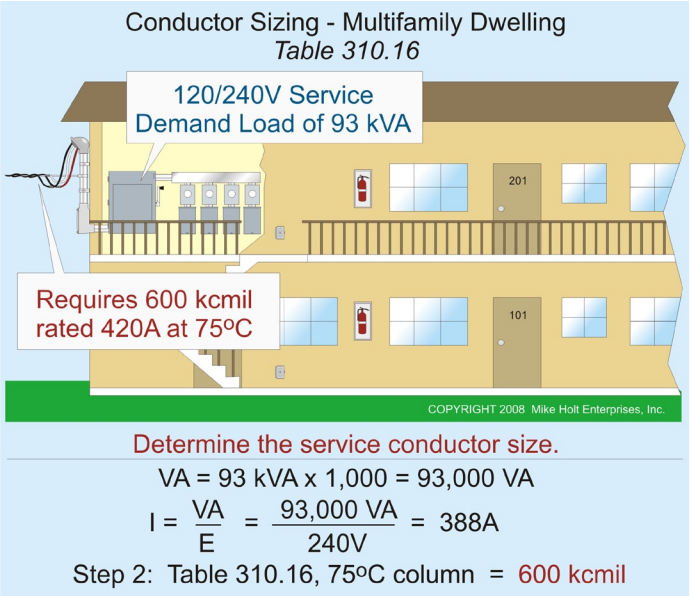

Figure 10–11

▶ Service Conductor Size Example 2

Question: *What size aluminum service conductors are required for a 120/240V, single-phase multifamily building that has a calculated load of 93 kVA?*

(a) 300 kcmil (b) 350 kcmil (c) 600 kcmil (d) 800 kcmil

Answer: *(d) 800 kcmil*

I = VA/E
I = 93,000 VA/240V
I = 388A

800 kcmil aluminum, rated 395A at 75ºC [Table 310.16]

According to Annex C Table C.10, a trade size 3½ Schedule 40 PVC raceway will accommodate three 800 kcmil THWN conductors.

If the service conductors are paralleled in two sets:

- *388A/2 raceways = 194A*
- *250 kcmil aluminum is rated 205A at 75ºC [Table 310.16], so two 250 kcmil aluminum conductors can be paralleled for this service. A trade size 2 Schedule 40 PVC raceway will accommodate three 250 kcmil THWN conductors [Annex C, Table C.10].*

If the service conductors are paralleled in three sets:

- *388A/3 raceways = 129.33A*

(continued in next column)

- *2/0 AWG aluminum is rated 135A at 75ºC [Table 310.16], so three 2/0 AWG aluminum conductors can be paralleled for this service. Trade size 1½ Schedule 40 PVC raceway will accommodate three 2/0 THWN conductors [Annex C, Table C.10].*

Author's Comment: Table 310.15(B)(6) only applies to feeder/service conductors for individual 120/240V dwelling units with 400A or less for single-family, two-family, or multifamily buildings. In this building, Table 310.15(B)(6) can be used for the feeder to each apartment, but Table 310.16 must be used for sizing the feeder/service conductors that supply the entire building.

▶ Service Conductor Size Example 3

Question: *What size copper service conductors are required for a multifamily building that has a calculated load of 270 kVA for a 120/208V, three-phase system? Service conductors are run in parallel in two raceways.* Figure 10–12

(a) Two–300 kcmil per phase (b) Two–350 kcmil per phase
(c) Two–500 kcmil per phase (d) Two–600 kcmil per phase

Answer: *(c) Two–500 kcmil per phase*

I = VA/(1.732 x 208V)
I = 270,000 VA/(1.732 x 208V)
I = 270,000 VA/360V
I = 750A

Amperes per Parallel Set = Amperes/Number of Parallel Sets
750A/2 conductors in parallel = 375A per conductor.

A 500 kcmil conductor has an ampacity of 380A at 75ºC [Table 310.16]. Table 310.15(B)(6) doesn't apply to services or feeders for multifamily buildings.

Two sets of 500 kcmil conductors (380A x 2) can be protected by an 800A overcurrent device. Their combined ampacity is 760A, but we're allowed to round up to the next standard size overcurrent device [240.4(B) and 240.6(A)].

If the service conductors are paralleled in three sets:

- *750A/3 raceways = 250A*
- *250 kcmil copper is rated 255A at 75ºC [Table 310.16], so three 250 kcmil conductors can be paralleled for this service. A trade size 2 Schedule 40 PVC raceway will accommodate three 250 kcmil THWN conductors [Annex C, Table C.10].*

Author's Comment: Throughout this book, we use copper conductors unless otherwise specified [110.5].