

NFPA 70®-Proposed 2020 Edition

National Electrical Code®

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Reference: Annex D3

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1. Revise Annex Example D3 to read as follows:

Example D3 Store Building

A store ~~50~~80 ft by 60 ft, or ~~3000~~4,800 ft², has 30 ft of show window. There are a total of 80 duplex receptacles. The service is 120/240 V, single phase 3-wire service. Actual connected lighting load is ~~8500~~7,000 VA, all of which for this example is considered continuous. All calculations are rounded up or down as permitted in 220.5(B).

*Calculated Load
(see 220.40)*

Noncontinuous Loads

Receptacle Load (see 220.44)

80 receptacles at 180 VA	14,400 VA
10,000 VA at 100%	10,000 VA
14,400 VA - 10,000 VA = 4,400 VA at 50%	<u>2,200 VA</u>
Subtotal	12,200 VA

Continuous Loads

General Lighting*

~~3000~~4,800 ft² at ~~3~~1.9 VA/ft² 9,000 9,120 VA

Show Window Lighting Load

30 ft at 200 VA/ft [see 220.14(G)] 6,000 VA

Outside Sign Circuit [see 220.14(F)] 1,200 VA

Subtotal 16,20016,320 VA

Subtotal from noncontinuous 12,200 VA

Total noncontinuous loads +
continuous loads = ~~28,400~~28,520 VA

*In the example, the actual connected lighting load at 125% (~~8500~~7,000 × 1.25 VA) is less than the load from Table 220.12, so the required minimum lighting load from Table 220.12 is used in the calculation. Had the actual lighting load × 125% been greater than the value calculated from Table 220.12, the actual connected lighting load would have been used.

Minimum Number of Branch Circuits Required

General Lighting: Branch circuits need only be installed to supply the actual connected load [see 210.11(B)].

~~8500~~7,000 VA × 1.25 = ~~10,625~~8,750 VA

~~10,625~~ 8,750 VA ÷ 240 V = 44 36.45 A for 3-wire, 120/240 V

8,750 VA ÷ 120 V = 72.92 A

The lighting load would be permitted to be served by 2-wire or 3-wire, 15- or 20-A circuits with combined capacity equal to $44 \underline{36}$ A or greater for 3-wire circuits or $88 \underline{73}$ A or greater for 2-wire circuits. The feeder capacity as well as the number of branch-circuit positions available for lighting circuits in the panelboard must reflect the full calculated load of $9000 \text{ VA} \times 1.25 = 11,250 \underline{9,120}$ VA. Lighting loads from Table 220.12 already include 125% for continuous load. See note at bottom of Table 220.12.

Show Window

$$6,000 \text{ VA} \times 1.25 = 7,500 \text{ VA}$$

$$7,500 \text{ VA} \div 240 \text{ V} = 31.\underline{25} \text{ A for 3-wire, 120/240 V}$$

$$\underline{7,500 \text{ VA} \div 120 \text{ V} = 62.5 \text{ A for 2-wire, 120 V}}$$

The show window lighting is permitted to be served by 2-wire or 3-wire circuits with a capacity equal to 31 A or greater for 3-wire circuits or $62 \underline{63}$ A or greater for 2-wire circuits.

Receptacles required by 210.62 are assumed to be included in the receptacle load above if these receptacles do not supply the show window lighting load.

Receptacles

Receptacle Load:

$$14,400 \text{ VA} \div 240 \text{ V} = 60 \text{ A for 3-wire, 120/240 V}$$

$$\underline{14,400 \text{ VA} \div 120 \text{ V} = 120 \text{ A for 2-wire, 120/240 V}}$$

The receptacle load would be permitted to be served by 2-wire or 3-wire circuits with a capacity equal to 60 A or greater for 3-wire circuits or 120 A or greater for 2-wire circuits.

Minimum Size Feeder (or Service) Overcurrent Protection
(see 215.3 or 230.90)

Subtotal noncontinuous loads	12,200 VA
Subtotal continuous loads <u>not from Table 220.12</u> at 125% (16,200 <u>7,200</u> VA $\times 1.25$) (sign and show window)	20,250 <u>9,000</u> VA
<u>Subtotal of calculated continuous loads with 125% already included</u> Total	32,450 <u>9,120</u> VA
Total	30,320 <u>30,320</u> VA

$$\underline{32,450 \underline{30,320} \text{ VA} \div 240 \text{ V} = 135 \underline{126} \text{ A}}$$

The next higher standard size is 150 A (see 240.6).

Minimum Size Feeders (or Service Conductors) Required
[see 215.2, 230.42(A)]

For 120/240 V, 3-wire system,
 $32,450 \underline{30,320} \text{ VA} \div 240 \text{ V} = 135 \underline{126} \text{ A}$ Service or feeder conductor is ~~1/0~~ 1 AWG Cu in accordance with 215.3 and Table 310.16 (with 75°C terminations).

Substantiation: Because revisions to Article 220 were finalized late in the Second Draft meeting, there was not enough time to correctly revise the Example. This TIA will revise the necessary part of example to coordinate with the changes made to Article 220. The square foot values used for the store size were changed in order to preserve the original intent of Example D3 which was for the calculated load to be less than the required connected load.

Emergency Nature: The standard contains an error or an omission that was overlooked during the regular revision process.

The changes proposed in the TIA are necessary to correctly depict the application of the requirements in Article 220. These important revisions to the Example will eliminate confusion for readers and provide the correct guidance for the application of the required calculations.