Table of Contents

1

Introduction and General

Article 90 and Chapter 1 of the *National Electrical Code* have always been referred to as the "get acquainted" information that every designer, installer, electrician, apprentice, inspector, and maintenance person must review and understand before other chapters, articles, and sections of the *National Electrical Code* can be understood and applied.

The first article in the *National Electrical Code* is Article 90, which contains the Introduction. Article 90 covers the purpose of the *National Electrical Code*, along with other pertinent information that is applicable throughout each chapter of the *National Electrical Code*.

Chapter 1 acquaints the user of the *National Electrical Code* with definitions and clearance rules that are mandatory to ensure the safety of the general public and personnel working in, near, or on wiring methods and equipment.

Users as well as students of the *National Electrical Code* must review and become acquainted with Article 90 and Chapter 1 before attempting to study, learn, and apply the other articles and chapters to a particular design or installation.

It is this concept of study that will make interpretations and applications of the many requirements in the *National Electrical Code* much easier to understand.

Note: For other code changes that are not included in this code change book, see the **2023 NEC** for a particular change of interest. All changes to the 2023 NEC are highlighted in Blue Text and helpful illustrations are highlighted in Black Text. New change or revisions are highlighted in Red Text.

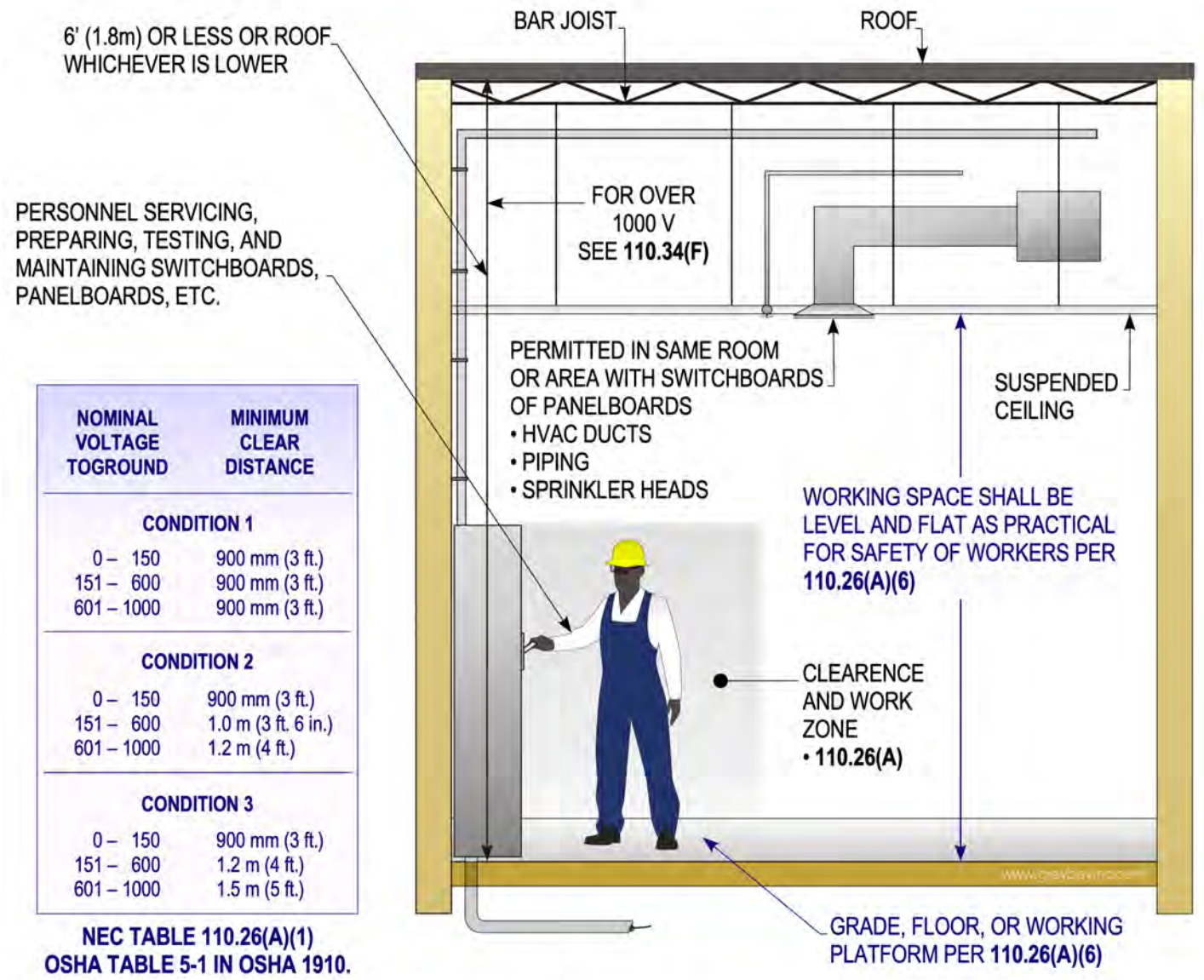
110.26 Spaces About Electrical Equipment.

(A) Working Space.

(6) Grade, Floor, or Working Platform. The grade, floor, or platform in the required working space shall be kept clear, and the floor, grade, or platform in the working space shall be as level and flat as practical for the entire required depth and width of the working space.

Stallcup's Comment: A new subdivision has been added to clarify that the grade, floor or platform being flat and level in the working space was not previously addressed in the National Electrical Code. The new subdivision clarifies that having a flat level working space is vital to the safety of personnel working on the equipment.

