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A TPC COMPANY







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A Trusted Electrical  
CE Provider Since  
1996







*Iowa State-Approved*

# Electrical Continuing Education







# Virtual Instructor-Led Training (VILT)



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# Complete Exam Prep and Practice Tests to Prepare You For Your Next Iowa Electrical Exam!

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Online Exam Prep

2020 NEC Changes

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# 2020 NEC Challenge



For just \$60, the most important NEC updates for 2020 are at your fingertips.

**Spend less time searching the Code and more time on-the-job with JADE Learning's new 2020 NEC Challenge!**



**Subscribe to the 2020 NEC Challenge**



**Receive Questions and Code Explanations for a Year**



**Master the 2020 NEC!**



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**2020 NEC Changes**

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# INSTALLING PHOTOVOLTAIC SYSTEMS

*Based on the NEC*

## Solar PV Training Course Based on the NEC

Learn:

- How PV technology works
- System components
- System types
- How PV power merges with utility
- Bi-directional metering
- Installation methods
- Sizing conductors
- Disconnects
- Rapid shutdown



**ONLY  
\$45.00  
for Iowa  
Electricians**

Installing  
Photovoltaic  
Systems

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**Email or Call JADE Learning for more information**



**1(800)443-5233**



[support@jadelearning.com](mailto:support@jadelearning.com)



# 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 JADE with the correct electrical license number.
- 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**



# Iowa



## 2020 NEC Changes CHAPTER 4 Part-1

- 2-Hours Credit

Welcome Iowa



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# What is Chapter 4 of the NEC?

## EQUIPMENT FOR GENERAL USE

Chapter 4 of the NEC addresses the following:

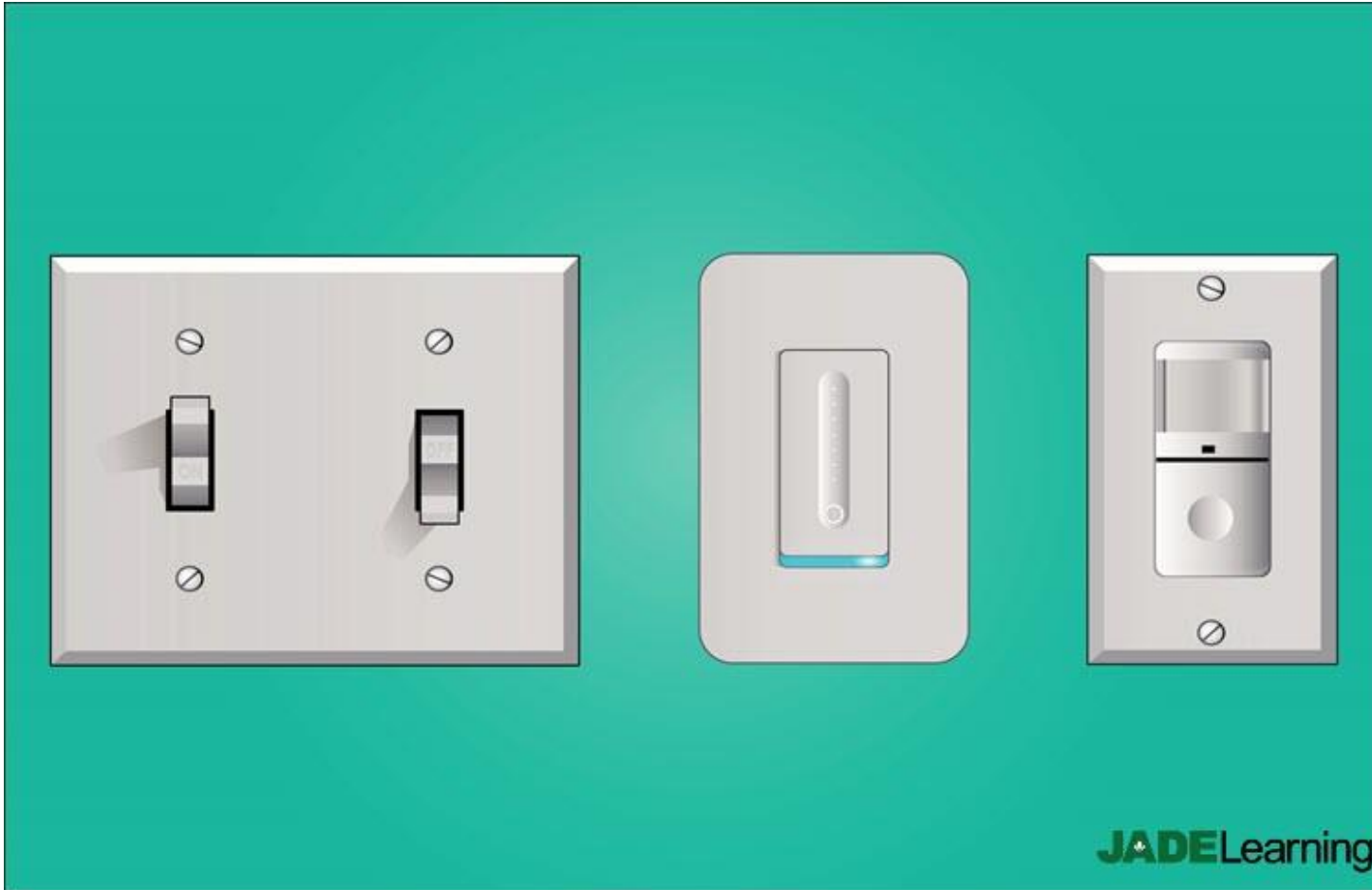
- Flexible cords and cables, fixture wires, switches, receptacles
- Switchboards and panel boards
- Lamps, lighting, appliances, and space heaters
- Motors, refrigeration equipment, generators, and transformers
- Capacitors and other components





