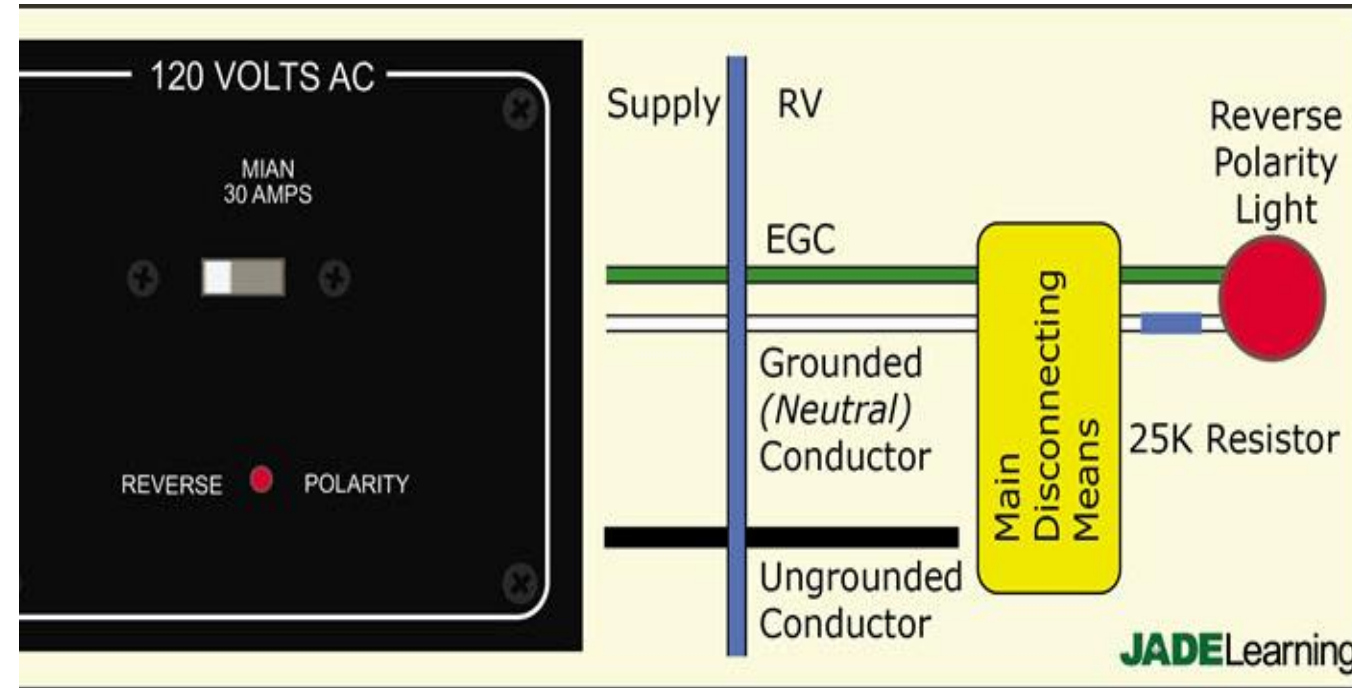
In mobile & manufactured homes, GFCI protection is now required according to Section 210.8(A):

1. Garages & accessory buildings
2. Crawl spaces
3. Basements
4. Boathouses
5. Bathtubs and shower stalls (within 6 feet)
6. Laundry area(s)



