

THE  
**100 Q&A**  
**CHEAT SHEET**

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VOLUME 1

*100 NEC Questions Every Electrician  
Should Be Able to Answer Cold*

**ARTICLES 90-480**

Aligned to the 2026 National Electrical Code

*A free companion to Michael Hamilton's Illustrated Guide  
to Understanding the National Electrical Code, Vol. 1*

**OAKWOOD PRESS**

# A Note Before You Start

There are two kinds of Code knowledge.

The first kind is knowing where to look. You've got the book, you know roughly which chapter holds the answer, and given ten minutes and a quiet truck cab, you'll find it.

The second kind is knowing it cold. The inspector asks why the receptacle is where it is. The GC asks whether the panel location is going to be a problem before the drywall goes up. The exam gives you ninety seconds a question. In those moments, the second kind is the only kind that counts.

This cheat sheet is built for the second kind.

It's 100 questions — the ones that come up on inspections, on exams, and in the arguments that happen on every job site in America. Each one has a direct answer, and most have a short note on *why* the rule exists, because a rule you understand is a rule you can still apply when the situation in front of you doesn't match the example in the book.

It is not a replacement for the Code. It's not a replacement for the full Illustrated Guide either. It's the thing you read on the drive in, the night before the exam, or the ten minutes before an inspection when you want the fundamentals sharp.

We put real work into it. No filler, no padding, no forty pages of "electricity is dangerous." Just the answers.

Take what's useful. Argue with the rest.

— The Oakwood Press Team

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## Read This First

Three things, quickly, because they matter.

### **1. The NEC is not automatically the law where you work.**

The National Electrical Code is a model standard published by the NFPA. It only becomes enforceable when a state, county, or city adopts it — and jurisdictions adopt on their own schedule, often with local amendments. Plenty of the country is still working to the 2023 or even the 2020 edition while the 2026 rolls out. Your adopted edition plus your local amendments is the law you work to. Nothing else.

## **2. This document is a study aid, not a Code reference.**

Every answer here is written in our own words as an explanation of a requirement — not as a quotation of Code text. For the actual language, the actual tables, and the actual exceptions, you go to the NFPA 70 book itself. Nothing here overrides it, and nothing here overrides your AHJ.

## **3. Anything you install, you own.**

If you're not licensed and qualified to do the work, don't do the work. Verify before you install. When in doubt, call the inspector before the wire goes in the wall, not after.

With that out of the way — let's work.

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# **How to Use This**

Three ways, depending on what you need.

### **The 15-minute drill.**

Cover the answers. Read the question, say the answer out loud, then check. Anything you miss, mark it. Come back tomorrow and only do the marked ones. Three passes and the list gets very short.

### **Exam prep.**

Work one section a day for a week. On the last day, do all 100 in one sitting and time yourself. Licensing exams are Code exams — they don't test whether you've read the Code, they test whether you can *find and apply* it under pressure. Speed on the fundamentals buys you time on the calculations.

### **Field lookup.**

Skim the section headers, find the topic, get your answer, get back to work. Then verify it in the book before you commit anything to a wall.

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# **The Five Rules That Make the Code Readable**

Before the questions, five habits. These are worth more than any single answer in this document, because they apply to every article you'll ever open.

**Rule 1 — Read the scope first.**

Every article opens with a scope statement telling you what it covers. Half of all Code arguments are two people applying two different articles to the same installation. Check the scope and the argument usually ends.

**Rule 2 — "Shall" is mandatory. Everything else is negotiable.**

"Shall" means you must. "Shall not" means you can't. "Shall be permitted" means you may, but you don't have to — this is permission, not obligation, and misreading it costs people money on jobs where a cheaper compliant option was sitting right there.

**Rule 3 — Informational Notes are not enforceable.**

They're explanation. So are the Informative Annexes. Useful, often clarifying, occasionally the thing that finally makes a section make sense — but an inspector cannot write you up for violating one, and you can't use one to win an argument on its own.

**Rule 4 — Exceptions modify only the rule directly above them.**

And where there are several numbered exceptions, each stands alone. You don't have to satisfy all of them. You have to satisfy one.

**Rule 5 — Chapters 1 through 4 apply generally. Chapters 5, 6, and 7 modify them.**

General requirements first, then special occupancies, special equipment, and special conditions amend or supplement. Chapter 8 (communications) stands largely on its own. When a special-occupancy rule conflicts with a general rule, the special rule wins for that occupancy.

Get those five in your bones and the Code stops feeling like a wall of text and starts feeling like a system.

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# SECTION 1

## How the Code Works — Articles 90, 100 & 110

### Questions 1-15

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#### 1. What is the stated purpose of the NEC?

The practical safeguarding of persons and property from the hazards that arise from using electricity.

**Why it matters.** Note what's missing. It is not a design specification. It is not an instruction manual for untrained people. It is not intended to guarantee an efficient, convenient, or adequate installation — only a safe one. A Code-minimum installation can be a genuinely bad installation and still pass. That distinction is the entire reason good electricians exist.

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#### 2. Is the NEC law?

Not by itself. It's a model standard published by the National Fire Protection Association. It becomes enforceable only when a governmental body adopts it, and most adopt with amendments.

**Why it matters.** Two electricians in neighboring counties can both be right and both be doing it differently. Know your adopted edition and your local amendments before you quote a section number at anyone.

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#### 3. What do "shall," "shall not," and "shall be permitted" mean?

- **Shall** — mandatory. You must.
- **Shall not** — prohibited. You can't.
- **Shall be permitted** — allowed, but optional. You may.

**Why it matters.** Reading permission as obligation is the most common way electricians overbuild a job and lose a bid.

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#### 4. Are Informational Notes enforceable?

No. They are explanatory material only. The same applies to the Informative Annexes at the back of the book.

**Why it matters.** The 3% branch-circuit voltage drop figure that everyone quotes as gospel lives in Informational Note territory. It's excellent engineering practice. It is not, on its own, an enforceable requirement — unless your jurisdiction amended it in, which some have.

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#### 5. Who is the Authority Having Jurisdiction, and how much power do they actually have?

The AHJ is the organization, office, or individual responsible for enforcing the Code and approving equipment, materials, installations, and procedures. In practice, usually your electrical inspector.

Their authority includes interpreting the rules, approving equipment and methods, granting special permission, and waiving specific requirements where alternatives provide equivalent safety.

**Why it matters.** You can be technically correct and still fail. Build the relationship. Ask before you install, not after.

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#### 6. What's the difference between approved, listed, labeled, and identified?

- **Approved** — acceptable to the AHJ. That's the whole definition.
- **Listed** — included in a list published by a qualified testing organization that evaluates products and does periodic follow-up.
- **Labeled** — bears the mark of such an organization.
- **Identified** — recognizable as suitable for the specific purpose, function, use, environment, or application described.

**Why it matters.** "Listed" doesn't mean "approved." Something can be listed and still be wrong for your application, and the AHJ has the final say. And "identified for the purpose" is the phrase that trips people up most — a listed product used outside what it was identified for is a violation.

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## 7. Does the NEC cover the utility company's wiring?

Generally, no. Installations under the exclusive control of an electric utility for the purpose of generation, transformation, transmission, energy storage, or distribution fall outside the Code's scope.

**Why it matters.** The dividing line is the **service point** — where the utility's conductors connect to the premises wiring. Everything on the load side of that point is yours and the Code's. Everything on the line side belongs to the power company.

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## 8. What does 110.3(B) require — and what changed in 2026?

Equipment that is listed, labeled, or identified must be installed and used in accordance with the manufacturer's instructions.

