National Electrical Safety Code®

Interpretation

Section 34.
Cable in underground structures

Rule 354D Random separation—Separation less than 300 mm (12 in) from underground structures or other cables—Supply and communication cables or conductors
(2012 Edition, pp. 253-254)
(9 December 2013) IR573

Question: Rule 354D states that in order for supply and communications lines to be in random separation (less than 12 inches from each other), the provisions of rule 354D1 are met along with either rule 354D2, rule 354D3, or rule 354D4. Rule 354D1e states that the communications cable have a continuous shield and rule 354D1g states that the communications cable shield be bonded to the effectively grounded supply conductor at intervals less than or equal to 300 m (1000 ft).

If rule 354D4 (insulated neutral supply in non-metallic conduit) was employed along with the provisions of rule 354D1, then the communications cable shield must be bonded to the neutral. How would that be possible if the neutral/supply was enclosed in conduit? The same problem would exist if the communications cable was in conduit instead of the neutral/supply, or was also in conduit.

If either the neutral/supply conductors, communications cable, or both were in non-metallic conduit and less than 12 in apart, would bonding between the facilities, while in the underground, be necessary?

Discussion: There seems to be conflicts between rule 354D1; and rule 354D2, rule 354D3 or rule 354D4. In addition, the general concept of what variations are possible with parallel runs of supply conductors and communications conductors under rule 354D is not clear.

All of the above scenarios are based on assumptions that the communications cable would contain metallic conductors and have adequate protection against potential impressed voltages/currents.

Interpretation

This interpretation is based on the assumption that the references to "conduit" are to "duct" that is not part of a conduit system. If so, section 35 applies to this request for interpretation. See the section 35 title and rule 350G for application and the *NOTE* under the title for terminology.

Your statements identifying the applicable rules are correct. However, note that additional grounding is required (not less than eight grounds in each one mile segment of the random lay section, not including grounds at individual services) if the supply system operates at over 300 V to ground, and each phase conductor has an overall insulating jacket. See rule 354D3c and rule 354D4.

In answer to your question, these random lay bonding/grounding rules apply not only to direct-buried supply/communication cables, but also to supply and/or communication cables in duct. If the systems are grounded at NESC-specified intervals, bonding between the systems as specified in rule 354D1g should not be a problem.