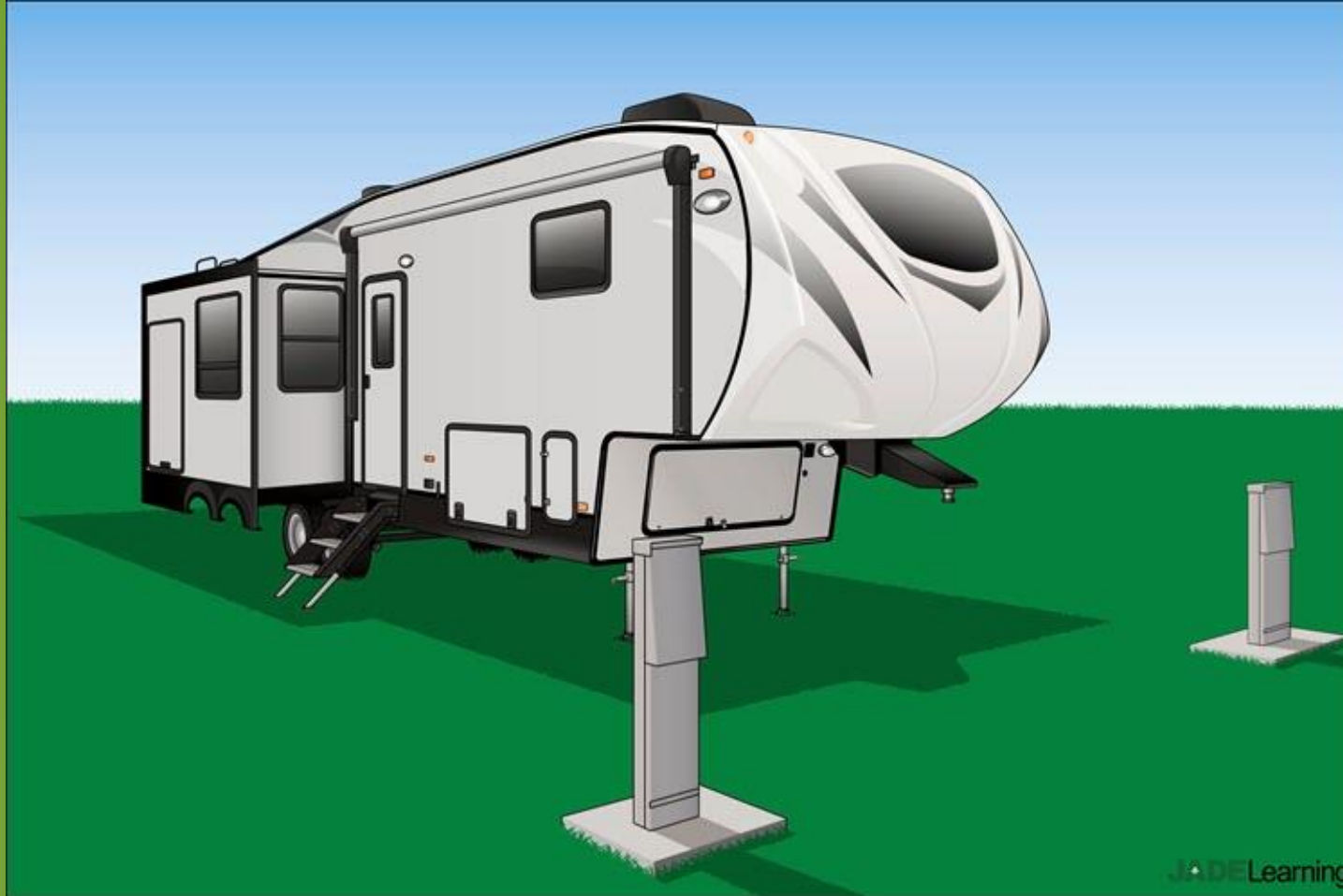
551.40(D) RVs and RV Parks. 120 & 240V Systems. Reverse Polarity Device.

- The 2020 NEC now requires every new recreational vehicle (RV) to have a device that provides a continuous audible or visible signal when connected in reverse polarity.



- When polarity is reversed (such as from incorrectly wired RV pedestals), any exposed metal in the RV in contact with the normally grounded side of the electrical system becomes energized.

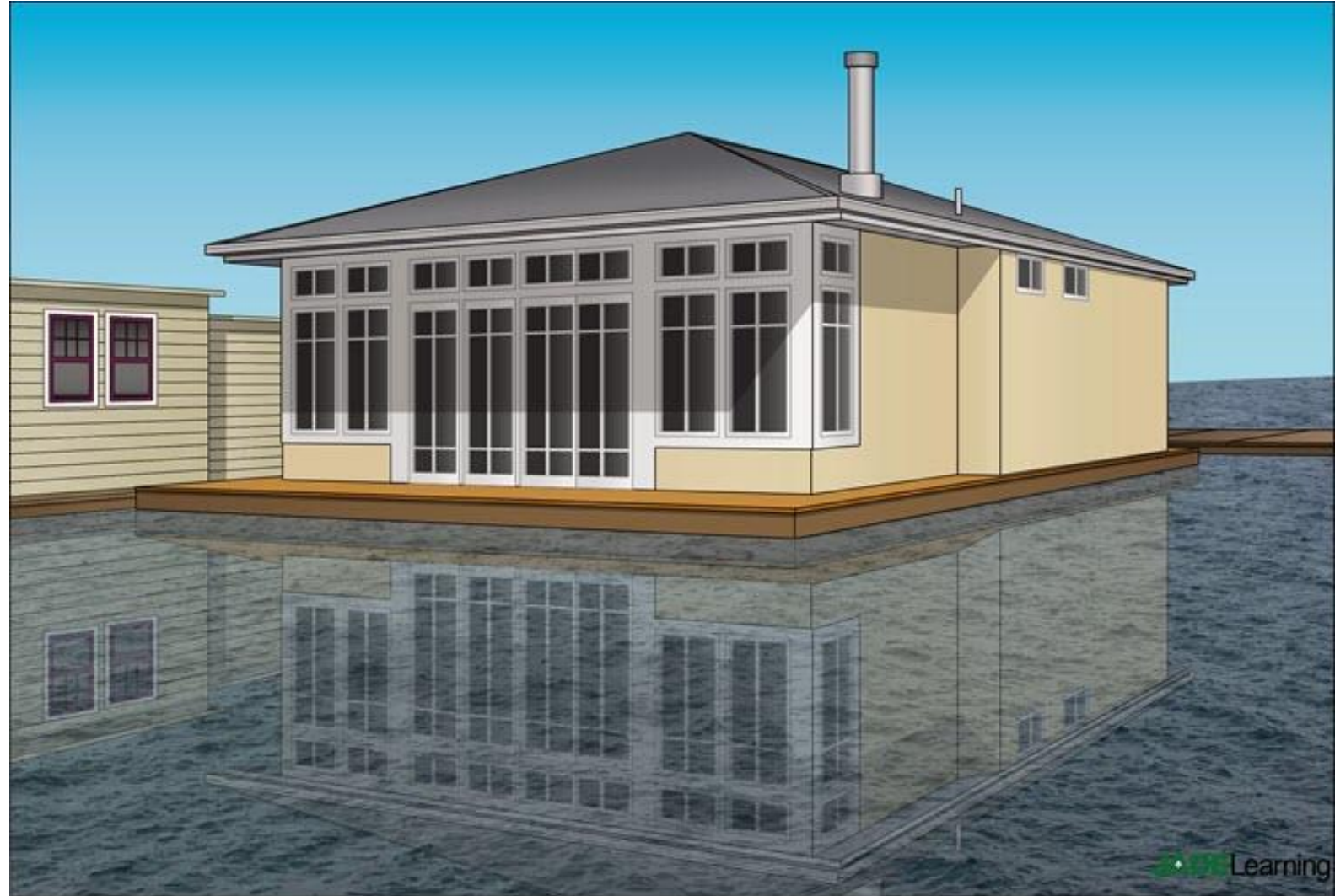
551.72(E)&(F) RVs and RV Parks. Distribution System. Connection to Recreational Vehicle Site Equipment.