The 2026 edition adds an important clarification: those instructions must comply with the NEC. A manufacturer can require *more* than the Code. A manufacturer cannot let you do *less*.

The 2026 edition also recognizes that instructions may be supplied as printed material, a QR code, or a web address for download.

**Why it matters.** "The paperwork went in the dumpster" is no longer a defense. The QR code on the equipment gets you to the instructions in thirty seconds, and the inspector has the same phone you do.

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## 9. What are the three dimensions of working space under 110.26?

- **Depth** — from Table 110.26(A)(1), based on the voltage to ground and which of three conditions exists. At 0–150V to ground, all three conditions require 3 ft. Above that, they diverge.
- **Width** — 30 in. or the width of the equipment, whichever is greater. The 30 in. doesn't have to be centered on the equipment, but the equipment must fit inside it, and doors or hinged panels must be able to open at least 90 degrees.
- **Height** — 6½ ft or the height of the equipment, whichever is greater.

**Why it matters.** A panel in a 24-inch closet fails on width even if the depth is generous. People measure depth and forget the other two.

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## 10. What are Conditions 1, 2, and 3?

- **Condition 1** — exposed live parts on one side of the working space, no live or grounded parts on the other.
- **Condition 2** — exposed live parts on one side, a grounded surface on the other. Concrete, brick, tile, and grounded metal all count as grounded surfaces.
- **Condition 3** — exposed live parts on both sides of the working space.

**Why it matters.** At 0-150V to ground it doesn't change your number — everything is 3 ft. Above 150V it changes everything, and a concrete block wall opposite the gear is the detail people miss most.

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## 11. Can you store anything in working space?

No. 110.26(B) requires the working space to be kept clear and states it is not to be used for storage.

**Why it matters.** This is one of the most frequently cited violations in commercial and industrial facilities, and the reason is that it isn't really an electrician's violation — it's a *facility's* violation. The mop bucket, the pallet of paper, the Christmas decorations. The infraction is the stuff being there. "It's only temporary" isn't a defense, and the person who gets hurt is the tech who couldn't step back fast enough.

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## 12. What changed about access and egress in the 2026 NEC?

The language on equipment doors got tightened. Open equipment doors are not permitted to impede access to or egress from the working space — and the 2026 edition now defines what "impede" means: access or egress is impeded if one or more simultaneously opened equipment doors reduce the working space access to less than 24 in. wide and 6½ ft high, where those doors are or can be opened 90 degrees.

**Why it matters.** Read that again — *are or can be*. It doesn't matter that the doors were shut at the time of inspection. Design the electrical room with every door swung wide open, or you'll be moving gear after the fact. In a room with switchgear down both sides of a corridor, this is not a paperwork change.

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## 13. What does 110.16 now require on an arc flash label?

The 2026 edition significantly expanded arc flash hazard marking for non-dwelling equipment and specified what the label has to say. Required content:

- Nominal system voltage
- Arc flash boundary
- Available incident energy, or the minimum required level of PPE
- The date the arc flash assessment was performed

The marking must be permanently affixed, must not be handwritten, and must be clearly visible to qualified persons before they open the equipment.

**Why it matters.** The date requirement is the sharp edge. A label with no date is a label nobody can trust, because the system may have been modified since. This change also pulls the NEC into closer alignment with NFPA 70E work practices.

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## 14. Why don't dwelling units need arc flash labels?

Because a 120/240V single-phase residential arc fault tends to self-extinguish. The waveform crosses zero twice per cycle, and at that voltage the arc generally doesn't re-strike. A three-phase arc fault, by contrast, is sustainable — there's always another phase at potential.

**Why it matters.** Understanding *why* is what lets you answer the follow-up question, which is the one the inspector or the exam actually asks.

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## 15. What are interrupting rating and short-circuit current rating, and how are they different?

- **Interrupting rating** (110.9) — the highest current at a rated voltage that a *device* is intended to safely interrupt. This belongs to breakers and fuses.
- **Short-circuit current rating** (110.10) — the maximum available fault current that an *assembly or component* can withstand without catastrophic damage. This belongs to panelboards, switchboards, controllers, and equipment.

**Why it matters.** A breaker with a 10 kAIC rating in a location with 22 kA available fault current is a bomb with a schedule. Both numbers have to be checked, and they're checked against different things.

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# SECTION 2

## Branch Circuits, GFCI & AFCI — Article 210

### Questions 16-34

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#### 16. What is a branch circuit?

The conductors between the final overcurrent protective device and the outlet or outlets it supplies.

**Why it matters.** "Final" is the operative word. Everything upstream of that last device is a feeder or service conductor, and it plays by different rules.

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#### 17. What's the difference between an outlet, a receptacle, and a device?

- **Outlet** — a point on the wiring system where current is taken to supply utilization equipment. A lighting outlet is an outlet. A hardwired disposal connection is an outlet.
- **Receptacle** — the contact device installed at the outlet for a plug.
- **Device** — a unit of the system that carries or controls electricity but doesn't consume it. Switches and receptacles are devices; luminaires are not.

**Why it matters.** When a rule says "outlets," it captures far more than plugs. AFCI requirements say "outlets or devices" — that's why your lighting is in scope.

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#### 18. How do you size branch-circuit conductors and overcurrent protection for a continuous load?

125% of the continuous load, plus 100% of the noncontinuous load. Apply it to both the conductor and the overcurrent device.

A **continuous load** is one where the maximum current is expected to continue for three hours or more.

**Why it matters.** Three hours is a low bar. Store lighting, office lighting, most commercial HVAC, and virtually all EV charging clear it easily.

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## 19. What are the small conductor rules in 240.4(D)?

After any correction and adjustment factors have been applied, overcurrent protection for small conductors is limited to:

- **14 AWG copper** — 15A
- **12 AWG copper** — 20A
- **10 AWG copper** — 30A
- **12 AWG aluminum or copper-clad aluminum** — 15A
- **10 AWG aluminum or copper-clad aluminum** — 25A

**Why it matters.** This rule overrides the ampacity tables. Table 310.16 will show you a higher number for 12 AWG at 90°C; you still can't put it on a 30A breaker for general use. The exceptions are specific and mostly live in Chapters 4 and 6 — motors, air conditioning, welders.

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## 20. What is the "next size up" rule in 240.4(B)?

Where the conductor ampacity doesn't correspond to a standard overcurrent device rating, you're permitted to use the next higher standard size — provided all three of these hold:

1. The conductors don't supply multi-outlet branch circuits feeding receptacles for cord-and-plug connected portable loads.
2. The conductor ampacity doesn't correspond to a standard rating.
3. The next higher standard rating doesn't exceed 800A.

**Why it matters.** Above 800A, you round *down*, not up. That single reversal is worth a question on almost every master exam.

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## 21. What are the standard overcurrent device ratings?

15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800 — and the list continues above that.

**Why it matters.** Additional standard ratings for fuses include 1, 3, 6, 10, and 601. And note that 240.6 is a list of *standard* ratings — it does not prohibit non-standard devices, it just defines which sizes the rounding rules point to.

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## 22. Where is GFCI protection required in a dwelling unit?

For 125V through 250V receptacles supplied by single-phase branch circuits rated 150V or less to ground, in:

- Bathrooms
- Garages
- Areas of accessory buildings not intended as habitable rooms and limited to storage, work, and similar uses
- Outdoors
- Crawl spaces at or below grade
- Basements
- Kitchens
- Within 6 ft of the top inside edge of the bowl of a sink
- Boathouses
- Within 6 ft of the outside edge of a bathtub or shower stall
- Laundry areas
- Indoor damp and wet locations

**Why it matters.** Two traps here. First, the bathroom requirement is *the room*, not a distance from the sink — a receptacle in the far corner of a large bathroom still needs it. Second, the sink rule is any sink in the dwelling. Wet bars, utility sinks, bar sinks — all in.