# 2020 NEC Changes Chapter 4a.

## 404.9 General Use Snap Switches, Dimmers, and Control Switches.

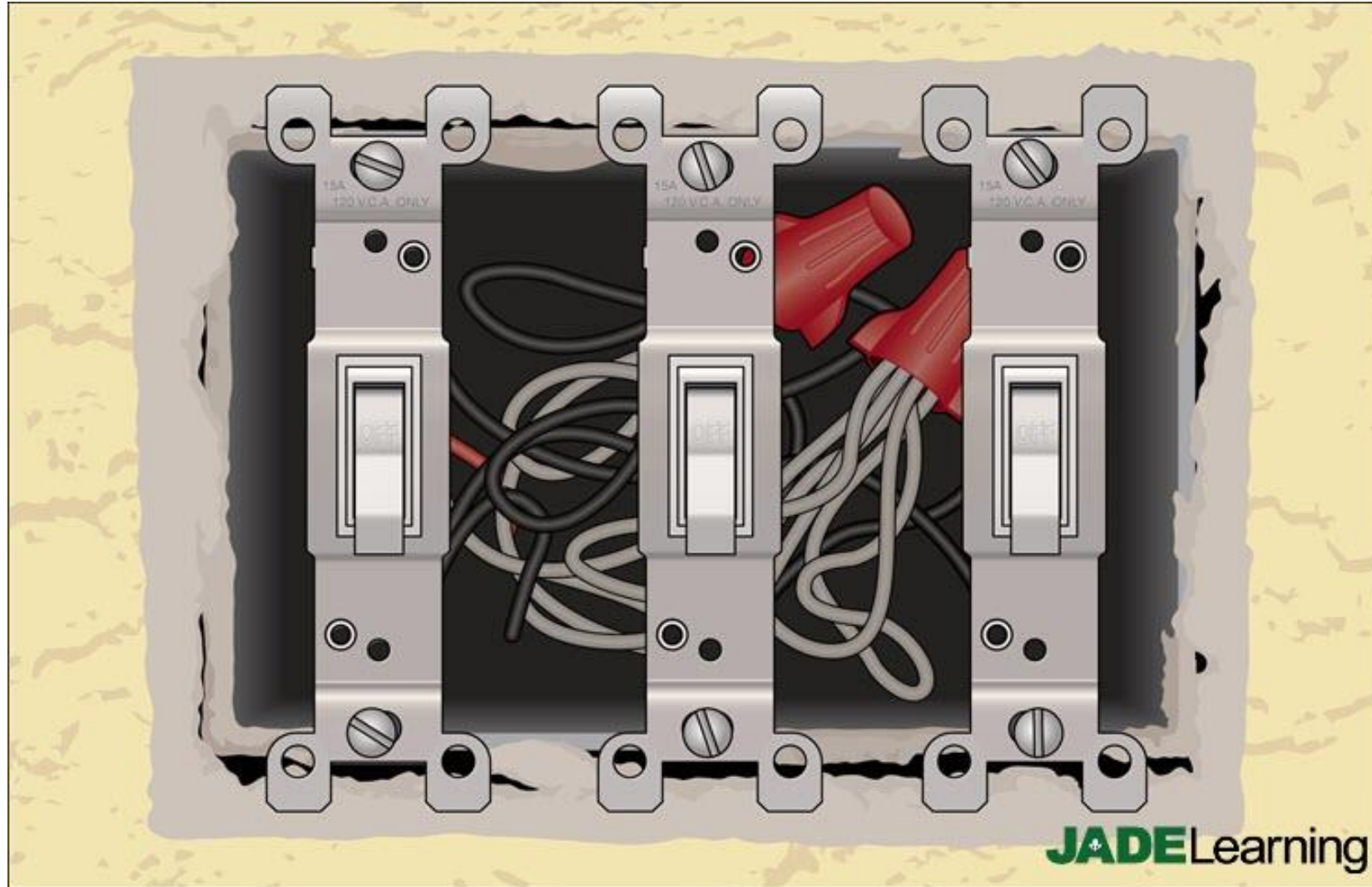


- In 2020 NEC, dimmers and control switches are specifically referenced in Section 404.9.
- The grounding requirements for these devices and their faceplates have been clarified in 2020.

