2006 Western Section Meeting
Charlie Trout Code Breakfast
September 20, 2006
By Mike Forister

1. A hydro-massage tub is installed in a master bedroom. There is no stool or sink. Does the dedicated 20-amp GFCI circuit for the tub require AFCI protection?

Yes, it would require AFCI protection according to Article 210.12(B).

2. A range branch circuit is calculated and installed at 40 amps. The range installed is rated at 13 kW. Does the wiring need to be changed?

No. Article 210.19(A)(3) requires that the minimum circuit for ranges rated 8.75KW or more be 40 Amps.
Article 220.14(B) permits Table 220.55 to be used to size branch circuits supplying electric ranges.
Table 220.55 Note 1 requires where ranges exceed 12KW the demand listed in Column C must be increased by 5% for each KW the range exceeds 12KW.
This range exceeds 12KW by 1KW which means the demand of 8KW in column C must be increased by 5%, which works out to be 8.4KW (35 Amps).

3. Can a 10.5A 120V rated fan-light-heat unit be installed in a bathroom and be supplied from the same 20Amp circuit supplying the bathroom receptacle?

No, Article 210.11(C)(3), Exception, allows the 20-ampere circuit supplying a single bathroom to supply other equipment within the same bathroom.
However in this situation the fan-light-heat unit would exceed 50 percent of the branch-circuit ampere rating allowed for utilization equipment fastened in place, see 210.23(A)(2).

4. What is the minimum number of fully engaged threads required for listed explosion proof equipment, using factory threads on conduit.

The minimum for factory threads is 4 ½ threads. NEC Article 500.8(D), Exception

5. A 40-foot section of Rigid Nonmetallic Conduit is run straight between 2 boxes. Are you required to have an expansion coupling installed? If it is necessary, how much can the run be expected to expand/contract? For this question, figure + 100°F and -20°F as temperature extreme.

Table 352.44(A) says the expansion characteristics for 120° would be 4.87 inches per 100 feet. Thus, the expected expansion/contraction for 40’ would be 1.948 inches. An expansion fitting is required if expected expansion/contraction is more than ¼ inch. An expansion fitting would be required.

6. Can the "Test" and "Reset" buttons on a GFCI receptacle be used to switch a garbage disposal on and off?

They are intended to check the function of the device only, unless the buttons are specifically marked "On" and "Off". UL "White" book, page 121, category KCXS

7. When permanently installed, does a 240-volt baseboard heater need to be "Listed"?

Yes, Article 424.6 requires equipment be listed.

8. The well driller supplied a twisted cable containing 4#10 conductors. The individual conductors are marked "Pump Cable". Can this cable be direct buried from the residence to the wellhead?

Yes, information on this cable may be found in the UL "White" book, page 245, under category TYLZ (Service Entrance Cable), sub category "Submersible Water Pump Cable"Type USE, USE-2. This category states that it may be direct buried.

9. A raceway contains 4 multi-wire circuits that feed general use receptacles. The circuits are 3-wire (2 ungrounded and 1 grounded conductor). The panel board that feeds these circuits is 120/240 volt, single phase. What would be the allowable ampacity of #12 THHN conductors?

There would be 8 current carrying conductors. The neutral is not counted according to Article 310.15(B)(4).

12THHN ampacity:	30amps	(310.16)
Adjustment Factor	70%	(310.15(B)(2)(a))
Allowable ampacity	21amps	(maximum 20 amp overcurrent)(240.4(D))

10. Can conductors with Type THHN insulation be used in a damp location?

Yes, Article 310.8(B) or 310.13.

11. What size EMT raceway would I need for the following combination of conductors?
4-#12 THWN 3-# 6 THWN 4-# 2 THWN

4-#12 @ .0133=	.0532	Table 5, Chapter 9
3-# 6 @ .0507=	.1521	
4-# 2 @ .1158=	.4632	
Total Area	.6685	
11/4" EMT	.598	40% Table 4, Chapter 9
11/2" EMT	.814	

12. May I use Tray Cable, as feeder conductors for a residence, from the main disconnect to the panelboard? It would be concealed through wall studs.

No, Tray Cable (TC) may not be used outside of a raceway or cable tray system, except in some industrial establishments. NEC 336.12(2), 336.10(7)

13. In healthcare facilities, do the emergency panel and normal power panel feeding the same area have to be bonded together?

Yes, 517.14, patient vicinity

14. Can a person run numerous home runs of NM-B cable into a flush mount breaker panel, through a 2" PVC made adapter mounted in the top of the enclosure? The individual KO's will not be used, as all home runs will run through the adapter.

No, 312.5(C) exception

15. Can a 120-volt receptacle be installed in the same box with a 277-volt switch?

Yes, if a barrier is installed, 404.8(B)

16. Are splices permitted in raceways with removable covers such as plug mold?

Yes, 376.56, 378.56, 388.56, 384.56, 386.56, 300.15(A)

17. I have a two-wire extension cord that needs a new attachment plug. Can I replace the plug with a three-wire plug?

No, NEC 406.9(E)

18. Where apartments share a common hallway, is a house panel required?

A separate panel is required from those supplying any apartment. Article 210.25 requires separate circuits from separate equipment.

19. I have a 12/2 NM Cable that I wish to place in conduit. The oblong cable measures 7/16" X 1/4". What size Rigid Metallic Conduit must I use?

Cable is treated as a single conductor and major dimension is used according to Chapter 9 Tables, Note 9.

7/16= .4375 Area= .1502 Table 4, RMC-1 conductor 53% 1/2"=0.291
A 1/2" conduit would be required.

20. A single pole thermostat is used to control 240-volt baseboard heaters. Can this thermostat be considered the required disconnect?

No, both conductors must be interrupted according to Article 424.20(A)(2). Article 424.20(B) states these devices shall not be permitted as the disconnecting means. NEC 424.19, 427.56