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## 23. What specifically changed in 210.8(A) in the 2026 NEC?

Garages and accessory buildings were split into separate list items. Previously they shared one entry; now garages stand alone and accessory buildings get their own item covering areas not intended as habitable rooms and limited to storage, work, and similar uses.

The exception covering factory-installed receptacles inside exhaust fan assemblies was also broadened — it previously applied only to bathroom exhaust fans and now applies to exhaust fans generally.

**Why it matters.** This is a renumbering trap. If you memorized "210.8(A)(7) is sinks," check the list again in the 2026 book. The items after the split shifted down.

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## 24. What changed for outdoor dwelling outlets in 2026?

The threshold in 210.8(F) rose from 50A to 60A. GFCI protection is now required for all outdoor outlets rated 60A or less located outside a dwelling unit, and the rule explicitly extends to the outside of dwelling garages, accessory buildings, and boathouses.

The exception for listed HVAC equipment sunsets on September 1, 2026.

**Why it matters.** This is the change most likely to cause you a callback in the next two years. Note it says *outlets*, not receptacles — your hardwired condensing unit and your pool heater are captured.

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## 25. Why has 210.8(F) been so contentious with HVAC contractors?

Because a lot of installed equipment has enough normal capacitive leakage current to trip a Class A GFCI device, which trips at roughly 4–6 mA. The Code gave manufacturers a runway to redesign. That runway is closing.

**Why it matters.** If a new condenser trips the GFCI on startup, the first move is not to remove the GFCI. It's to verify the equipment is listed for GFCI-protected supply and check the manufacturer's instructions — which, per 110.3(B), you now have no excuse for not having.

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## 26. Where is AFCI protection required in a dwelling unit?

On 120V single-phase 15A and 20A branch circuits supplying outlets or devices in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, and similar rooms or areas.

**Why it matters.** The list effectively covers every habitable space in a house. Where a location requires both AFCI and GFCI — kitchens and laundry being the obvious ones — a dual-function device is the clean answer.

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## 27. What changed for AFCI in the 2026 NEC?

The arc welding exception in 210.12(B) had its January 1, 2025 expiration date removed and its scope extended: an individual branch circuit supplying an outlet for arc welding equipment is exempt not only in the dwelling unit, but in garages and accessory buildings as well.

Notably, proposals to extend AFCI requirements into basements and garages did **not** pass this cycle.

**Why it matters.** Arcing is what a welder does for a living. Requiring an arc-fault device on that circuit was never going to work, and the committee finally made the fix permanent.

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## 28. What do you do when you extend or modify an existing branch circuit in an AFCI area?

Per 210.12(D), the circuit must be protected by either a listed combination-type AFCI at the origin of the branch circuit, or a listed outlet branch-circuit type AFCI at the first receptacle outlet of the existing circuit.

**Exception:** not required where the extension is 6 ft or less and no additional outlets or devices are added. The 6 ft is measured on conductors *outside* the enclosure — wire inside the box or cabinet doesn't count against you.

**Why it matters.** This is the rule that makes a fuse-box-to-panelboard swap workable. Land the new panel next to the old one, keep the extensions short, and you don't trigger a whole-house AFCI retrofit.

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## 29. How many small-appliance, laundry, and bathroom circuits does a dwelling need?

- At least **two** 20A small-appliance branch circuits for the kitchen, pantry, breakfast room, dining room, and similar areas
- At least **one** 20A laundry branch circuit
- At least **one** 20A bathroom branch circuit

**Why it matters.** "At least." Two small-appliance circuits is a floor, not a target, and in a modern kitchen it's usually not enough for the customer even though it's enough for the inspector.

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### 30. Can the bathroom receptacle circuit serve anything else?

It depends on how you run it. Two compliant options:

4. A 20A circuit serving **only** bathroom receptacle outlets — it can serve receptacles in more than one bathroom, but nothing else at all.
5. A 20A circuit supplying a **single** bathroom — it can then also serve other equipment within that same bathroom, such as the light and the fan.

**Why it matters.** What you can't do is run the fan and light in bathroom A off a circuit that also feeds the receptacle in bathroom B. Pick a lane.

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### 31. What is the 6-foot / 12-foot receptacle spacing rule?

In dwelling unit habitable rooms, receptacles are placed so that no point along the floor line of any wall space is more than 6 ft, measured horizontally, from a receptacle outlet.

Practically, that means receptacles no more than 12 ft apart along a wall, with one within 6 ft of each doorway or wall break.

Wall space includes any space 2 ft or more in width, the space occupied by fixed panels in walls, and fixed room dividers such as freestanding bar-type counters or railings.

**Why it matters.** The rule exists so that a 6-ft appliance cord reaches a receptacle from anywhere along the wall without an extension cord. Understand the intent and you'll never place them wrong.

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### 32. What are the kitchen countertop receptacle rules?

- A receptacle outlet is required at each wall countertop space 12 in. or wider.
- Receptacles are placed so that no point along the wall line is more than 24 in., measured horizontally, from a receptacle.
- Island and peninsular countertop spaces have their own provisions.

**Why it matters.** The 24-inch figure is the one people invert. It's 24 in. from any point *to* a receptacle — which works out to receptacles no more than 4 ft apart along the counter.

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### 33. What's new for receptacles below countertops in the 2026 NEC?

Receptacle outlets are now prohibited within 24 in. below the countertop surface — and the prohibition applies to both required wall-space receptacles and countertop receptacles.

**Why it matters.** This closes a loophole. The 2023 edition responded to Consumer Product Safety Commission data on children pulling appliance cords off island and peninsula counters and suffering burns — but the way it was written, you could still mount a receptacle on the side of the island just below the lip. Same hanging cord, same hazard. 2026 shuts it.

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### 34. Where are lighting outlets required in a dwelling?

At minimum, per 210.70:

- At least one wall-switch-controlled lighting outlet in every habitable room and bathroom
- At outdoor entrances and exits with grade-level access
- At stairways, with switching at each floor level where there are six or more risers between levels
- In attics, underfloor spaces, utility rooms, and basements used for storage or containing equipment requiring servicing — with the switch at the usual point of entry

**Why it matters.** The attic and crawl space requirement is triggered by *equipment requiring servicing*, not just storage. Put an air handler up there and you've created a lighting requirement.

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# SECTION 3

## Load Calculations — Article 120 (formerly Article 220)

### Questions 35-48

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#### 35. Where did Article 220 go?

It was relocated to **Article 120** in the 2026 NEC. Same subject — branch-circuit, feeder, and service load calculations — moved because load calculations apply generally to all installations rather than sitting inside the wiring-and-protection chapter.

Nearly every section number inside it changed.

**Why it matters.** This is the single most disruptive renumbering in the 2026 edition for working electricians. Every calculation cheat sheet, every set of shop notes, every "220.83 existing dwelling" reference in your head now points to the wrong place. There's a translation table at the back of this document.

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#### 36. Why did the NEC reorganize at all?

The Code's organizational framework dates to 1937. In 2022, the NFPA formed a task group to evaluate structural limitations and reorganize without changing technical requirements. The 2026 edition implements the first significant stage; further restructuring is anticipated for 2029, previewed in the new **Informative Annex L**.

**Why it matters.** If you're planning to buy Code books, understand that this is a multi-cycle project. The 2026 renumbering is the beginning, not the end.