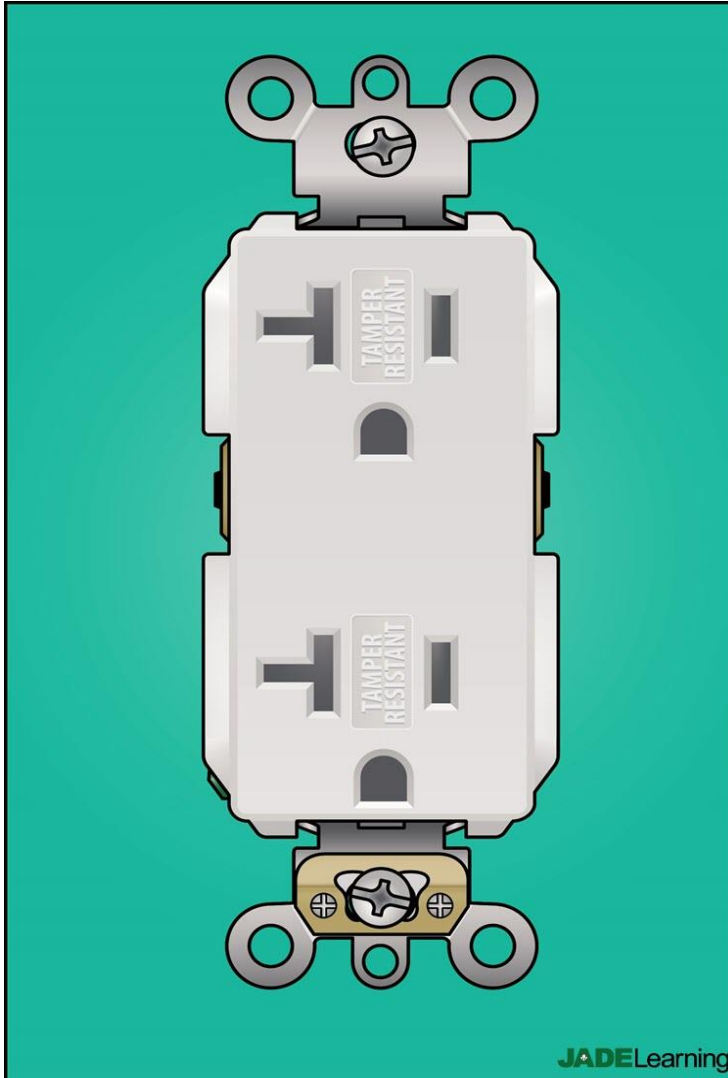


## 404.14(A), (B), (C), (D) Rating and Use of Switches.

Snap switches are now permitted to be used with new types of loads depending on the switch type (AC, AC/DC, CO/ALR or 347-volt switches) including LEDs and their associated drivers.



## 406.3(A) Receptacle Rating and Type. Receptacles.



*Section 406.3(A) has been revised in 2020 NEC to say:*

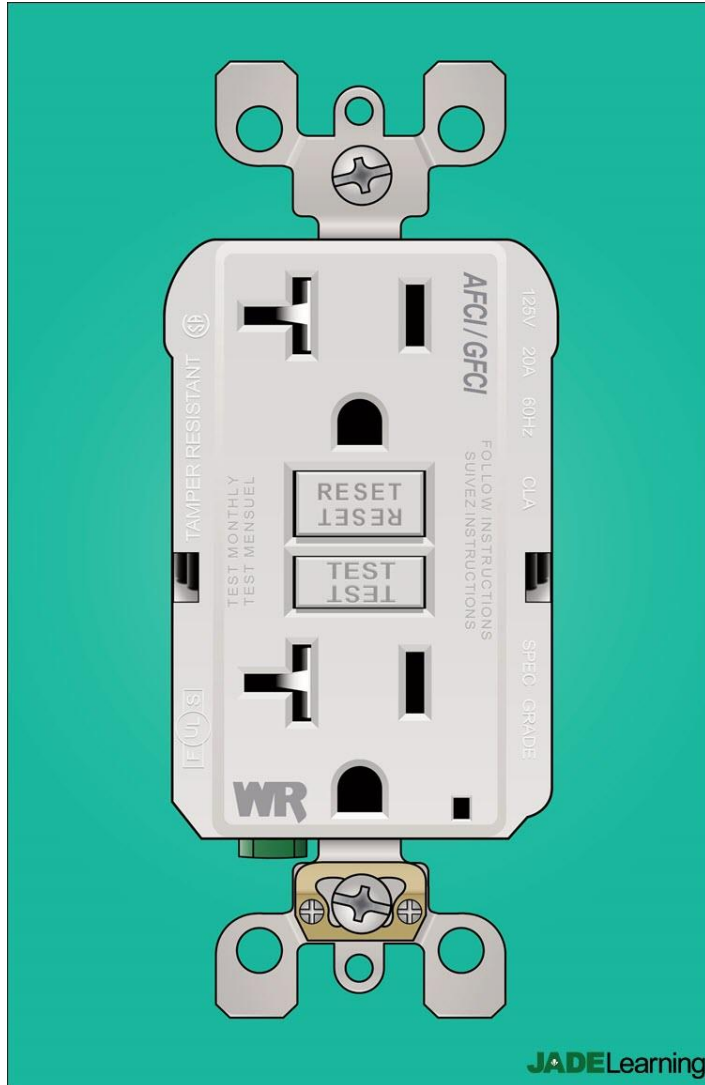
- Receptacles shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings. Receptacles shall not be permitted to be reconditioned.*



## 406.4(D)(4) Replacements. AFCI Protection.

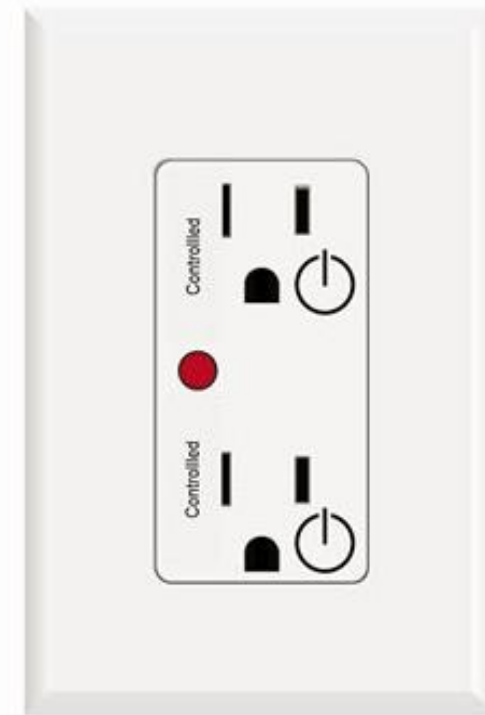
### When Replacing Receptacles:

- In the 2017 NEC: When no EGC was previously installed and no AFCI device was commercially available for a two-wire receptacle with no ground, an AFCI protected replacement receptacle was not required to be installed.
- Since AFCI protection is commercially available now, this exception was removed from the 2020 NEC.



