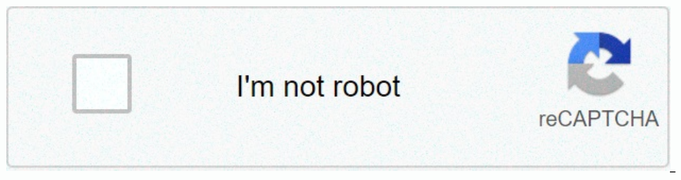

Continue

Nec 2017 table 310.16

 The choice of the correct full-conductor involves referring to the chapter of more than one component and more than one national electricity law (NEC). The following questions must be answered before selecting the wires. What is the lowest temperature rating for all connected terminals, conductors or devices? What is the associated load or what is the calculated load in accordance with Article 220? Is the load or any part of the load a continuous load? What is the maximum ambient temperature? How many power wires are on a racetrack or cable? Table 310.15(B)(16) shows the maximum permissible amperes of insulated conductors of a size not exceeding 2 000 volts (V). (Before the 2011 edition of the Code of Conduct, this table was Table 310.16). Table 310.15(B)(16) shows the columns of copper and aluminium wires. Ampacities of copper-clad aluminium wires are in the same columns as aluminium wires. Both types of conductors are divided into three categories: 60 °C (140 °F), 75 °C (167 °F) and 90 °C (194 °F). Wire sizes range from 18 AWG to 2000 kcmil. The equivalent data for single-insulation conductors are given in Table 310.15(B)(17) (formerly Table 310.17). The ampacities in Table 310.15(B)(16) are based on up to three power lines on a racetrack, cable or ground (buried directly). The amps are also based on an ambient temperature of 30 °C. Ampacities vary depending on both the type of conductor and the insulation characteristics (see Figure 1). Copper wires of the same size have three different permissible amps. The same applies to aluminium (and copper-clad aluminium) conductors. Maximum permissible ampactities depend on the temperature rating of the conductor. For example, for a 3 AWG copper conductor with a temperature value of 60 °C, the maximum permissible ampere is 85 amps (A). The maximum permissible amperity of the same 3 AWG copper conductor at 75 °C is 100A. If the temperature of the copper conductor 3 AWG is 90°C, the permissible ampereness is 115A (see Figure 2). Table 310.104(A) contains information on conductors classified as 600 V. Before the 2011 edition of the Code of Conduct, this table was Table 310.13(A). The wire data in this table includes trade name, type number, maximum operating temperature, operating regulations, insulation, insulation thickness and exterior cover anywhere). The conductor application and insulation of conductors over 600 V are set out in Tables 310.13(B) to (E). Type THHN building wire is a universal conductor used throughout the construction industry. The maximum operating temperature of this conductor is 90 °C. Although the conductor has insulation at 90 °C, amperity is not automatically selected from the 90 °C column. On the other hand, the column suitable for the conductor's ampere selection depends on the temperature classification of the endpoints (or connection points). In accordance with point 110.14(C), the amperity of the conductor shall be selected and coordinated in such a way that the lowest temperature value of the connected headless, conductor or device is not exceeded. The determination of the provisions for the termination of equipment shall be based on point 110.14(C)(1)(a) or point C(1)(b). Although point 110.14(C)(1)(a) covers circuits classified as not more than 100A or marked as 14 AWG for 1 AWG conductor, 110.14(C)(1)(b) covers circuits classified as more than 100 A or marked as more than 1 AWG conductors. If the device is not listed and otherwise marked, the ampae of the conductors used to determine the provisions for the termination of equipment are based on Table 310.15(B)(16), as duly modified by point 310.15(B)(7). The conductor has at least two terminals or terminals. Each dismissal has a temperature rating. If at least one temperature classification is not known, use the default ratings in point 110.14(C)(1)(a) or (C)(1)(b). The temperature limitations of the conductor can be compared to the strength of the chain. The chain is only as strong as its weakest link. For example, at one end of the 90 °C conductor there is a 60 °C terminal and the other has a 75 °C terminal. The weakest link in this example is the end of 60 °C (see Figure 3). Circuits with a nominal value of 100A or less For circuits up to 100A or less, there are four provisions marked before 100A or less. The choice of conductor must already be based on one of these four provisions. The first provision instructs the use of a conductor at 60 °C. The maximum amperity of the 60 °C conductor is listed in