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#### 37. What is the general lighting load per square foot for a dwelling now?

**2 VA per square foot** for general lighting and general-use receptacles — reduced from 3 VA.

**Why it matters.** The reduction came from Department of Energy studies on actual consumption in the LED era. Practically, it means calculated services come out smaller, which matters enormously when a homeowner wants to add EV charging to an existing 100A or 150A service.

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### **38. What VA do you add for small-appliance and laundry circuits?**

1,500 VA for each 20A small-appliance branch circuit — minimum two per dwelling unit — and 1,500 VA for each 20A laundry circuit, minimum one per dwelling unit.

**Why it matters.** You add them at the required minimum count even if the actual house has more, unless the extra circuits are actually installed. Count what's there.

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### **39. What changed in the optional dwelling unit calculation?**

The first tier dropped from 10 kVA to **8 kVA at 100%**, with the remainder at 40%.

**Why it matters.** A smaller first tier means more of the load falls into the 40% bucket, which lowers the calculated demand. Combined with the 2 VA/sq ft change, the 2026 optional method produces meaningfully smaller numbers than the 2023 method on the same house.

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### **40. How is EV charging handled in the optional method now?**

At **100% of the EVSE nameplate rating**, with no demand factor applied.

The 2026 edition also clarified that EVSE loads are calculated at 100%, not 125%, and allows an EVSE load to be taken as less than 7,200 W where nameplate data supports it.

**Why it matters.** People were applying the continuous-load 125% multiplier to EVSE inside a load calculation. That's double-counting — the 125% is already baked into how the branch circuit is sized. In the service calculation, it's 100%.

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### **41. How do you calculate floor area for a dwelling load calculation?**

Outside dimensions of the dwelling unit, excluding open porches, garages, and unused or unfinished spaces not adaptable for future use.

**Why it matters.** "Not adaptable for future use" is the judgment call. An unfinished basement with a poured floor and 8 ft ceilings is adaptable. A 30-inch crawl space is not.

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## 42. Heating or air conditioning — do you add both?

Neither. You use the **larger** of the two. They're noncoincident loads; you're not running the furnace and the AC simultaneously.

**Why it matters.** This is free money on a load calculation, and it's the most common place people inflate a service unnecessarily.

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## 43. What demand factors apply to heating and cooling in the optional method?

Use the largest of the following:

- Air conditioning — 100% of nameplate
- Heat pump without supplemental heat — 100% of nameplate
- Heat pump with supplemental heat — 100% of the heat pump plus 65% of the supplemental electric heat for central systems
- Three or fewer separately controlled electric space heating units — 65% of nameplate
- Four or more separately controlled electric space heating units — 40% of nameplate
- Electric thermal storage and other heating — 100% of nameplate

**Why it matters.** The three-units-versus-four-units line is a real cliff. Splitting baseboard heat into four separately controlled zones instead of three drops that portion of your calculation from 65% to 40%.

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## 44. What is a Power Control System, and why does it matter for load calculations?

A PCS is a listed system that monitors and actively limits current so that conductors and equipment can't be overloaded. Think of it as a governor on your service.

The 2026 NEC permits using the PCS control setting in load calculations, with a hard cap: **the control setting cannot exceed 80% of the overcurrent device rating** for the circuit being monitored.

**Why it matters.** This is one of the most commercially significant additions in the 2026 Code. A homeowner with a 100A service who wants a Level 2 charger, a heat pump, and an induction range previously faced a service upgrade with a utility coordination timeline and a five-figure bill. A listed PCS can make the existing service work.

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## 45. How do you calculate loads when a PCS is in play?

The load is the sum of controlled loads plus noncontrolled loads.

- If the PCS monitors **only** controlled loads, use the control setting in place of those loads.
- If the PCS monitors **both** controlled and noncontrolled loads, use the minimum operating current of the controlled loads in their place.
- Noncontrolled loads are calculated normally under Article 120.

**Why it matters.** Informative Annex D has worked examples. If you're going to sell PCS-based solutions, work through them before you quote a job.

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## 46. Where did Article 750 (Energy Management Systems) go?

Relocated to **Article 130**. Part I applies to both energy management systems and power control systems; Part II applies specifically to PCS.

And here's the trap: **Article 750 still exists in the 2026 NEC** — but it now covers grounding and bonding of limited-energy systems. Same number, entirely different subject.

**Why it matters.** If someone cites "750" at you, ask which edition they're reading from. This is exactly the kind of collision that makes the transition years messy.

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## 47. What's the difference between an EMS and a PCS?

An **energy management system** monitors and controls loads primarily to manage cost and consumption. A **power control system** adds the capability to monitor and control loads specifically to prevent overloading conductors and equipment — it's a safety function, not just an economic one.

**Why it matters.** Only the PCS function can be leaned on in a load calculation. A smart thermostat is not a PCS.

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## 48. What's the minimum service size for a one-family dwelling?

100A, 3-wire.

**Why it matters.** That's a floor, not a recommendation. With modern electrification loads, a calculated 100A service on a new build is increasingly a service you'll be back to upgrade in five years.

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# SECTION 4

## Services, Feeders & Overcurrent Protection — Articles 215, 225, 230, 240

### Questions 49-63

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#### 49. Service conductors, feeder, branch circuit — where does each begin and end?

- **Service conductors** — from the service point to the service disconnecting means.
- **Feeder** — from the service equipment, or from another power source, to the final branch-circuit overcurrent device.
- **Branch circuit** — from the final overcurrent device to the outlets.

**Why it matters.** Service conductors are the only conductors in the building without overcurrent protection ahead of them. That's why the rules on where they can run and how far they can go inside a building are so restrictive.

---

#### 50. How many service disconnecting means are permitted?

Up to six for each service. In current editions those disconnects must be in separate enclosures, each with a single disconnect — or in a listed assembly such as switchgear, a switchboard, or a metering center.

**Why it matters.** The old "six-handle" panelboard, where you killed a house by flipping six breakers in one enclosure, is gone. The change came from firefighter and first-responder feedback: one enclosure, one handle, one motion.

---

#### 51. Where must the service disconnect be located at a one- or two-family dwelling under the 2026 NEC?

Outdoors. It must be readily accessible and either:

6. On the dwelling unit, or
7. Within sight and not more than 50 ft from the dwelling unit.

The separate emergency disconnect requirements that lived in 230.85 were deleted and folded into 230.70.

**Why it matters.** This is a consolidation, not a relaxation. The intent is the same — first responders need to kill the power from outside without entering the structure — but the requirement now lives in one place instead of two.

---

## 52. How must that disconnect be marked?

**One- and two-family dwellings:** marked **EMERGENCY DISCONNECT**, on the outside front of the enclosure, with a red background and white lettering at least ½ in. high.

**All other occupancies:** marked **SERVICE DISCONNECT**, on or adjacent to the disconnect.

In both cases the marking must be durable enough for the environment, permanently affixed, and **not handwritten**.

**Why it matters.** Red background, white text, half-inch letters. Those are specific and they get checked. A Sharpie on the cover is an automatic correction notice.

---

## 53. Can a shunt-trip pushbutton serve as the service disconnect?

No. The 2026 edition clarified that a remote-control device is not considered a service disconnecting means.

**Why it matters.** Remote control introduces a dependency — control wiring, a power supply, a coil. A first responder needs a device they can physically operate, that works when everything else has failed.

