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Service and Feeder Conductor Sizing in One- and Two-Family Dwellings

Code: 2017 Electrical Code
Section: 310.15(B)(7)

Date: June 12, 2018

Question 1:

When is a feeder allowed to utilize Table 310.15(B)(7) for a one- or two-family dwelling?

Answer 1:

The language for section 310.15(B)(7) of the 2017 NEC has been modified by substituting Table 310.15(B)(7) of the 2011 NEC by NC amendment in place of “83 percent” throughout this section.

A feeder rated 100 through 400 amperes may be sized in accordance with Table 310.15(B)(7) of the 2011 NEC when the feeder supplies the entire load of the individual dwelling unit in accordance with section 310.15(B)(7)(2). The requirements of section 310.15(B)(7)(2) are typically satisfied when installing a feeder to supply power to a subpanel in the interior of a dwelling from the busbar lugs within an exterior “combo-panel” that are protected by the main breaker and supplies all loads that are part of or associated with the dwelling unit.

Question 2:

Breakers have been installed in the “combo-panel” for supplying power to other circuits that are part of or associated with the dwelling unit, and the lugs on the bottom of the busbars supply power to a feeder protected by the main breaker that serves most of the loads that are part of or associated with the dwelling unit. Now that the feeder between the panels does not supply all loads that are part of or associated with the dwelling unit, is that feeder now prohibited from being sized in accordance with Table 310.15(B)(7)?

Answer 2:

The feeder is not granted permission to use Table 310.15(B)(7) from section 310.15(B)(7)(2) because the feeder does not supply all loads that are part of or associated with the dwelling unit. However, section 310.15(B)(7)(3) states that no feeder for the dwelling is required to have an allowable ampacity rating greater than their service conductors.

Regardless of the service-entrance conductor installation either by utility, contractor, or if nothing that meets the definition of a service-entrance conductor has been installed, the largest size the service-entrance conductors that are allowed to be sized in accordance with Table 310.15(B)(7) for that installation shall be used to determine the allowable ampacity rating of the service conductors for purposes of applying this section.

Example: The utility supplies an underground lateral to a 200 ampere meter-panel combo on the exterior of a single family dwelling. There is a copper feeder from the busbar lugs, protected by the 200 ampere main breaker, and feeds a subpanel in the house. All circuits for the house are supplied from the subpanel except for a heat pump and irrigation branch circuit that both originate in the meter-panel combo outside of the dwelling.

The feeder from the busbar lugs, protected by the main breaker, and feeds a subpanel in the house is not granted permission by section 310.15(B)(7)(2) to use Table 310.15(B)(7) because all loads associated with the dwelling are not supplied from the feeder (the heat pump and irrigation system). According to Table 310.15(B)(16), 3/0 AWG copper is the minimum size at 75°C that the feeder would be sized if not allowed to utilize Table 310.15(B)(7).

Because the utility supplied the underground lateral on a meter-panel combo, there are no service-entrance conductors per Article 100. In an overhead or non-combo installation where service-entrance conductors would have been present, the service-entrance conductors would be allowed to be sized in accordance with Table 310.15(B)(7). If service-entrance cable was present, it would have been allowed to be a minimum size of 2/0 AWG copper.

The electrical code recognizes that there is no logical reason to require a feeder to be larger than the rating of the service-entrance conductors (present or not) or when portions of the dwelling's load are taken off of the feeder that is essentially an extension of the service-entrance conductors, except the feeder possesses overcurrent protection. Therefore, the feeder from the busbar lugs, protected by the main breaker, and feeds a subpanel in the house is not required to be larger than 2/0 AWG copper in accordance with section 310.15(B)(7)(3).

AMENDMENT 310.15(B)(7)

Amend NEC 2017, page 149:

(7) Single-Phase Dwelling Services and Feeders. For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, service and feeder conductors supplied by a single-phase, 120/240-volt system shall be permitted to be sized in accordance with 310.15(B)(7)(1) through (4).

For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, single-phase feeder conductors consisting of 2 ungrounded conductors and the neutral conductor from a 208Y/120 volt system shall be permitted to be sized in accordance with 310.15(B)(7)(1) through (3).

- (1) For a service rated 100 through 400 amperes, the service conductors supplying the entire load associated with a one-family dwelling, or the service conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than the ampacity as listed in Table 310.15(B)(7).
- (2) For a feeder rated 100 through 400 amperes, the feeder conductors supplying the entire load associated with a one-family dwelling, or the feeder conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than the ampacity as listed in Table 310.15(B)(7).
- (3) In no case shall a feeder for an individual dwelling unit be required to have an ampacity greater than that specified in 310.15(B)(7)(1) or (2).
- (4) Grounded conductors shall be permitted to be sized smaller than the ungrounded conductors, if the requirements of 220.61 and 230.42 for service conductors or the requirements of 215.2 and 220.61 for feeder conductors are met.

Where correction or adjustment factors are required by 310.15(B)(2) or (3), they shall be permitted to be applied to the ampacity associated with the temperature rating of the conductor.

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600