

Charlie Trout Code Breakfast 2009

Question: Where does it say you can use a compact fluorescent lamp in a recessed luminaire?

Answer: UL White Book category Lamps, Self-Ballasted and Lamp Adapters (OOLR), page 252 in the 2009 White Book.

Question: According to 240.4(G) and Table 240.4(G), conductor ampacities for motor circuits are not limited to those specified in 240.4; therefore, motor wiring may use the full ampacities as listed in Table 310.16. A 15hp motor has a power factor correction capacitor attached at the load-side of the overload relay. Due to the addition of the capacitor, the ampacity used to calculate the heater value must be reduced by 18%. Assuming copper conductors, size the motor conductors. Motor voltage is 460 VAC.

Answer: Correct wire size is 10 AWG. 460.9 states that the effect of the capacitor shall be disregarded in determining the motor circuit conductor rating in accordance with 430.22.

Question: Where does it say you can use a light emitting diode (LED) light bulb in a recessed luminaire?

Answer: UL White Book category Lamps, Self-Ballasted, Light Emitting Diode Type (OOLV), page 253 in the 2009 White Book.

Question: A standard molded case circuit breaker is used as the short circuit and ground fault protection for a 10hp, single phase, 230 volt motor. The motor has no problem starting, what is the maximum ampere rating of this circuit breaker?

Answer:

10hp, single phase, 230volt FLA=50 amperes NEC Table 430.248

Inverse time delay circuit breaker=250% NEC 430.52

50 x 250%=125 amperes

A 125 ampere breaker is the maximum rating. NEC 240.6

Question: You are replacing a 50 year old panelboard that has an AIC rating of 42KA whose cabinet is set into a masonry wall and the manufacturer of the original panelboard is no longer in business. The replacement panelboard along with its trim has no special markings. What will be the AIC rating of the new panelboard once it is installed into the old cabinet?

Answer: 10KA. See Panelboards (QEUY), page 288 in the 2009 White Book. The answer is in the first paragraph. Unless the panel is marked with a cabinet identifier or specific dimensions that allow for a higher short circuit current rating, the default is 10 KA. The panel must also come with trim from the panelboard interior manufacturer to attain a higher rating.

Question: An industrial plant has the service from the utility at 13,800 VAC. The facility substation transformers reduce the voltage to 4160 VAC. The substation transformers use high-resistance grounding to limit ground fault currents to ten Amperes. Because the plant cannot afford an inadvertent shutdown, an alarm is provided to signal the occurrence of a ground fault. If a ground fault alarm occurs, the substation will be de energized during a non-productive period; the result is that a ground fault may persist for several hours, even a few days. What is the percent insulation level required for the 4160VAC medium-voltage cable.

Answer: 173%. Reference Table 310.13(E), footnote 3. These notes are not Fine Print Notes and they therefore are enforceable.

Question: How do you identify fittings that are suitable for use with interlocking metal armor type metal clad cable where an integral aluminum bonding conductor along with the interlocking sheath is suitable as an equipment grounding conductor?

Answer: The fitting or the container is marked MCI-A. See Metal Clad Cable Connectors, Type MC (PJOX) on page 264 in the 2009 White Book.

Question: What is the minimum size Intermediate Metal Conduit (IMC) allowed for installing nine # 10 AWG THWN, four # 8 AWG XHH and four # 6 AWG compact XHHW conductors?

Answer:

| Wire Size and Insulation | Number of Conductors | Conductor Cross Sectional Area | Calculated Cross Sectional Area | Reference |
|--------------------------|----------------------|--------------------------------|---------------------------------|-----------|
| 10 AWG THWN | 9 | 0.0211 | 0.1899 | Table 5 |
| 8 AWG XHH | 4 | 0.0437 | 0.1748 | Table 5 |
| 6 AWG XHHW | 4 | 0.0590 | 0.236 | Table 5 |
| Total | | | 0.6007 | |

1 1/4" IMC @ 40% fill = 0.659 (Table 4)

Installation requires 1 1/4" IMC

Question: Where can I find a list of Light Emitting Diode (LED) categories in the 2009 UL White Book?

Answer: 2009 UL White Book. Table of Contents, Page 32. Or Index of UL Product Categories and Industry Terms pages C30-C31

Question: What is the minimum number of receptacles required in a critical care area at a patient bed location,?

Answer: The minimum number is six. NEC 517.19(B)

Question: A park has a permanently installed roller coaster. Power conductors are installed in Rigid Conduit to a motor on the first tower. The control system for this motor is 24 volt DC. Can the control conductors be installed in the same raceway?

Answer: Yes, Article 522.24(B)(1) allows such an installation when the control conductors are functionally associated. They must have insulation equal to the power conductors (this is a requirement of 522.24(B)(1) and 725.48(B)(1) and as currently worded in the question is not an applicable requirement, however 300.3(C)(1) would be an applicable requirement). 725.48(B)(1) has the same allowance. The 24 volt DC is not identified otherwise so should be assumed to class 1.

Question: An installation has six showcases placed end to end. The first case is fed from a floor outlet with hard usage rubber cord. The cases are then daisy chained with cord and locking type connectors. Is this a legal installation?

Answer: Yes, this is permitted. NEC 410.59

Question: Where does it say I can use a metallic outlet box in a 2 hour fire rated wall?

Answer: UL White Book, Metallic Outlet Boxes (QCIT), page 282 and 283.

Question: What is a Two-Fer and if it is listed where do I find information on the listing.

Answer: Two-fers covered in Article 520 are Listed under the category of Receptacles, Stage Type (RUFR), located on page 328 in the 2009 White Book. You can find the answer by looking up two-fers in the Index of Product categories and Industry terms in Appendix C, page C56 in the very back of the White Book.

Question: A fixture whip contains #18 AWG TFN conductors. What is the ampacity of these conductors?

Answer: The allowable ampacity is 6 amps. NEC 402.5

Question: An installation has two voltages present 277/480 and 120/208. Can I use colored tape to identify the ungrounded conductors #6 and smaller?

Answer: Article 210.5 (C) allows marking tape as one of the acceptable identification methods.

Question: I have a 2500 square foot single family residence, with a 900 square foot attached garage. What is the minimum number of 15 amp general lighting circuits that are required to serve this facility?

Answer: 3 watts per square foot x 2500=7500 watts NEC 220.12
(garage does not count)
15 amp circuit=1800 watts
 $7500 \div 1800 = 4.17$
5 fifteen amp circuits minimum required

Question: Is it permissible to use a molded case circuit breaker marked “SWD” to switch HID (high intensity discharge) luminaires?

Answer: No. See 240.83(D). SWD ratings are applicable only for fluorescent lighting. However, a breaker marked HID can be used to switch fluorescent or HID lighting. Also see UL White Book CCN DIVQ which has listing language for marking. Also see the Molded Case Circuit Breaker marking guide page 13 or 14 for explanation on “SWD” and “HID” markings.

Question: An RV park has hook ups for 125 RV's. How many of these hook ups are required to be 50 ampere 125/250 volt?

Answer: A minimum of 25 sites would require 50 ampere, 125/250 volt receptacles. NEC 551.71

Question: A 3/4" PVC raceway is installed on the exterior of a building between two junction boxes. The run is 140 feet. The temperature change in the area is 115 degrees F. What is the anticipated expansion of this raceway?

Answer: The expansion for 115 degrees is 4.66 inches per hundred feet. The expansion would be $140\% \times 4.66 = 6.524"$.