---

## 54. When are service conductors considered "outside" a building?

Under 230.6, conductors are considered outside the building where they are:

- Installed under not less than 2 in. of concrete beneath the building
- Within the building in a raceway encased in not less than 2 in. of concrete or brick
- Installed in a vault meeting the Article 450 construction requirements
- In a conduit under not less than 18 in. of earth beneath the building
- In specified fire-rated assemblies in certain occupancies

**Why it matters.** This matters because service conductors inside a building have to terminate at the disconnect nearest the point of entrance. The 230.6 provisions are how a designer legally routes unprotected conductors past the exterior wall.

---

## 55. Where are you prohibited from installing overcurrent devices?

Under 240.24:

- In the bathrooms of dwelling units, dormitories, and guest rooms or suites
- Over steps of a stairway
- Where exposed to physical damage
- In the vicinity of easily ignitable material — clothes closets being the classic example

They must also be readily accessible, with specific exceptions.

**Why it matters.** The bathroom prohibition is absolute for dwellings. Wet hands, bare feet, grounded plumbing, and a panel cover is an unacceptable combination and there's no exception to argue.

---

## 56. Overload, short circuit, ground fault — what's the difference?

- **Overload** — operation of equipment above its rating, or a conductor carrying current above its ampacity, in an otherwise healthy circuit. Damage accumulates over time. A fault is not an overload.
- **Short circuit** — an unintended low-impedance connection between normal current-carrying conductors.
- **Ground fault** — an unintended connection between an ungrounded conductor and ground or equipment grounding conductors.

**Why it matters.** Three different phenomena, three different protective strategies. This distinction is why a motor circuit has a small overload device and a much larger short-circuit device, and why the exam loves motor questions.

---

## 57. What did the 2026 NEC add for panelboard and switchboard short-circuit current ratings?

In other than one- and two-family dwellings, switchboards and panelboards now require:

- Field marking of the available fault current **and the date the calculation was performed**, in a readily accessible location on the enclosure at the point of supply
- Field marking of the short-circuit current rating at the nominal circuit voltage
- Documentation of the calculation, made available to anyone authorized to inspect, install, or maintain the installation
- Recalculation and re-marking whenever modifications change the available fault current at the line terminals

**Why it matters.** The dated marking is the heart of it. Available fault current changes when the utility changes a transformer, and a label from 2015 tells you nothing about the system today. Replacement or added overcurrent devices must have an interrupting rating at least equal to the marked available fault current.

---

## 58. Where must overcurrent protection be located?

At the point where the conductor receives its supply — 240.21. The tap rules in 240.21(A) through (H) are the exceptions to that principle, and each has its own conditions.

**Why it matters.** Every tap rule is a negotiated exception to a safety principle. That's why they're so specific and why partial compliance is no compliance.

---

## 59. Summarize the 10-foot tap rule.

Tap conductors not exceeding 10 ft, where all of the following hold:

- The tap conductor ampacity is not less than the calculated load, and not less than the rating of the device or overcurrent device it supplies
- The tap conductors don't extend beyond the equipment they supply
- The tap conductors are enclosed in a raceway where they leave the enclosure
- The tap conductor ampacity is at least **10%** of the rating of the overcurrent device protecting the feeder

**Why it matters.** The 10% floor is the condition people forget. Tapping 14 AWG off a 400A feeder inside a 10-ft run is not permitted, no matter how small the load.

---

## 60. Summarize the 25-foot tap rule.

Tap conductors not exceeding 25 ft, where:

- The tap conductor ampacity is at least **one-third** the rating of the overcurrent device protecting the feeder
- The tap conductors terminate in a single overcurrent device that limits the load to the tap conductor ampacity
- The tap conductors are protected from physical damage by being enclosed in an approved raceway or other approved means

**Why it matters.** One-third for 25 ft, ten percent for 10 ft. Longer run, bigger conductor. The logic is that a longer unprotected conductor has more opportunity to be damaged, so it needs more margin.

---

## 61. How do you size a feeder?

Not less than 125% of the continuous load plus 100% of the noncontinuous load, and not less than the calculated load determined under Article 120.

**Why it matters.** Both conditions have to be satisfied. People run the demand calculation, get a number, and forget to check it against the continuous-load rule.

---

## 62. What are the voltage drop recommendations, and are they enforceable?

The commonly cited figures are 3% on a branch circuit and 5% total from the service to the farthest outlet.

They appear as Informational Note material — which means they are **recommendations**, not enforceable requirements, unless your jurisdiction has amended them into law. Some have.

**Why it matters.** This is one of the most confidently misquoted rules in the trade. It's excellent practice. It's a good spec. It's usually not a Code violation.

---

## 63. What's the difference between a feeder and a branch circuit for a detached structure?

A single branch circuit run to an outbuilding follows 225.30 and doesn't require a disconnecting means at the structure in the same way a feeder does. A feeder supplying a detached structure requires a disconnecting means at that structure, and an equipment grounding conductor run with the feeder.

***Why it matters.*** One circuit to a shed light is a different animal from a subpanel in a detached garage. Know which one you're building before you pull wire.

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# SECTION 5

## Grounding & Bonding — Article 250

### Questions 64-78

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#### 64. What is the difference between grounding and bonding?

**Grounding** is connecting to earth, or to a conductive body that serves in place of earth. **Bonding** is connecting metallic parts together to establish electrical continuity and conductivity.

**Why it matters.** This is the single most important distinction in Article 250, and getting it backwards is why so many people misunderstand everything downstream. Bonding is what clears faults. Grounding to earth is what stabilizes voltage and handles lightning and line surges.

---

#### 65. Does the earth clear a ground fault?

No. Explicitly no — 250.4(A)(5) states that the earth shall not be used as the sole equipment grounding conductor or effective ground-fault current path.

**Why it matters.** Soil resistance is measured in ohms; a 120V circuit through 25 ohms of earth passes under 5 amps. That won't trip a 20A breaker in this lifetime. The fault current has to get back to the *source*, and it does that on copper, not dirt.

---

#### 66. What is the effective ground-fault current path?

An intentionally constructed, low-impedance, electrically conductive path designed to carry fault current from the point of a ground fault back to the electrical supply source — with enough current-carrying capacity to facilitate the operation of the overcurrent device.

**Why it matters.** Read the last clause again. The purpose of the path is to **open the breaker**. If your grounding scheme doesn't reliably do that, it's decoration.

---

## 67. What are the permitted grounding electrodes?

Under 250.52(A), where present at each building or structure served:

- Metal underground water pipe in direct contact with earth for 10 ft or more
- Metal in-ground support structure in direct contact with earth for 10 ft or more
- Concrete-encased electrode — the "Ufer" ground
- Ground ring
- Rod and pipe electrodes
- Plate electrodes
- Other listed electrodes and local metal underground systems

**Why it matters.** "Where present" is a requirement, not a suggestion. If a qualifying electrode exists at the building, it must be part of the grounding electrode system. You don't get to skip the Ufer because driving a rod is faster.

---

## 68. Why does a metal water pipe electrode always need to be supplemented?

Because water pipes get replaced with plastic, and when they do, the electrode silently disappears. 250.53(D)(2) requires a metal underground water pipe electrode to be supplemented by an additional electrode.

**Why it matters.** The failure mode is invisible. A plumber replaces 20 ft of buried line on a Tuesday and nobody knows the grounding electrode system changed.

---

## 69. What is the 25-ohm rule?

A single rod, pipe, or plate electrode that does not have a resistance to earth of 25 ohms or less must be supplemented by one additional electrode.

**Why it matters.** Almost nobody tests. Two rods spaced at least 6 ft apart satisfy the requirement without measurement, which is why the standard practice in most of the country is simply to drive two and move on. That's not laziness — it's the compliant path that doesn't require a fall-of-potential test on every house.

