

# Charlie Trout Code Breakfast

## Western Section Meeting

### St Louis, Missouri

### September 19, 2007

**1.** I have a solar array mounted on the roof of a building. A DC fan, supplied by the array, is installed to cool the array. A circuit breaker is used for protection and disconnecting the fan. Can I use a standard circuit breaker, or does it need to be listed for DC?

**Answer:** Article 690.9(D) requires the overcurrent device to be “listed” for use in DC circuits and have the appropriate voltage, current, and interrupt ratings.

**2.** What is the minimum metal thickness of an enclosure that reducing washers are Listed for use on?

**Answer:** 0.053 in.- See QCRV page 249

**3.** Fort Smith, for the first time, is in the process of bringing electricity into the community. I have a 900 square foot Arkansas mansion. How many 15-ampere general lighting circuits will the code require?

**Answer:** 2 15-ampere circuits would be the minimum required.

$$900 \times 3 = 2700 \text{ VA}$$

$$2700 \div 120 = 22.5 \text{ amperes}$$

$$22.5 \div 15 = 1.5$$

Roundup 1.5 = 2 Circuits required

**4.** A generator is installed about 35 feet from a building. This generator is to serve as the source for a legally required standby system. The generator has a disconnect, which is visible from the served building. Is a disconnect required where the generator feed enters the building?

**Answer:** No, Article 701.11(B)(5) does not require a disconnecting means under condition that the disconnect at the generator is within sight.

**5.** A service is installed for area lighting. The load is less than 30 amperes. What is the minimum size of the service disconnect?

**Answer:** The minimum disconnect size is 60 amperes according to 230.79(D).

**6.** What is the short circuit rating of a panelboard that is retrofitted into existing enclosure that is not the enclosure identified on the panelboard markings?

**Answer:** 10,000 Amps- See QEUY, page 251

**7.** What is the minimum bending radius for a tray cable that has a 1-inch diameter?

**Answer:** The minimum bending radius is four times the diameter, or 4-inches according to Article 336.24.

**8.** Am I permitted to make splices in Cellular Concrete Floor Raceways?

**Answer:** No, splices must be made in header access units or junction boxes. NEC 372.12.

**9.** What is the title of the Section in the 2007 UL White Book that explains how to apply the White Book in the Field and what pages is it located on?

**Answer:** Pages 36 and 37, Practical Application of the White Book in the Field

**10.** What is the smallest allowable aluminum conductor permissible for the equipment-grounding conductor for a 40-ampere circuit?

**Answer:** Table 250.122 specifies a #8 aluminum equipment grounding conductor.

**11.** In an older installation, a dryer is connected with a 3-wire cord and connector. Is the grounded/grounding conductor considered a current carrying conductor?

**Answer:** No, according to Article 400.5(B), a single conductor used for both equipment grounding and to carry unbalanced current from other conductors, as provided for in 250.140, shall not be considered as a current-carrying conductors.

**12.** A new panelboard is installed next to the original. The old panelboard is used as a junction box. A 12" piece of EMT is installed between the new and old panelboards. There are 30 #12 THWN, 6 #10 THWN, and 3#6 THWN conductors in the raceway. What size will the raceway need to be?

**Answer:** A 1 ¼” EMT raceway would be required.

60% wire fill is allowed in a nipple less than 18” long. Chapter 9, Table 1, Note 4

#12 THWN = .0133 sq inches x 30 = .399  
#10 THWN = .0211 sq inches x 6 = .1266  
#6 THWN = .0507 sq inches x 3 = .1521  
Total conductor area = .6777

1” EMT 60% fill = .519

1 ¼” EMT 60% fill = .897

**13.** I am installing a smoke detector in an existing dwelling. The wiring in the dwelling does not contain an equipment grounding conductor. Do I have to ground the box I am installing for the smoke detector?