- Section 551.72(F) now requires RVs to be powered by only one 30- or 50-amp supply cord.
- A 15- or 20-amp convenience receptacle may be used in addition to the supply cord.

555 Part III. Floating Buildings.

- Article 553 (Floating Buildings) was moved to Part III of Article 555 (Marinas, Boatyards, etc.).
- A floating building is not a watercraft, but shares many water requirements with marinas and boatyards.



555.2 Marinas, Boatyards, Floating Buildings and Commercial and Noncommercial Docking Facilities. Definitions.



- Section 555.2 in the 2020 NEC is the new home for 14 terms and definitions used to navigate Article 555 on water-based structures.
- In the 2017 NEC, only 2 definitions were provided.

555.9 Marinas, Boatyards, Floating Buildings and Commercial and Noncommercial Docking Facilities. Boat Hoists.

- GFCI requirements for boat hoists and residential boat docks was moved from Section 210.8(C) to Section 555.9.
- GFCI protection for personnel is required for outlets up to 240 volts that supply boat hoists at dwelling unit docking facilities.



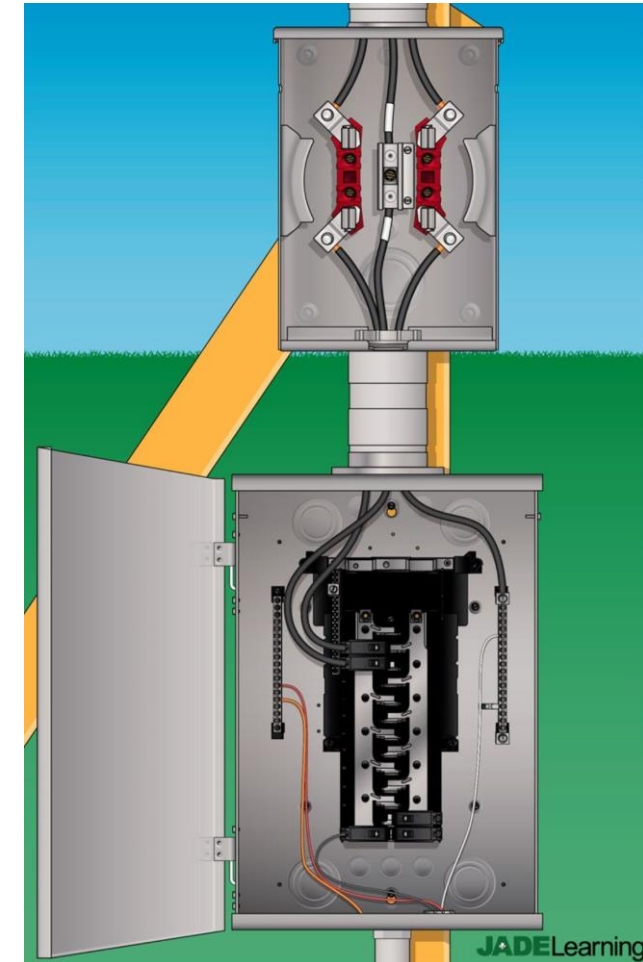
555.35(A) Marinas, Boatyards: Ground-Fault Protection of Equipment (GFPE) and GFCI Protection.



- Receptacles for shore power must have GFPE protection that trips at 30 mA or less.
- For other than shore power, GFCI receptacles must trip between 4 to 6 mA.
- Feeders must have GFPE protection not exceeding 100 mA.

590.8 Temporary Installations. Overcurrent Protective Devices.

- Section 590.8(A) in the 2020 NEC now requires examination of used OCPDs to make sure that they have been installed properly with no evidence of impending failure.
- Breakers must be replaced when there is evidence of impending failure; meaning arcing, overheating, loose parts, bound parts, or visible damage or deterioration.



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