---

## 70. How is a ground rod installed?

At least 8 ft in contact with soil. Where rock bottom is hit, it may be driven at up to a 45-degree angle, or buried in a trench at least 30 in. deep. The upper end is flush with or below grade unless protected from physical damage.

**Why it matters.** The clamp and the connection have to be listed for direct earth burial. A standard acorn clamp buried in soil is a violation and a corrosion failure waiting to happen.

---

## 71. How do you size the grounding electrode conductor?

From Table 250.66, based on the size of the largest ungrounded service-entrance conductor.

Three caps override the table:

- Not required to be larger than **6 AWG copper** where it connects only to a rod, pipe, or plate electrode
- Not required to be larger than **4 AWG copper** where it connects only to a concrete-encased electrode
- Not required to be larger than the ground ring conductor where it connects only to a ground ring

**Why it matters.** Those caps are why you almost never see anything bigger than #6 running to a ground rod on a residential service, no matter how large the service is.

---

## 72. How do you size the equipment grounding conductor?

From Table 250.122, based on the rating of the overcurrent device ahead of the circuit.

Two modifiers:

- Where conductors are increased in size — for voltage drop, for example — the EGC must be increased proportionally in circular mil area.
- The EGC is never required to be larger than the circuit conductors.

**Why it matters.** The proportional-increase rule is quietly one of the most-missed requirements in the Code. Upsize your feeder for a long run and you have to upsize the ground with it.

---

### 73. Where is the grounded conductor bonded to ground?

At the **service disconnecting means**, via the main bonding jumper — and at the source of a **separately derived system**, via the system bonding jumper.

Nowhere else. Not downstream.

**Why it matters.** One bonding point per system. This is the rule that governs the entire architecture of a premises wiring system.

---

### 74. Why can't you bond neutral and ground in a subpanel?

Because it puts normal load current onto the equipment grounding conductor and every metal enclosure, raceway, and bonded metal part connected to it.

The result is objectionable current flowing on surfaces people touch, and a shock hazard that persists under completely normal operating conditions with no fault present anywhere in the system.

**Why it matters.** This is the mistake that separates people who memorized the rule from people who understand it. There's no fault involved. The system is behaving exactly as designed. It's just been given a parallel path for return current that runs through the building's metal.

---

### 75. What's the difference between the main bonding jumper and the system bonding jumper?

- **Main bonding jumper** — connects the grounded conductor to the equipment grounding conductor at the **service**.
- **System bonding jumper** — does the same job at a **separately derived system**, such as the secondary of a transformer or the output of a generator with a switched neutral.

**Why it matters.** Same function, different location, different name. The Code distinguishes them because the rules about where they go and what size they are come from different tables.

---

### 76. Can you run a three-wire feeder to a detached building and bond the neutral there?

Not for new installations. 250.32(B) requires an equipment grounding conductor to be run with the supply conductors to a separate building or structure. The old allowance

permitting the grounded conductor to serve the grounding function at a detached structure was removed in the 2008 NEC.

**Why it matters.** You will still find these installations everywhere, and existing ones are generally allowed to remain. But you can't build one today, and if you're extending or modifying, check with the AHJ before you assume the existing method carries forward.

---

## **77. Does a detached building with a feeder need its own grounding electrode?**

Yes. A grounding electrode system is required at each building or structure supplied by a feeder or branch circuit, with limited exceptions — a structure supplied by a single branch circuit including an equipment grounding conductor being the main one.

**Why it matters.** Electrode at the structure, *plus* an equipment grounding conductor back to the source. Both. Neither one replaces the other.

---

## **78. What has to be bonded besides the electrical system?**

Under 250.104, interior metal water piping systems, and metal piping systems and structural metal that are likely to become energized. Sizing comes from Table 250.102(C)(1) based on the service conductors, or from Table 250.122 based on the circuit likely to energize the piping.

**Why it matters.** Bonding the gas line is the one that generates arguments. The general approach is that the equipment grounding conductor of the circuit likely to energize the piping — the furnace circuit, typically — serves as the bonding means. Check your local amendments; this one gets modified regularly.

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# SECTION 6

## Wiring Methods & Materials — Chapter 3

### Questions 79-92

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#### 79. How much free conductor is required at a box?

At least **6 in.** of free conductor, measured from the point where it emerges from its raceway or cable sheath — and at least **3 in.** of that must extend outside the opening of the box.

**Why it matters.** The 3-inch requirement was added because a 6-inch tail in a deep box still leaves you working inside the enclosure. The rule is about giving the next person room to make a connection safely.

---

#### 80. What did the 2026 NEC add at 300.4 about damaged wiring?

New language: conductors and wiring methods damaged by overheating, fire, corrosive influences, or water — and no longer suitable for use — must be **replaced**.

Two new Informational Notes point to NEMA guidance documents for evaluating water-damaged and fire-damaged electrical equipment.

**Why it matters.** This is a reconditioning rule in disguise. Equipment can sometimes be reconditioned; wire and cable can't. After a flood or a fire, the question of whether the wiring can stay is now answered in the Code text rather than negotiated on site.

---

#### 81. What changed for cable ties in 2026?

Cable ties used as a means of securement and support for cable, flexible conduit, and flexible tubing must be **listed and identified** for securement and support. Where a cable tie fixing device is used, it must be listed and identified for the same purpose.

Type 2S and 21S cable ties are evaluated for this use.

**Why it matters.** The bag of generic nylon ties in the van is now a compliance question. Ties that were fine for bundling are not automatically fine for supporting, and the difference shows up under heat and UV over years.

---

## 82. What are the burial depth basics under 300.5?

Minimum cover depends on the wiring method and the circumstances. The common anchors from Table 300.5(A):

- **Direct-buried cables or conductors** — 24 in.
- **Rigid metal conduit or intermediate metal conduit** — 6 in.
- **Nonmetallic raceways listed for direct burial without concrete encasement** — 18 in.
- **Residential branch circuits rated 120V or less, GFCI protected, with maximum 20A overcurrent protection** — 12 in.
- **Irrigation and landscape lighting control circuits, 30V or less, in Type UF or other identified cable or raceway** — 6 in.

Reduced cover applies under concrete slabs, under buildings, and in other specified conditions.

**Why it matters.** Verify against the table in your edition before you dig. And measure to the *top* of the raceway or cable, not the bottom of the trench.

---

## 83. When do you have to apply conductor adjustment factors?

Where more than three current-carrying conductors are installed in a raceway or cable, the ampacity is adjusted per Table 310.15(C)(1).

Counting rules:

- The neutral of a balanced 3-wire circuit derived from a single-phase 3-wire system is generally not counted.
- The neutral of a 4-wire 3-phase wye circuit is not counted where the load is balanced and largely linear.
- The neutral **is** counted where the major portion of the load consists of nonlinear loads — because harmonic current adds on the neutral rather than cancelling.
- Equipment grounding conductors are not counted.

**Why it matters.** The nonlinear-load exception is not academic. LED drivers, VFDs, and switch-mode power supplies are everywhere now, and in a heavily nonlinear installation the neutral can carry more current than any phase.

---

## 84. What ambient temperature do the ampacity tables assume?

Table 310.16 is based on a 30°C (86°F) ambient. Higher ambients require correction factors from Table 310.15(B)(1). Correction and adjustment factors apply *together*, not as alternatives — you multiply both.

**Why it matters.** Rooftop raceway in direct sunlight has its own history in the Code, and the adder has been narrowed significantly over recent cycles. Don't rely on what you learned in 2014 — read the section in your adopted edition.