## 406.4(D)(7) Replacements. Controlled Receptacles.

- When replacing a controlled receptacle, an equivalent controlled receptacle must be installed.
- If automatic control is no longer required, the replacement receptacle may then not be identified as controlled.



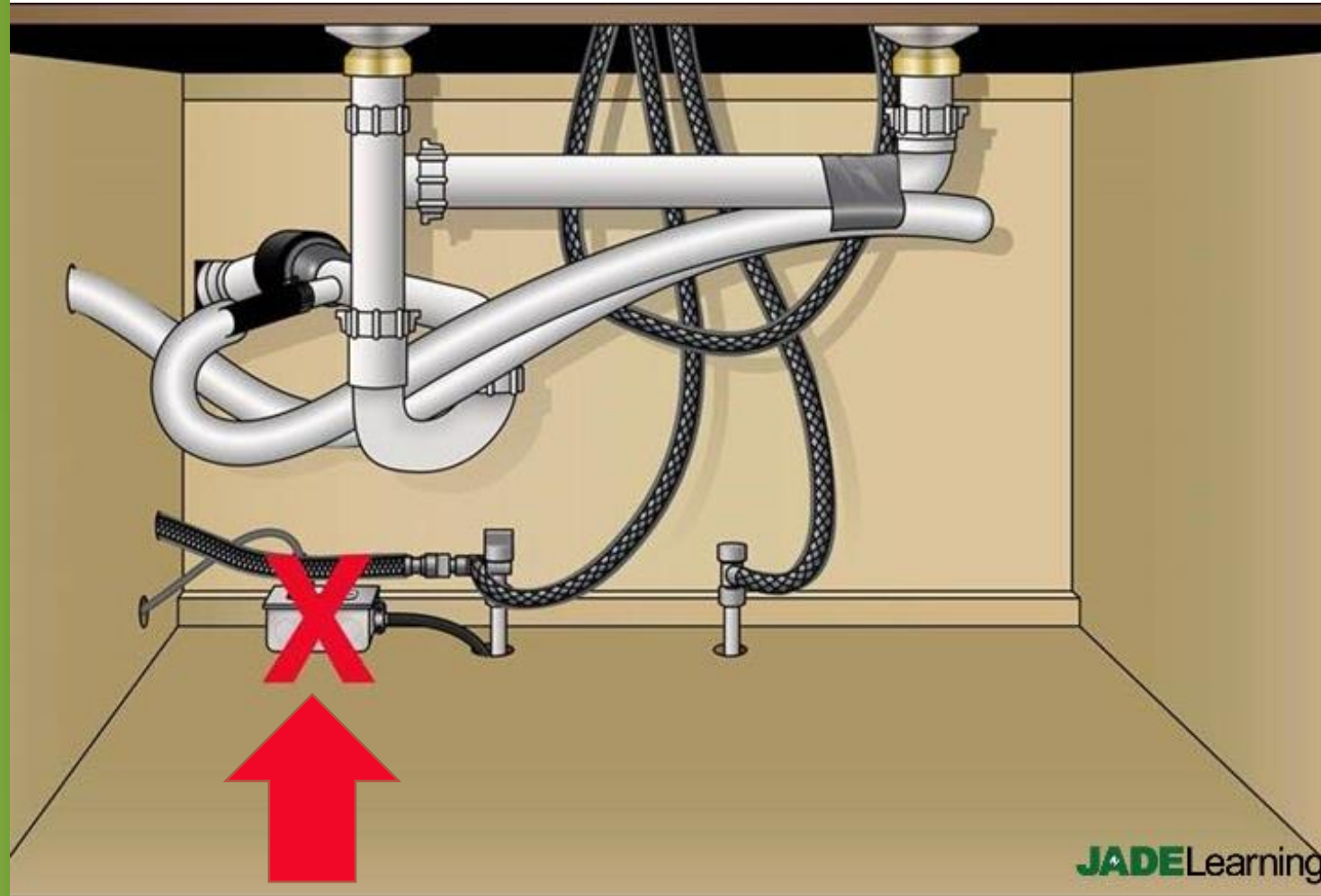
Two Controlled



Two Controlled



## 406.5(G)(2) Receptacle Orientation. Under Sinks.



New for 2020 NEC:

- *Receptacles shall not be installed in a face-up position in the area below a sink.*
- This new directive has no exceptions and applies to all receptacles under all sinks.