**Answer:** Yes, Article 314.4 states: “All metal boxes shall be grounded in accordance with the provisions of Article 250”, and 250.110 states: “Exposed non-current carrying metal parts of fixed equipment likely to become energized shall be grounded.”

**14.** Can single conductor type USE cables be used in premises wiring?

**Answer.** No, see TYLZ page 305

**15.** An installation has an electric furnace rated at 30 amps. Can I install an air conditioner also rated 30 amps, and use the same circuit breaker to protect both circuits?

**Answer:** Yes, Article 422.12, Exception 2 allows permanently connected air-conditioning equipment to be connected to the same branch circuit.

**16.** Am I allowed to install a 1500-watt wall heater on a 15-amp branch circuit?

**Answer:** No, according to Article 424.3(b), fixed electric space heating equipment shall be considered a continuous load.  $15 \times 120 = 1800 \times 80\% = 1440$  watts allowable on a 15 amp circuit.

**17.** Two separate circuits are run into a two-gang box one circuit feeds the kitchen sink luminaire and the other circuit feeds a counter top receptacle. Do both circuit equipment grounding conductors need to be commonly tied together or just the equipment grounding conductors of each circuit?

**Answer:** All the equipment grounding conductors would be tied together. Article 250.148 requires all equipment grounding conductors be spliced in the box and bonded to the box.

**18.** What five UL Product Categories can be used for transfer equipment in Optional Standby Systems? Please provide the category codes.

**Answer:** QEUY, WIAX, WPTZ, WPXT and WPYV . See Index of Product Categories Correlated to the 2005 NEC, Section 702.6, page 407.

**19.** A 208-volt, three-phase four wire service has paralleled phase conductors consisting of 5-500kcmil, copper conductors in 5 raceways. What is the minimum size of the grounded conductor?

**Answer:** 1/0 Copper is the minimum size in each raceway. NEC 250.24(C)(2), 250.66

**20.** An installation has 3-4wire, #12 THWN circuits feeding fluorescent lighting. All 3 circuits are contained in one raceway. What is the maximum overcurrent protection allowed for the conductors?

**Answer:** 15 amperes would be the maximum overcurrent device allowed.

Article 310.15(B)(4)(c) requires the neutral be counted as a current carrying conductor, if the circuit is a 4 wire, 3 phase circuit feeding non-linear loads.  
Table 310.15(B)(2)(a) requires 50% derating for 12 conductors

Table 319.16 allows 25 amperes for #12 THWN conductors.  $50\% \times 25 = 12.5$  amperes

Article 240.4 allows next higher standard overcurrent device.

# Winning Teams

## Third Place Table 4 - 15.5 Correct

|                          |                           |                            |
|--------------------------|---------------------------|----------------------------|
| Grant Hammet, Colorado   | Lloyd Osborn, Colorado    | Larry Bobo, Colorado       |
| Giles Scherman, Colorado | Terry Schneider, Colorado | Richard Vosler, Colorado   |
| Walt Stoddard, Michigan  | John Hartigan, Michigan   | Donald Schreiner, Michigan |
| Herbie Moulton, Neon     |                           |                            |

## Second Place Table 24 - 16 Correct

|                   |                   |                     |
|-------------------|-------------------|---------------------|
| Brad Steier, ND   | Dan Offerdahl, ND | Jon Perkins, ND     |
| Josh Wilson, ND   | Earl Scherer, ND  | Mitch Feiminger, ND |
| Timoth Clevon, MN | Bill Cole, ND     | Don Offerdahl, ND   |
| Eugene Cross, ND  |                   |                     |

## First Place Table 14 - 16.5 Correct

|                     |                      |
|---------------------|----------------------|
| James Carpenter, TX | Michael Johnston, TX |
| Chad Kennedy, SC    | Jeff Fecteau, IL     |
| Phil Simmons, WA    | Richard Loyd, AZ     |
| Jim Pauley, KY      | Alan Manche, KY      |