---

## 85. How does 110.14(C) limit the ampacity you can actually use?

The **termination temperature rating** governs the final ampacity, regardless of what the conductor insulation is rated for.

- Equipment rated 100A or less, or marked for 14 AWG through 1 AWG conductors — use the **60°C** column, unless the equipment is listed and identified for higher.
- Equipment rated over 100A, or marked for conductors larger than 1 AWG — use the **75°C** column.

You may use the 90°C ampacity for derating calculations, but the final result cannot exceed what the terminal rating allows.

**Why it matters.** This is the rule that makes THHN's 90°C rating mostly a derating tool rather than an ampacity gain. Almost nothing in the field has 90°C terminations.

---

## 86. How do you calculate box fill?

Per 314.16, using conductor volume allowances by size:

- Each ungrounded and grounded conductor entering the box and terminating or spliced within it — **1 volume allowance** each
- Conductors passing through without splice or termination — **1** each, provided at least 12 in. of free length isn't required
- All equipment grounding conductors together — **1** total, based on the largest
- One or more cable clamps inside the box — **1** total, based on the largest conductor
- Each support fitting such as a fixture stud or hickey — **1** each
- Each yoke or strap-mounted device — **2**, based on the largest conductor connected to it

Conductors originating outside the box and terminating inside count. Wire connectors, cable connectors on the outside, and looped conductors under a certain length have their own treatment.

**Why it matters.** Two per device is the one people forget, and it's the one that turns a "should be fine" box into a violation. Two switches and a receptacle in one box is six allowances before you've counted a single conductor.

---

## 87. How is NM cable supported?

Secured within **12 in.** of every box, cabinet, or fitting where the cable enters with a cable clamp, and at intervals not exceeding **4½ ft** thereafter.

**Why it matters.** The 12 in. is measured to the securing point, not to the staple nearest the box. And where the box is a single-gang nonmetallic box without cable clamps, the securement distance changes — check 314.17.

---

## 88. How is EMT supported?

Securely fastened within **3 ft** of each outlet box, junction box, cabinet, or termination, and at intervals not exceeding **10 ft** thereafter.

**Why it matters.** The 3 ft/10 ft pattern is easy to remember but it isn't universal across raceway types. Rigid, IMC, PVC, and flex all have their own numbers, and PVC's support intervals change with conduit size and temperature because of expansion.

---

## 89. Where is NM cable not permitted?

Broadly: in wet or damp locations, where exposed to physical damage without protection, embedded in masonry or fill, and in specified commercial and institutional occupancies and building construction types under 334.10 and 334.12.

**Why it matters.** The permitted-use rules turn on building *construction type*, not on what the building is used for. A Type III or Type V building may permit NM where a Type I or II building of identical use does not.

---

## 90. What is the maximum number of bends between pull points?

**360 degrees** total — the equivalent of four quarter bends — between pull points such as conduit bodies and boxes.

**Why it matters.** It's cumulative across the whole run, offsets included. Two offsets and three 90s will beat you, and you'll find out during the pull.

---

## 91. When is a box or conduit body required?

At every conductor splice, outlet, switch point, junction point, pull point, or termination point — 300.15. Specific wiring methods have their own listed exceptions.

**Why it matters.** The corollary is that every splice has to be accessible. A buried junction box behind finished drywall is a violation even if the splice itself is perfect.

---

## 92. How can a box be supported?

Under 314.23: to a building structural member, by an independent support, by a brace, by mounting in a suspended ceiling grid meeting specific requirements, or — under limited conditions — by the raceway itself.

The raceway-support option requires two or more threaded raceways entering the box, made up wrenchtight, each supported within a specified distance of the box, with box size limits.

**Why it matters.** Raceway support is common in commercial work and frequently done wrong. Threadless connectors on EMT do not satisfy the "threaded and wrenchtight" condition.

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# SECTION 7

## Equipment for General Use — Articles 400-480

### Questions 93-100

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#### 93. What changed in Article 406 in the 2026 NEC?

The scope expanded from receptacles to **wiring devices** generally. Under the revised Article 100 definition, wiring devices now include receptacles, cord connectors, attachment plugs, snap switches, dimmers, and electronic control switches.

The practical shift: small switch-type wiring devices moved out of Article 404 and into Article 406.

**Why it matters.** If you learned "404 is switches, 406 is receptacles," relearn it. Article 404 still exists and still covers switches as a category — but the device-level rating and installation requirements for snap switches are now grouped with receptacles under 406, where devices with similar construction live together.

---

#### 94. What's required when you replace a receptacle?

Under 406.4(D), the replacement must meet current requirements for the location:

- **GFCI** protection where it would be required for a new installation
- **AFCI** protection where it would be required for a new installation
- **Tamper-resistant** where required
- **Weather-resistant** where required

Where there's no equipment grounding conductor in the box, three compliant options:

8. Install a non-grounding-type receptacle
9. Install a GFCI-type receptacle marked "No Equipment Ground"
10. Install a grounding-type receptacle supplied through a GFCI, marked "GFCI Protected" and "No Equipment Ground"

**Why it matters.** This is the rule that quietly upgrades the country's housing stock one receptacle at a time. Swap a receptacle in a kitchen and you've triggered current GFCI and AFCI requirements for that location.

---

## 95. What can't you do with flexible cord?

Under 400.12, flexible cords and cables are not permitted:

- As a substitute for the fixed wiring of a structure
- Run through holes in walls, structural ceilings, suspended or dropped ceilings, or floors
- Run through doorways, windows, or similar openings
- Attached to building surfaces, with limited exceptions
- Concealed by walls, floors, or ceilings, or located above suspended or dropped ceilings
- Installed in raceways, except where specifically permitted

**Why it matters.** Every one of these prohibitions exists because someone treated cord as permanent wiring and a building burned. The exceptions are narrow and specific.

---

## 96. Do you use the motor nameplate FLA or the Code tables to size conductors?

The **tables** — 430.6(A) directs you to Tables 430.247 through 430.250 for conductor sizing and overcurrent protection, not the nameplate.

The **nameplate** is used for overload protection sizing.

**Why it matters.** This is the classic motor exam trap, and it catches experienced people. Table values for conductors and short-circuit protection; nameplate values for overload. Two different numbers doing two different jobs.

---

## 97. How do you size conductors for a single motor, and for multiple motors?

- **Single motor, continuous duty** — conductors at not less than **125%** of the table full-load current.
- **Feeder for several motors** — **125% of the largest motor's** full-load current, plus the sum of the full-load currents of all the other motors in the group.

**Why it matters.** Only the largest gets the 125%. Applying it to all of them inflates the feeder and is a very common estimating error.

---

## 98. How do motor overload and short-circuit protection differ in size?

- **Overload protection** (430.32) — typically **125%** of the motor nameplate full-load current for motors with a service factor of 1.15 or greater, or a temperature rise of 40°C or less. **115%** for all others.
- **Short-circuit and ground-fault protection** (430.52) — sized from Table 430.52, at percentages far above the full-load current, varying by motor type and device type.

**Why it matters.** This is the whole reason motor circuits look wrong to people who only do lighting and receptacles. A device sized at 250% of full-load current sitting ahead of a motor is not a mistake — it has to let the inrush through, because a separate device downstream is watching for overload.

---

## 99. What protects transformer secondary conductors?

Not the primary overcurrent device. Article 450 governs protection of the *transformer*; the *conductors* on the secondary are governed by 240.21(C).

A single-phase transformer with a 2-wire primary and 2-wire secondary is a special case where primary protection can protect the secondary conductors, provided the protection is sized correctly using the voltage ratio. For three-phase secondaries, the options are limited and specific — the 10-ft secondary rule, the 25-ft rule, and the outside-installation provisions.