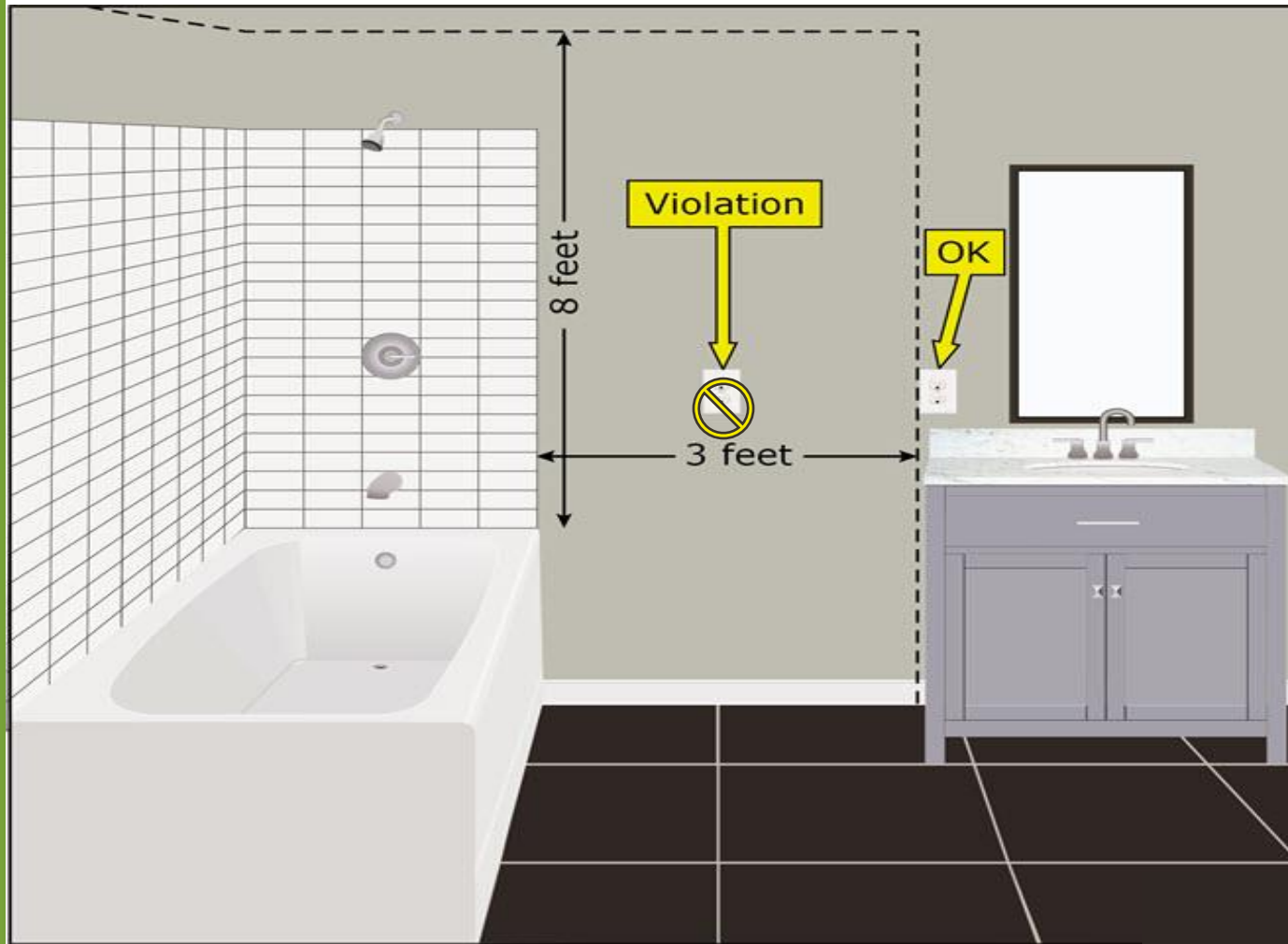
## 406.7 Attachment Plugs, Cord Connectors, and Flanged Surface Devices.

New for 2020 NEC:

- *Attachment plugs, cord connectors, and flanged surface devices shall not be permitted to be reconditioned.*
- The term reconditioned is often referred to as rebuilt, refurbished, or remanufactured.



