

IEEE STANDARDS ASSOCIATION



Part 3: Safety Rules for the Installation and Maintenance of Underground Electric Supply and Communication Lines

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PART 3 UNDERGROUND LINES



313. Inspection and tests of lines and equipment

A. When in service

5. Corrections

a. Lines and equipment with recorded conditions or defects that would reasonably be expected to endanger human life or property shall be promptly corrected, disconnected, or isolated.

Section 32. Underground conduit systems

Rule 320B5. Gas and other lines that transport flammable material



The present rule requires not less than a 12 inch separation between communication and supply conduits and gas or other lines that transport flammable material.

Section 32. Underground conduit systems

Rule 320B5. Gas and other lines that transport flammable material



An exception was added in the 2017 NESC to allow less than 12 inches separation. The supply cable is limited to not more than 600 volts between conductors and is required to have supplemental mechanical protection, if needed, to limit the likelihood detrimental heat transfer to gas lines or lines that transport flammable materials.

Section 32. Underground conduit systems

Rule 323E Vault and utility tunnel access



Rule 323E3 requires access doors to vaults and tunnels to be locked unless qualified person(s) are in attendance to restrict entry to unqualified persons.

The 2017 NESC edition replaces “qualified” and “unqualified” with “authorized” and “unauthorized”

Section 35. Direct-buried cable and cable in duct not part of a conduit system



The present rules require jacketed underground cable concentric neutrals to be effectively grounded at one quarter mile (1,320 feet) intervals or at eighth mile (660 feet) intervals if the random separation rules are applicable.

The present rules also require bonding between supply cable concentric neutrals and communication cable shields at 1,000 foot intervals if the random separation rules apply.

Section 35. Direct-buried cable and cable in duct not part of a conduit system



Where the aboveground equipment spacing does not meet these requirements, the required grounding of the concentric neutral or bonding between supply and communication cables requires the cable jackets to be removed, the connection to a grounding electrode made, the cables reinsulated and buried underground.

For cables in commercial parks or in areas where underground cables are routinely installed in duct, meeting these requirements may require cutting into the duct if the interval location is not suitable for an above or below ground termination device.

Section 35. Direct-buried cable and cable in duct not part of a conduit system



Revisions in the 2017 NESC will allow grounding and bonding at locations where the concentric neutral is normally accessible (pad mounted equipment or handhole) nearest to the required grounding interval, 1,320 feet, or 660 feet and 1,000 feet if the random separation rules apply.

See Rules 314C1, 314C2, 354D1g, and 354D3b

Rule 354. Random separation – Separation less than 12 inches from underground structures or cables



354D3. Insulating jacketed grounded neutral supply cable

Each phase conductor of a multi-grounded supply system operating above 300 V to ground and having an overall insulating jacket shall have an effectively grounded copper concentric conductor meeting all of the following requirements:

- a. **A conductance not less than one half that of the phase conductor.**

This requirement practically eliminates the use of 3 phase cables in direct buried systems.

Rule 354. Random separation – Separation less than 12 inches from underground structures or cables



This requirement practically eliminates the use of 3 phase cables in direct buried systems.

- Three phase cables normally have one third size neutrals.
- Recent studies show that a one third size neutral will carry the phase to ground fault current needed to cause the protective device to open and clear the faulted cable.

Rule 354D3a was deleted.



384. Grounding and bonding

C. Bonding should be provided between all aboveground metallic supply and communications enclosures that are separated by a distance of 1.8 m (6 ft) or less. **For the purpose of this rule, pole grounds are not required to be bonded to the communication enclosure.**

CPs requesting revising the bonding requirement to include pole grounds have been rejected based on a study and paper done by an expert on system grounding.



384. Grounding and bonding

The rule does not prohibit the practice of bonding between communication pedestals and supply pole grounds but, based on safety issues raised by the study, does not require it.

The following note was added to the rule in the 2017 edition of the NESC.

NOTE: This rule does not prohibit bonding communication metallic enclosures to supply pole grounds, provided all affected parties are in agreement.