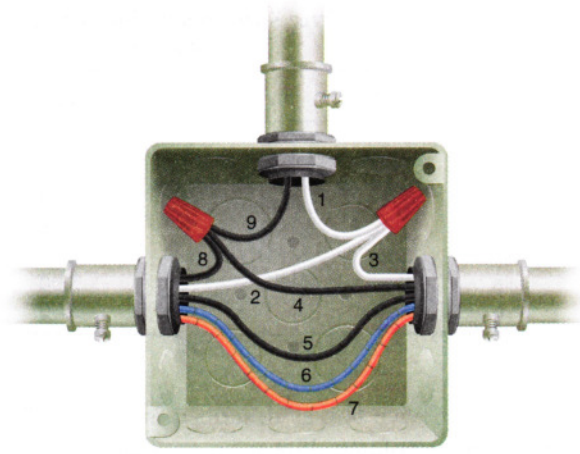
Calculation Example 1

For this example, as shown in Exhibit 314.1, the box does not contain any cable clamps, support fittings, devices, or equipment grounding conductors (EGCs).

Solution

To determine the minimum standard-sized, square, metal box for the number of 12 AWG conductors being installed, count the conductors and compare the total to the maximum number of conductors permitted by Table 314.16(A). Each conductor running through the box without a splice is counted as one conductor, and each other conductor is counted as one conductor. Therefore, the total conductor count is nine. Table 314.16(A) indicates that the maximum fill for a standard 4 in. × 1½ in. square box is nine 12 AWG conductors. The minimum standard square box size is 21 in.^{3}



Standard 4 in. × 1½ in. square box (21.0 in.^{3})

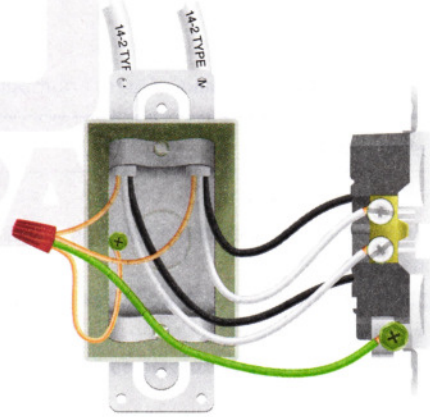
EXHIBIT 314.1 A standard-sized square box containing no fittings or devices, such as luminaire studs, cable clamps, switches, receptacles, or EGCs.

Calculation Example 2

The standard method for determining adequate box size calculates the total box volume first and then subtracts the total box fill to ensure compliance. Using this method, determine whether the box in Exhibit 314.2 is adequately sized.

Solution

Table 314.16(A) shows the minimum volume of a standard 3 in. × 2 in. × 3½ in. device box to be 18 in.^{3} The box fill for this situation as given in Commentary Table 314.2 is 16 in.^{3} Because the total box fill of 16 in.^{3} is less than the 18 in.^{3} total box volume, the box is adequately sized.



Standard 3 in. × 2 in. × 3½ in. device box (18 in.^{3})

EXHIBIT 314.2 A standard-sized device box containing a device and conductors requiring deductions.

COMMENTARY TABLE 314.2 Total Box Fill for Calculation Example 2

Items Contained Within Box	Volume Allowance	Unit Volume Based on Table 314.16(B)(1) (in.^{3})	Total Box Fill (in.^{3})
4 conductors	4 volume allowances for 14 AWG conductors	2.00	8.00
1 clamp	1 volume allowance (based on 14 AWG conductors)	2.00	2.00
1 device	2 volume allowances (based on 14 AWG conductors)	2.00	4.00
EGCs (not over four)	1 volume allowance (based on 14 AWG conductors)	2.00	2.00
Total			16.00