## 406.9(C) Receptacles in Damp or Wet Locations. Bathtub and Shower Space. (1of2)

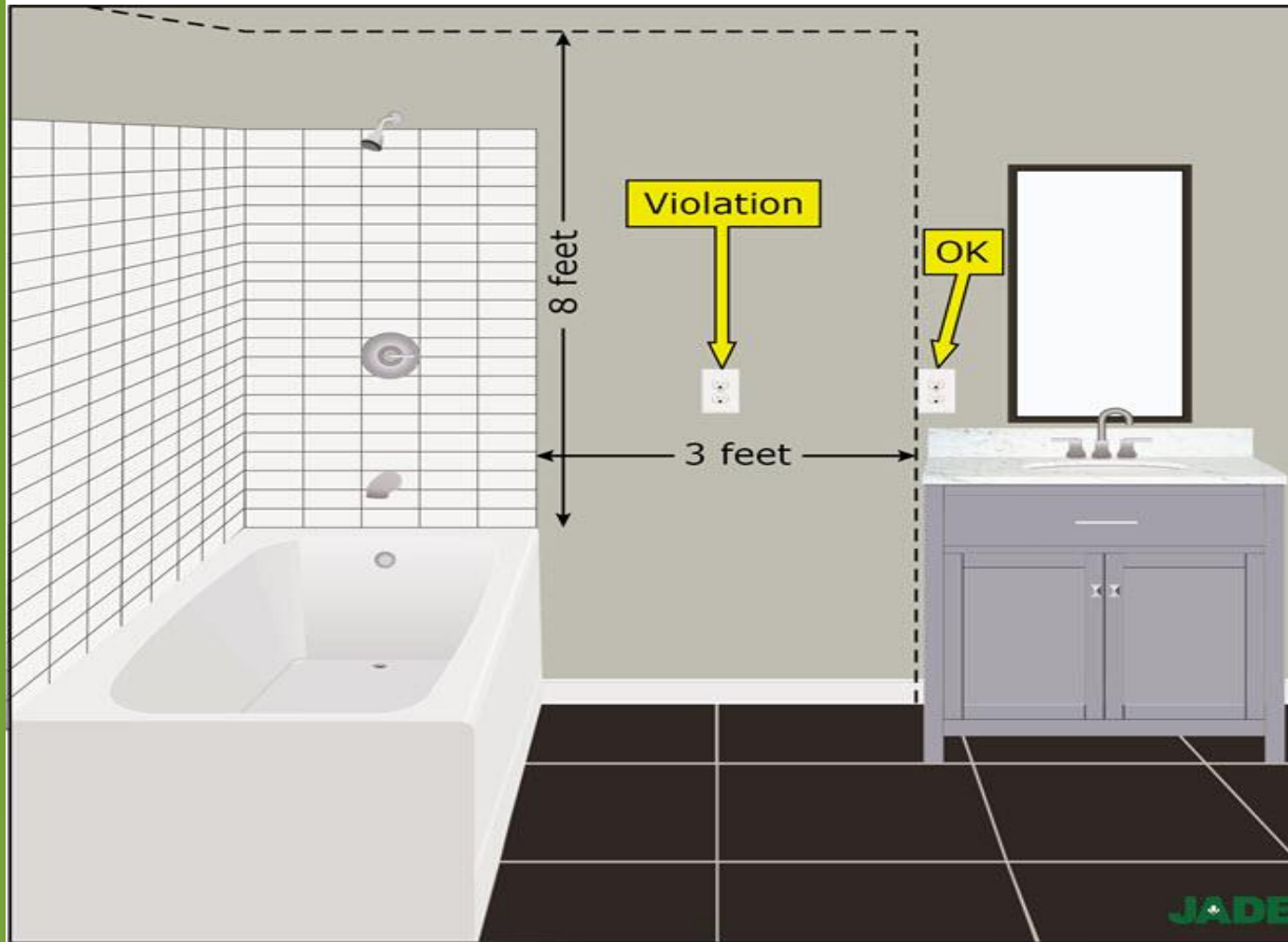


### Receptacle Locations in 2020

- Receptacles are not permitted within 8 feet vertically and 3 feet horizontally of the bathtub rim or shower stall threshold.
- Receptacles are still required within 3 feet of the sink.



## 406.9(C) Receptacles in Damp or Wet Locations. Bathtub and Shower Space. (2of2)



If a bathroom is too small and conflict exists between the bathtub/shower space and receptacle(s) being installed, an exception allows the receptacle to be installed on the farthest wall in the bathroom.

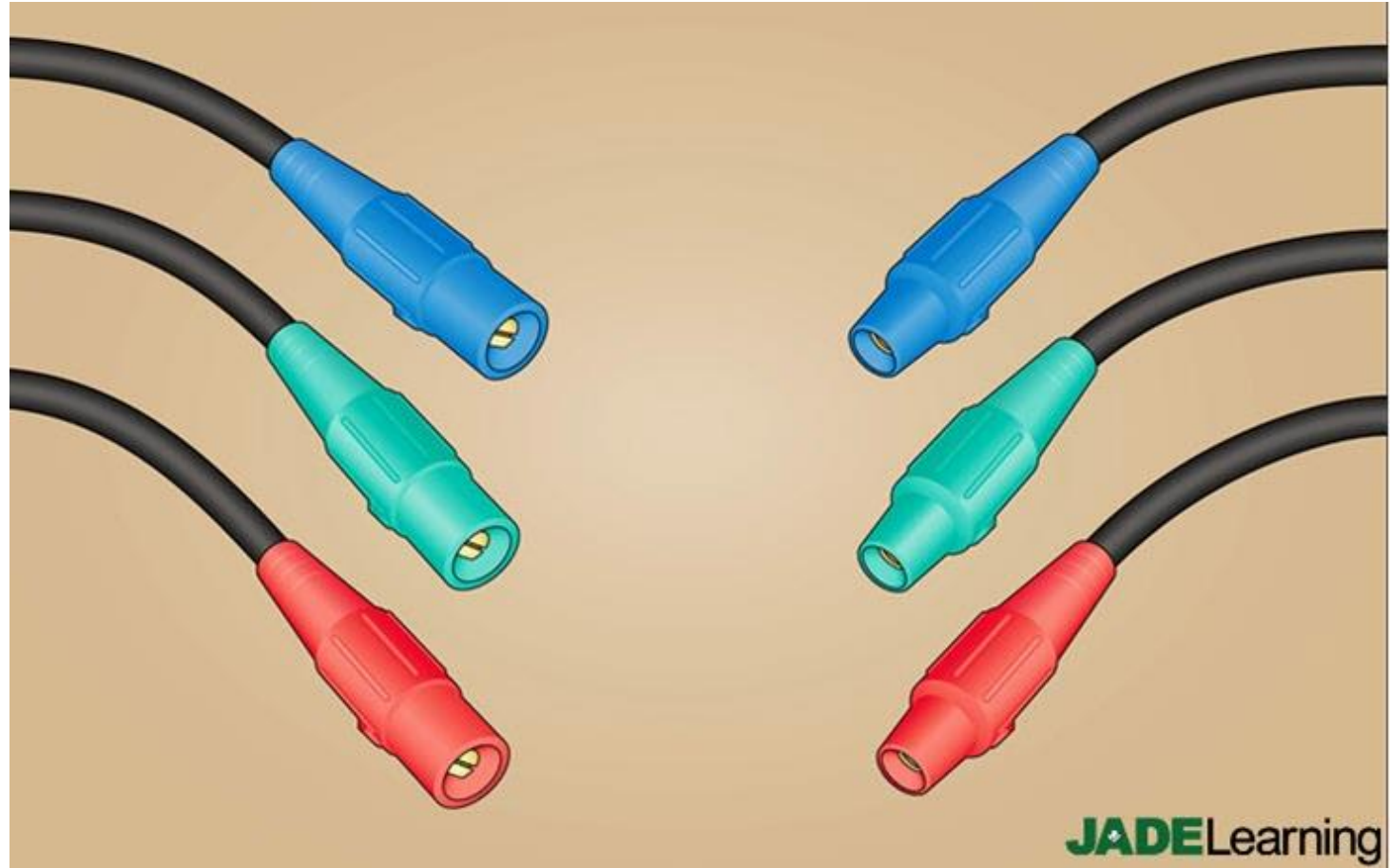
## 406.12 Tamper Resistant Receptacles.