the column of 60 °C in Table 310.15(B)(16). The first provision is very limited because the only conductors with a temperature of 60 °C are TW and UF types. The type of wiring (MTW) of machine tools is also a wet 60 °C classification. In accordance with the second provision of point 110.14(C)(1)(a), a conductor with a higher temperature may be used, provided that the amperity of such conductors is determined by the amperity of 60 °C of the conductor size used. If the terminal is either 60 °C or unknown, the maximum amperity of the conductor is the amperification mentioned in the 60 °C column, regardless of the insulation value of the conductor. For example, at the other end of the THHN conductor is 60 °C and the other terminal of 75 °C. Because one. One. the temperature of the connection points is 60 °C, the amperity of the conductor shall not exceed the classification indicated in the column of 60 °C (see Figure 4). The third provision of paragraph 110.14(C)(1)(a) states that conductors with higher temperature ratings may be installed if the device is listed and identified for use with such conductors. This means that the ampere of the 75 °C conductor may be based on a column of 75 °C if the temperature of all the heads is at least 75 °C. This also means that the ampere of the 90 °C conductor may be based on a column of 90 °C, if all the majors are classified at least 90 °C. Be careful when using a column of 90 °C, as no devices are listed and have not been identified for use with 90°C conductors other than individual ropes, connector wires and devices listed for use above 600 V. This third provision of point 110.14(C)(a) also means that the amperity of a 90 °C conductor may be based on a column of 75 °C, provided that all majors are classified at least 75 °C. For example, at one end of the THHN conductor there is a terminal of 75 °C and on the other there is a terminal of 60/75 °C. A temperature value of 60/75°C means that the device is marked with both 60°C and 75°C for conductors; It is therefore permissible to use a 75 °C rating if the temperature of the installed conductor is at least 75 °C. Since the classification of all the contact points in this example is at least 75 °C, the ampereness of the conductor may be based on a column of 75 °C (see Figure 5). Next month's Code in Focus will continue to discuss the restrictions on redundancy temperatures. MILLER, owner of Lighthouse Educational Services, teaches classes and seminars on the electrical industry. He is the author of the Illustrated Guide to the National Electricity Act and the Electrician Exam Manual. He can be reached at 615.333.3336, charles@charlesRmiller.com and www.charlesRmiller.com. Code change summary: The reorganisation of Article 310 will lead to the restoration of the most commonly used ampere table's beloved title. For 9 years now, the electric community has had a mouthful every time the most commonly used amputation table was mentioned in a conversation or discussed during a seminar. The ampere table most commonly used in the 2008 NEC and before that was Table 310.16. Simple enough. In the context of the 2011 NEC restructuring, Table 310.16 was re-mapped Table 310.15(B)(16). Table 310.16 was so well known before the 2011 code change that each code cycle since then, including the 2017 NEC, has been at the top of the table with the following reminder: Table 310.15(B)(16) (formerly Table 310.16). In the 2020 NEC, in connection with the restructuring from Article 310 to the new Article 311, the amperity table 310.15(B)(16) has recovered the old title and now, once again, Table 310.16. In addition, the note below the table has been reformatted and the table header has been significantly shortened. See code language below. Below is a preview of the NEC. For more information about the NFPA.ORG, see the actual text of the NEC. Once you are there, click on their link to free access to the 2020 NEC version of NFPA 70. Code language for 2017: Table 310.15(B)(16) (formerly Table 310.16) Permissible ampacities of insulated conductors Up to 2000 volts, 60°C to 90°C (140°F to 194°F), up to three-current conductors in raceway, cable or ground (directly buried), based on ambient temperature 30°C (86°F)* 2020 Code Language: Table 310.16 Ampactions of insulated conductors with up to three current conductors on the racetrack, cable, or Earth (directly buried) amperity based on NEC® Table 310.15(B)(16) (formerly Table 310.16) Permissible ampacities of insulated conductors Rated Up to 2000 volts, 60°. -90°C (140°-194°F), up to three power cords in raceway, cable or ground (directly buried), Based on ambient temperature 30°C (86°F).*NOTE: Annex C 2017 NEC must be filled from the pipe. For more information on the temperature ratings for ending equipment, see NEC 110.14(C). Size temperature rating of the conductor. (See Table 310.104(A). Size AWG or kcmil 60°C (140°F) 75°C (167°F) 90°C (194°F) 60°C (140°F) 75°C (167°F) 90°C (194°F) AWG or kcmil Types TW, UF Types RHW, THHW, THW, THWN, XHHW, USE, ZW Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2 Types TW, UF Types RHW, THHW, THW, THWN, XHHW, USE Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2 Copper Aluminum or Copper-Clad Aluminum 18* 16* 14 * 12 * 10 * 8 — — 15 20 30 40 — — 20 25 35 50 14 18 25 30 40 55 — — — 15 25 35 — — — 20 30 40 — — — 25 35 45 — — — 12 * 10 * 8 6 4 3 2 1 55 70 85 95 110 65 85 100 115 130 75 95 115 130 145 40 55 65 75 85 50 65 75 90 100 55 75 85 100 115 6 4 3 2 1 1/0 2/0 3/0 4/0 125 145 165 195 150 175 200 230 170 145 165 195 100 115 130 150 120 135 155 180 135 150 175 205 1/0 2/0 3/0 4/0 250 300 350 400 500 215 240 260 280 320 255 285 310 335 380 290 320 350 380 430 170 195 210 225 260 205 230 250 270 310 230 260 280 305 350 250 300 350 400 500 600 700 750 800 900 350 385 400 410 435 420 460 475 490 520 475 520 535 555 585 285 315 320 330 355 340 375 385 395 425 385 425 435 445 480 600 700 750 800 900 1000 1250 1500 1750 2000 455 495 525 545 555 545 590 625 650 655 615 665 705 735 750 375 405 435 455 470 445 485 520 545 560 500 545 585 615 630 1000 1250 1500 1750 2000 2000