

Use of Service Entrance Cable (SE) for Interior Installations

What is the difference between an SE Cable and a USE Cable?

National Electrical Code (NEC) Article 338 addresses service entrance cables and there are two types of service-entrance cables. Type SE having a flame-retardant, moisture-resistant covering and Type USE which is identified for underground use with a moisture-resistant covering, but is not required to have the flame-retardant covering.

All service-entrance cable is rated 600V and is listed in sizes 14 AWG and larger for copper and 12 AWG and larger for aluminum or copper-clad aluminum conductors.

The lettering “SE” on a cable indicates the cable outer jacket and the internal conductors are designed for above-ground installations and are listed for locations where the cable jacket and internal conductors are exposed to the sun in wet locations.

Type SE cable is made up of either: Type RHW, RHW-2, XHHW, XHHW-2, THWN or THWN-2 insulated conductors, and the outer jacket of the cable is flame-retardant.

Type SE cable containing two or more conductors is permitted to have one conductor that is uninsulated.

Types USE and USE-2 cables are designed and listed for underground installations including direct burial and available in both single-conductor and multi-conductor cables. Multi-conductor Type USE cable contains conductors with insulation equivalent to RHW or XHHW with the conductors rated at 90C in a damp or dry locations but only 75C for a wet application. Similarly, Type USE-2 cable contains conductors with insulation equivalent to RHW-2 or XHHW-2 and is rated at 90C in a wet, damp or dry installation.

Type USE cable, containing two or more conductors, is permitted to have one conductor that is uninsulated.

Can Type SE Cable be installed in the interior of a building?

Answer: YES

Type SE cable is often used for interior wiring to supply heating and cooling equipment, appliance branch circuits and for feeders to subpanels. NEC 338.10 (B)(4) requires that when SE cable is installed as interior wiring it has to comply with all of Part II of Article 334, except for the ampacity requirements in 334.80.

The link to NEC Article 334 part II brings in all the installation requirements for Non-Metallic Sheathed Cable (Type NM). However, Type SE cable installations are not required to meet the ampacity adjustment rules of 334.80 which apply to Type NM cable installations.

The ampacity of conductors used in Type SE service-entrance cable used for interior wiring can be rated at 75C (except when SE cables smaller than 10 AWG are installed in thermal insulation). SE cable has a 75C rating because the insulation permitted in SE and SEU cable are type RHW, RHW-2, XHHW, XHHW-2, THWN or THWN-2.

For type SE cables with ungrounded conductors size 10 AWG and smaller, where installed in thermal insulation, the ampacity shall not exceed the 60C rating. The thermal insulation covering the cable does not allow the heat from the conductor to be cooled by surrounding air. To determine the ampacity use the 60C rating column from NEC Table 310.15(B)(16).

If the ampacity must be adjusted or corrected according to NECC 310.15, the 90C rating of the XHHW conductors inside the cable can be used as the starting point for any required adjustment. In the end, the conductor ampacity rating cannot be greater than the 60°C rating column from NEC Table 310.15(B)(16).