

# NATIONAL ELECTRICAL CODE®

## 300-5. Underground Installations.

(a) **Minimum Cover Requirements.** Direct buried cable or conduit or other raceways shall be installed to meet the minimum cover requirements of Table 300-5.

(b) **Grounding.** All underground installations shall be grounded and bonded in accordance with Article 250 of this Code.

(c) **Underground Cables Under Buildings.** Underground cable installed under a building shall be in a raceway that is extended beyond the outside walls of the building.

(d) **Protection from Damage.** Direct buried conductors and cables emerging from the ground shall be protected by enclosures or raceways extending from the minimum cover distance required by Section 300-5(a) below grade to a point at least 8 feet (2.44 m) above finished grade. In no case shall the protection be required to exceed 18 inches (457 mm) below finished grade.

Conductors entering a building shall be protected to the point of entrance.

Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, Schedule 80 rigid nonmetallic conduit, or equivalent.

(e) **Splices and Taps.** Direct buried conductors or cables shall be permitted to be spliced or tapped without the use of splice boxes. The splices or taps shall be made by approved methods and with identified materials.

(f) **Backfill.** Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where materials may damage raceways, cables, or other substructures or prevent adequate compaction of fill or contribute to corrosion of raceways, cables, or other substructures.

Where necessary to prevent physical damage to the raceway or cable, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.

(g) **Raceway Seals.** Conduits or raceways through which moisture may contact energized live parts shall be sealed or plugged at either or both ends.

(FPN): Presence of hazardous gases or vapors may also necessitate sealing of underground conduits or raceways entering buildings.

(h) **Bushing.** A bushing, or terminal fitting, with an integral bushed opening shall be used at the end of a conduit or other raceway that terminates underground where the conductors or cables emerge as a direct burial wiring method. A seal incorporating the physical protection characteristics of a bushing shall be permitted to be used in lieu of a bushing.

(i) **Single Conductors.** All conductors of the same circuit and, where used, the neutral and all equipment grounding conductors shall be installed in the same raceway or shall be installed in close proximity in the same trench.

*Exception No. 1: Conductors in parallel in raceways shall be permitted, but each raceway shall contain all conductors of the same circuit including grounding conductors.*

*Exception No. 2: Isolated phase installations shall be permitted in non-metallic raceways in close proximity where conductors are paralleled as permitted in Section 310-4 and the conditions of Section 300-20 are met.*

Table 300-5. Minimum Cover Requirements, 0 to 600 Volts, Nominal, Burial in inches

(Cover is defined as the shortest distance measured between a point on the top surface of any direct buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.)

**Type of Wiring Method or Circuit**

<b>Location of Wiring Method or Circuit</b>	<b>1 Direct Burial Cables or Conductor</b>	<b>2 Rigid Metal Conduit or Intermediate Metal Conduit</b>	<b>3 Nonmetallic Raceways Listed for Direct Burial without Concrete Encasement or Other Approved Raceways</b>	<b>4 Residential Branch Circuits Rated 120 Volts or less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes</b>	<b>5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More than 30 Volts and Installed with Type UF or in Other Identified Cable or Raceway</b>
All Locations Not Specified Below	24	6	18	12	6
In Trench Below 2-Inch Thick Concrete or Equivalent	18	6	12	6	6
Under a Building	0 (In Raceway Only)	0	0	0 (In Raceway Only)	0 (In Raceway Only)
Under Minimum of 4-Inch Thick Concrete Exterior Slab with No Vehicular Traffic and the Slab Extending Not Less than 6 Inches beyond the Underground Installation	18	4	4	6 (Direct Burial) 4 (In Raceway)	6 (Direct Burial) 4 (In Raceway)
Under Streets, Highways, Roads, Alleys, Driveways, and Parking Lots	24	24	24	24	24
One- and Two-Family Dwelling Driveways and Outdoor Parking Areas, and Used Only for Dwelling- Related Purposes	18	18	18	12	18
In or under Airport Runways, Including Adjacent Areas Where Trespassing Prohibited	18	18	18	18	18
In Solid Rock Where Covered by Minimum of 2 Inches Concrete Extending Down to Rock	2 (In Raceway Only)	2	2	2 (In Raceway Only)	2 (In Raceway Only)

Note 1. For SI units: one inch = 25.4 millimeters

Note 2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 2 inches thick.

Note 3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.

Note 4. Where one of the wiring method types listed in columns 1-3 is combined with one of the circuit types in columns 4 and 5, the shallower depth of burial shall be permitted.

430-102. **Location.**

(a) **Controller.** A disconnecting means shall be located in sight from the controller location and shall disconnect the controller.

*Exception No. 1: For motor circuits over 600 volts, nominal, a controller disconnecting means capable of being locked in the open position shall be permitted to be out of sight of the controller, provided the controller is marked with a warning label giving the location of the disconnecting means.*

*Exception No. 2: A single disconnecting means shall be permitted to be located adjacent to a group of coordinated controllers mounted adjacent one to each other on a multimotor continuous process machine.*

(b) **Motor.** A disconnecting means shall be located in sight from the motor location and the driven machinery location.

*Exception: Where the disconnecting means provided in accordance with Section 430-102(a) is capable of being locked in the open position.*

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