**Why it matters.** The transformer is protected. The conductors leaving it are, by default, not. That gap is where a lot of bad installations live.

---

## 100. What does Article 480 cover, and why should you care now?

Stationary standby batteries — disconnecting means, insulation and spacing, battery support structures, ventilation, working space, and marking.

**Why it matters.** For most of the Code's history this was a utility, telecom, and data center article that residential electricians never opened. Battery energy storage is now appearing on ordinary houses and small commercial buildings. Article 480 has moved

from niche to routine in about five years, and the requirements around disconnecting means and spaces about batteries are the ones catching people out.

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# APPENDIX A

## The 2026 Renumbering Map

The 2026 NEC moved, merged, split, and deleted more articles than any edition in decades. If you learned the Code on the 2020 or 2023 book, this table is the thing that will save you the most time in the next two years.

### Relocated

| Subject                                               | Was         | Now                |
|-------------------------------------------------------|-------------|--------------------|
| Branch-circuit, feeder, and service load calculations | Article 220 | <b>Article 120</b> |
| Energy management systems                             | Article 750 | <b>Article 130</b> |
| Fire-resistive cable systems                          | Article 728 | <b>Article 772</b> |

### Deleted

| Article | Subject                                                           | What happened                                          |
|---------|-------------------------------------------------------------------|--------------------------------------------------------|
| 235     | Branch circuits, feeders, and services over 1,000V AC / 1,500V DC | Split into new Articles 265, 266, 267, 268             |
| 770     | Optical fiber cables                                              | Absorbed into the consolidated limited-energy articles |
| 805     | Communications circuits                                           | Absorbed into the consolidated limited-energy articles |

### New — Medium and High Voltage

| Article | Subject                                                        |
|---------|----------------------------------------------------------------|
| 245     | Overcurrent protection for systems over 1,000V AC / 1,500V DC  |
| 265     | Branch circuits over 1,000V AC / 1,500V DC                     |
| 266     | Feeders over 1,000V AC / 1,500V DC                             |
| 267     | Outside branch circuits and feeders over 1,000V AC / 1,500V DC |

| Article | Subject                                                                          |
|---------|----------------------------------------------------------------------------------|
| 268     | Services over 1,000V AC / 1,500V DC                                              |
| 270     | Grounding and bonding of systems over 1,000V AC / 1,500V DC                      |
| 305     | General requirements for wiring methods and materials over 1,000V AC / 1,500V DC |
| 315     | Medium voltage conductors, cable, cable joints, and cable terminations           |
| 495     | Equipment over 1,000V AC / 1,500V DC                                             |

## New — Limited-Energy Systems

| Article | Subject                                                                        |
|---------|--------------------------------------------------------------------------------|
| 720     | General requirements for limited-energy system wiring methods and materials    |
| 721     | Power sources for limited-energy systems                                       |
| 722     | Limited-energy cables                                                          |
| 723     | Raceways, cable routing assemblies, and cable trays for limited-energy systems |
| 742     | Overvoltage protection of limited-energy systems                               |
| 750     | Grounding and bonding of limited-energy systems                                |

## New — Other

| Article | Subject                                                                                                                                                   |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 206     | Non-power-limited remote-control and signaling circuits                                                                                                   |
| 624     | Electric self-propelled vehicle power transfer systems (ESVSEs) — forklifts, ground support equipment, construction machinery, golf carts, electric boats |

## The one that will bite you

**Article 750 exists in both the old and new structure — with completely different subject matter.** In the 2023 NEC it was energy management systems. In

the 2026 NEC it is grounding and bonding of limited-energy systems. When someone cites 750, ask which edition.

### **Terminology changes worth knowing**

- "Overcurrent protective device" is now abbreviated **OCPD** throughout, and "overcurrent device" was standardized to the same term.
  - The designation **AC** was added to rules that apply only to alternating-current circuits, making clear those requirements don't extend to DC systems.
  - **Informative Annex L** is new, and previews the structural changes anticipated for the 2029 edition.
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# APPENDIX B

## Twelve Violations Inspectors Actually Write

Not the obscure ones. The ones that show up over and over, on jobs done by people who know better.

### **1. Storage in working space.**

110.26(B). The most-cited violation in commercial and industrial facilities, and it's almost never the electrician who caused it. Photograph the clear space at final and move on.

### **2. Missing or handwritten equipment labels.**

Service disconnect markings, arc flash labels, available fault current markings. The 2026 edition tightened all three and none of them can be handwritten.

### **3. Insufficient free conductor at boxes.**

Six inches from the sheath, three inches outside the box opening. Fast to get right at rough-in, miserable to fix at trim.

### **4. Box fill exceeded.**

Almost always a device count problem. Two allowances per yoke, and nobody remembers.

### **5. Neutral and ground bonded in a subpanel.**

Every remodel where someone reused an old panel as a subpanel and left the bonding screw in.

### **6. Missing GFCI where the rules moved.**

The 2026 sink rule, the 60A outdoor threshold, the accessory building split. The locations expand every cycle and field habits lag by about two editions.

### **7. Wrong wire for the termination temperature.**

110.14(C). Using the 90°C column and landing on a 75°C lug.

## **8. Improper support spacing.**

NM within 12 in. of the box then every 4½ ft. EMT within 3 ft then every 10 ft. Different for every wiring method, and people apply one habit to all of them.

## **9. Inaccessible splices.**

A junction box that ends up behind finished surface. Perfect connections, automatic failure.

## **10. Missing equipment grounding conductor to a detached structure.**

The three-wire feeder habit persists nearly two decades after it stopped being legal for new work.

## **11. Undersized grounding electrode conductor — or an oversized one nobody needed.**

Both directions cost money. Know the caps in 250.66.

## **12. Panel in a prohibited or non-compliant location.**

Dwelling bathrooms, clothes closets, over stairs, or squeezed into a space that fails the 30-inch width test.

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# Where To Go From Here

If you got through all 100 and most of them landed, you're in good shape. If you got through all 100 and a third of them were new information, that's the more useful result — you now know exactly where the gaps are.

Here's the honest limitation of a document like this one.

A cheat sheet gives you **answers**. It can't give you the reasoning underneath them, and the reasoning is what you need the moment a situation doesn't match the question. The Code is written in a dense, cross-referenced legal style — it tells you what to do without ever telling you why, and it assumes you'll hold six other sections in your head while you read the one in front of you.

That's the gap Michael Hamilton's Illustrated Guide is built to close.

**Volume 1 covers Articles 90 through 480** — the same territory as this cheat sheet, at roughly 680 pages instead of forty. Every section of the Code that matters, walked through in order, with:

- **Author's Comments throughout** — the intent behind each requirement, not just the text. This is the part that makes the Code applicable when the job in front of you isn't in any example.
- **Full-color illustrations** — the concepts that never quite make sense from text alone. Working space geometry, tap rules, grounding architecture, box fill.
- **Step-by-step calculation examples** — load calculations, motor circuits, conductor sizing, worked all the way through.
- **Chapter review questions** — so you find out whether you actually understood it or just recognized it.
- **Fully updated for the 2026 NEC**, including every renumbering in Appendix A of this document.

It's the resource apprenticeship programs assign on day one, that journeymen keep in the truck, and that inspectors use to check their own interpretations. If you've got a licensing exam coming, it's the standard prep text — and licensing exams are Code exams. The candidates who pass aren't the ones who've read the Code. They're the ones who understand it.

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*And if this cheat sheet was useful, send it to the apprentice on your crew. That's what it's for.*

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