



## Construction Codebooks and Estimating Guides

### National Electrical Code Explanations

#### National Electrical Code Top Ten Tips: Article 300, Wiring Methods

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These are the 10 NEC Article 300 items we deem most important, based on the pervasiveness of confusion and the potential costs of same.

The language throughout NEC Article 300 misplaces the word "only," but the meaning where this is misused is still clear if you interpolate just a bit.

1. NEC Article 300.3 addresses conductors and enclosures. (B) requires all conductors of the same circuit to be in the same wireway. One reason for this is the basic physics involved when the electromagnetic fields of conductors interact. Many other reasons make this requirement of great practical value. An exception to it does exist, and there are sometimes practical reasons for taking advantage of that exception. (C) allows conductors at or below 600V to be mixed in the same enclosure, cable, or raceway regardless of their voltage. That mixing is safe from the standpoint of the NEC, but the more of it you do the higher your risk of misoperation and other problems. Good engineering practice demands separating wiring systems as much as is practical. Thus, you would run 5V signal wires in one wireway, 120V control wires in another, and 480V power in yet another—even though you might terminate them all in one control cabinet. Even inside the cabinet, you want to route and bundle the wires so as to maintain the maximum separation that is reasonably attainable. Motor drive power and output wiring deserves extra attention in this regard.
2. NEC Article 300.4 addresses protection against physical damage. Many folks who run nonmetallic-sheathed cables (e.g., Romex) don't consider adding protection. In residential applications, this is usually unnecessary, but a hole drilled off-center could easily leave the wiring susceptible to puncture from a nail or screw driven to support shelving, cabinets, or other wall-mounted objects.
3. NEC Table 300.5 provides the minimum cover requirements for buried cable of 0 to 600V.
4. NEC Article 300.8. Raceways or cable trays containing electrical conductors cannot contain elements of other systems—no water pipes, gas pipes, or any other non-electrical system elements can run in those electrical wireways. The intent of the NEC Article 300.8 also means, for example, running Romex through an A/C duct is a Code violation.
5. NEC Article 300.11 addresses the issues of securing and supporting. Cables and raceways must have their own support—independent of other systems. Their supporting structures cannot be piggybacked onto other supports. For example, you can't hang conduit from ceiling grids, but you can clamp to the I-beams or rafters to hang rod and strut specifically for the conduit. (C) prohibits using wireways to support other wireways, cables, or non-electrical equipment. Thus, using cable ties to secure the wiring for that new PA system to conduit is a Code violation. A chief concern of NEC Article 300.11 is that electrical wireways be independent. They may share a support—for example, you can strap multiple conduits to a strut suspended by two rods. But, you cannot then strap a strut to those conduits and hang a secondary set of rods to support another set of conduit or anything else.
6. NEC Article 300.12 requires mechanical continuity of raceways and cable sheaths.
7. NEC Article 300.13 requires mechanical and electrical continuity for conductors in raceways. In other words, you cannot have a splice in a raceway (but you can have it in a box or conduit body that has an accessible cover). NEC Article 300.5 does allow splices in direct-buried conductors. That's because you can use instruments to locate the splices and you can excavate to get to them. However, it's much more difficult to do maintenance and inspection on conductors that are in raceways.
8. NEC Article 300.15 explains the exceptions noted in our comments in the preceding item, and it addresses similar issues in 13 subheadings.
9. NEC Article 300.19 and NEC Table 300.19(A) provide specifics on conductor and raceway supports.
10. NEC Article 300.20 requires conductors to be grouped together to reduce heating (this takes advantage of magnetic field