In the 2020 NEC, tamper-resistant receptacles are now required in additional locations including common areas of hotels, assisted-living facilities, accessory buildings, and detached garages.

## 406.13 Single Pole Separable Connector Type.

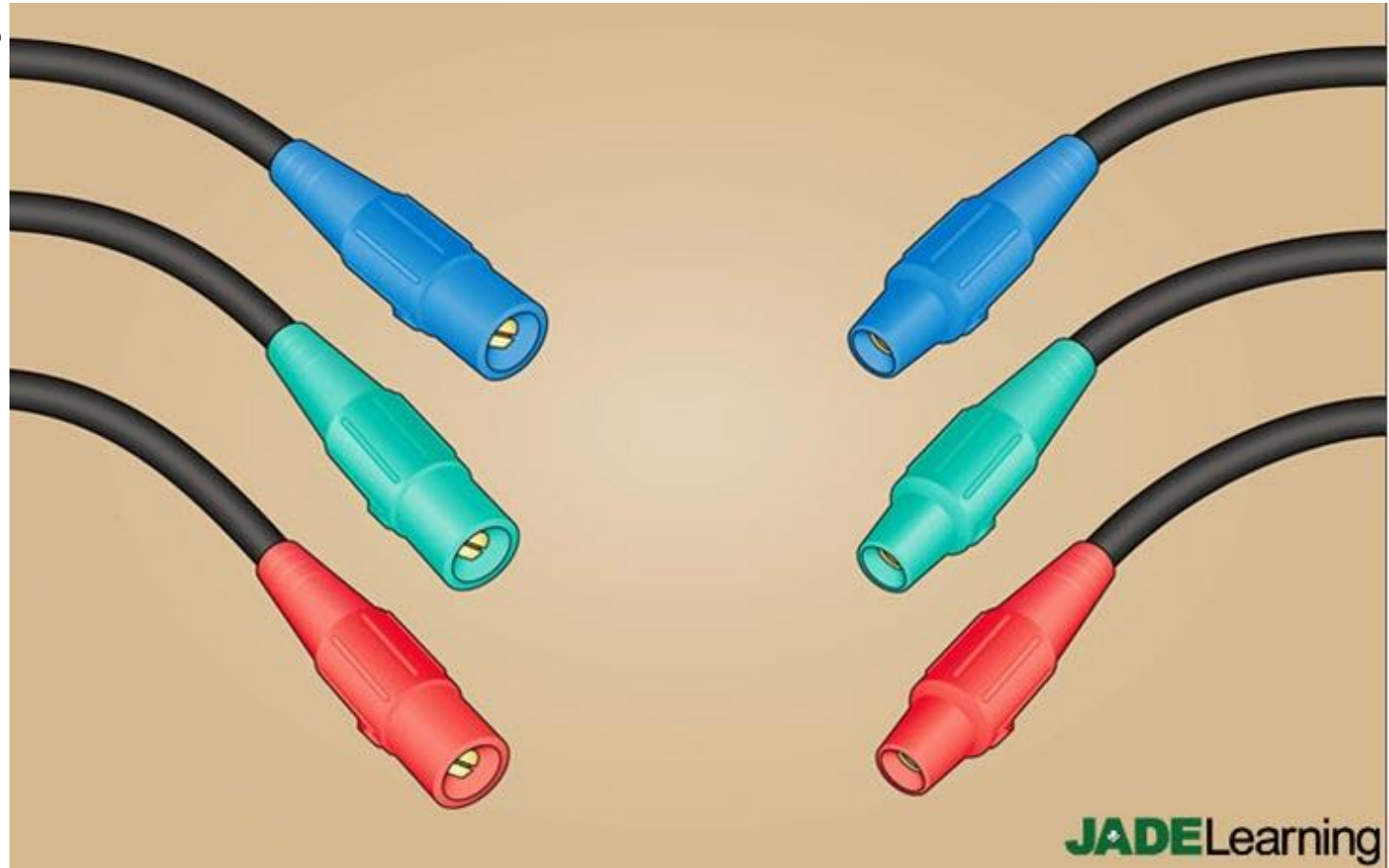
- Single-pole separable-connectors individually carry the ungrounded, grounded and equipment grounding conductors.
- Section 406.13(A) through (D) was added to 2020 NEC to provide guidelines for the order these are to be connected.



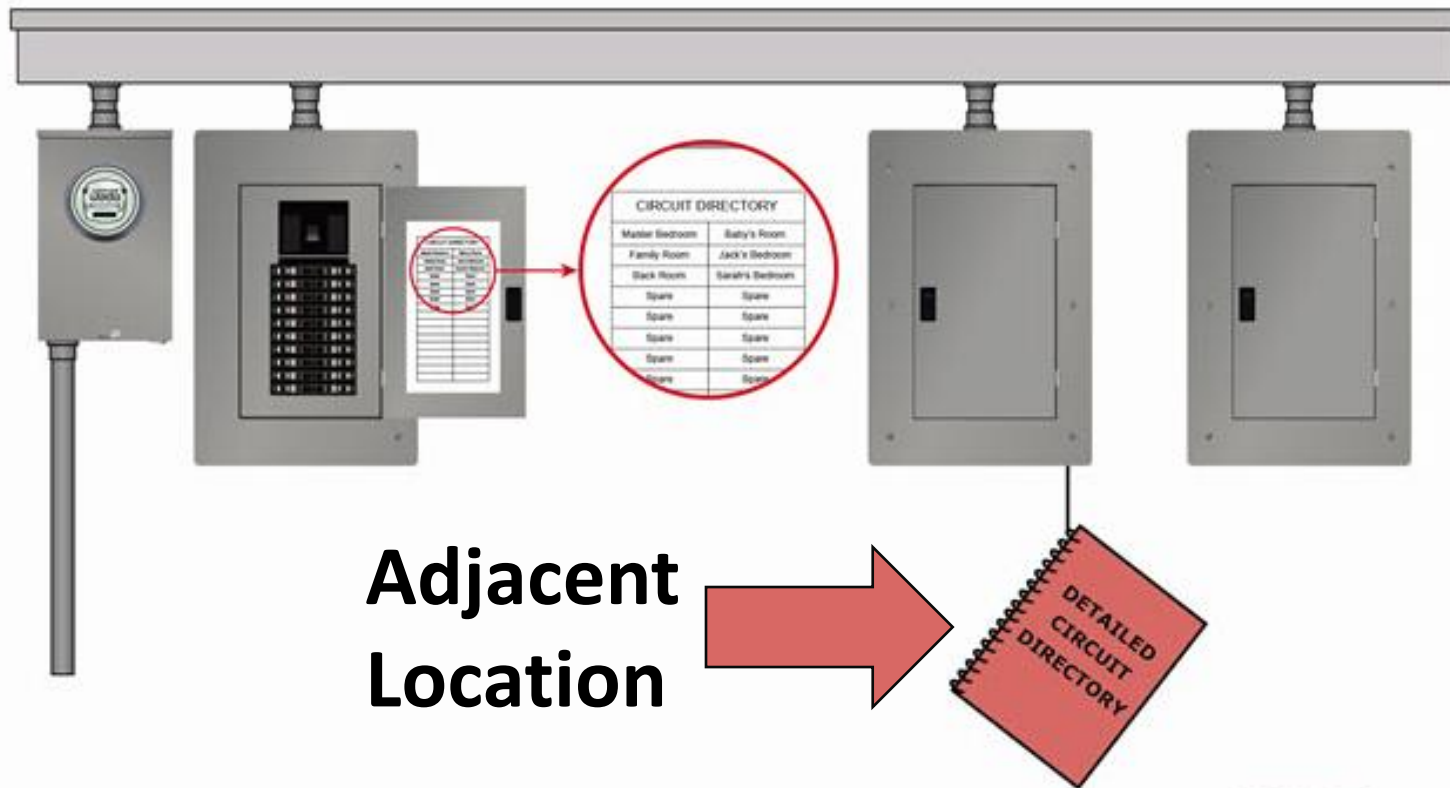


## 406.13 Single Pole Separable Connector Type.

- Section 406.13(D) requires a specific order for attaching these connectors:
  1. **Equipment Ground**
  2. **Grounded Conductor**
  3. **Ungrounded Conductor**
- Disconnection must be in the reverse order.



# 408.4(A) Field Identification Required. Circuit Directory or Circuit Identification.



- Directories may be located on the face, inside of, or now *in an approved location adjacent to* the panel door.
- The AHJ must approve any adjacent location(s).

## 408.6 Switchboards/Panelboards. Short-Circuit Current Rating.

- Section 408.6 extends available fault current marking requirements to all switchboards, switchgear and panelboards in other than one- and two-family dwelling units.
- The Short Circuit Current Rating (SCCR on Equipment) must be no less than the available fault current that may be able to pass through the equipment.





# 408.8 Switchboards/Panelboards. Reconditioning of Equipment.



If switchboards, switchgear or panelboards are damaged by fire, fire-related contaminants or water, the equipment must be evaluated by the original manufacturer or a qualified testing lab (UL) before returning to service.

## 408.43 Panelboard Orientation.

- Panelboards are now prohibited from being installed on their backs facing up.
- Panelboards may be placed horizontally, but all the breaker handles must be up when “on.”



# THANK YOU FOR ATTENDING!

Questions?

For additional instructor support, please contact  
[instructor@jadelearning.com](mailto:instructor@jadelearning.com)

For questions about your continuing education, please  
contact [registrar@jadelearning.com](mailto:registrar@jadelearning.com)