OSHA 1910.305(h)(5) | NFPA 70B 2.2 7 2.4 | NFPA 70E 205.5 | UL White Book



NOMINAL VOLTAGE TOGROUND	MINIMUM CLEAR DISTANCE
CONDITION 1	
0 – 150	900 mm (3 ft.)
151 – 600	900 mm (3 ft.)
601 – 1000	900 mm (3 ft.)
CONDITION 2	
0 – 150	900 mm (3 ft.)
151 – 600	1.0 m (3 ft. 6 in.)
601 – 1000	1.2 m (4 ft.)
CONDITION 3	
0 – 150	900 mm (3 ft.)
151 – 600	1.2 m (4 ft.)
601 – 1000	1.5 m (5 ft.)

NEC TABLE 110.26(A)(1)
OSHA TABLE 5-1 IN OSHA 1910.

WORKING SPACE (GRADE, FLOOR, OR WORKING PLATFORM)
NEC 110.26(A)(6)

PURPOSE OF CHANGE: A NEW SECTION **110.26(A)(6)** HAS BEEN ACCEPTED AND ADDED BY THE CMP TO CLARIFY WHAT IS CONSIDERED AS GRADE, FLOOR, OR WORKING PLATFORM AND SUCH AREA BEING FLAT IF POSSIBLE.

Name Date

2023 Illustrated Code Changes: Chapter 1 – Questions

Section Answer

In answering these questions, use the **National Electrical Code** (**NEC**) and the information provided in this "Illustrated Code Change Book".

1. A _____, _____ or other means can be used to identify a field evaluation has been performed. _____ _____

(a) label
(b) symbol
(c) all of the above
(d) none of the above

2. Under certain conditions, _____ can be used to supply a dispenser that is utilized for fueling. _____ _____

(a) RNMC
(b) RMC
(c) IMC
(d) all of the above

3. This new definition _____ other _____ systems that are considered accessible. _____ _____

(a) recognizes
(b) building
(c) all of the above
(d) none of the above

4. This is a new definition pertainng to a _____ branch-circuit that also includes associated _____. _____ _____

(a) motor
(b) equipment
(c) conductors
(d) all of the above

5. A _____ can be used to convert AC to DC power. _____ _____

(a) transmitter
(b) compressor
(c) motor
(d) none of the above

6. Commissioning of electrical _____ are _____ to ensure a safe installation. _____ _____

(a) devices
(b) paramount
(c) necessary
(d) all of the above

7. A corrossive environment is considered _____ (outdoors or indoors) where there is a lot of _____. _____ _____

(a) areas
(b) ventilation
(c) all of the above
(d) nonel of the above

8. A listed _____ assembly can be installed in a countertop, but a _____ assembly cannot be used. _____ _____

(a) receptacle
(b) face-up
(c) all of the above
(d) none of the above

Answer Section

_____ _____ **9.** All conductive _____ must be connected together to provide an equpotential plane for made bodies of water.

(a) elements
(b) wood
(c) PVC
(d) all of the above

_____ _____ **10.** A _____ provides ground-fault protection for PV systems.

(a) GFD
(b) GFCI
(c) AFCI
(d) all of the above

_____ _____ **11.** A _____ switch on the ouput side of _____ power supply will automatically be available due to loss of power.

(a) transfer
(b) uninterruptable
(c) all of the above
(d) none of the above

_____ _____ **12.** A _____ can be installed in a panelboard and considered as part of an assembly.

(a) circuit-breaker
(b) bus
(c) connection
(d) all of the above

_____ _____ **13.** Electrical _____ devices shall provide a mechanicaly secure connection.

(a) connection
(b) loose
(c) all of the above
(d) none of the above

_____ _____ **14.** Arc flash _____ shall include the date that it was applied.

(a) incident
(b) labels
(c) all of the above
(d) none of the above

_____ _____ **15.** NFPA _____ can be utilized to determine and select maintenance procedures.

(a) 70
(b) 70E
(c) 70L
(d) 70B

_____ _____ **16.** Under certain conditions, the _____ can approve and accept equipment.

(a) contractor
(b) AHJ
(c) electrician
(d) none of the above

_____ _____ **17.** The _____ has to be marked on recondition equipment and the _____ marking removed.

(a) date
(b) original
(c) all of the above
(d) none of the above

_____ _____ **18.** Note that _____ and _____ are a method to comply with the marking requirements.

(a) labels
(b) signs
(c) all of the above
(d) none of the above

Chapter 1
Answer Key

Answer	Section
1. (c)	**Article 100**
2. (d)	**Article 100**
3. (c)	**Article 100**
4. (d)	**Article 100**
5. (a)	**Article 100**
6. (d)	**Article 100**
7. (c)	**Article 100**
8. (c)	**Article 100**
9. (a)	**Article 100**
10. (a)	**Article 100**
11. (c)	**Article 100**
12. (d)	**Article 100**
13. (a)	**110.14(A)**
14. (b)	**110.16(B)**
15. (d)	**110.17, Ins 1 & 2**
16. (b)	**110.20(C)**
17. (c)	**110.21(A)(2) & (A)(3)**
18. (c)	**110.21(B)(1) and (B)(2), In. Notes 1 & 2**
19. (d)	**110.26**
20. (d)	**110.26(A)(4), (4)**
21. (c)	**110.26(A)(6)**
22. (a)	**110.29**

2

Wiring and Protection

Chapter 2 of the National Electrical Code has always been referred to as the “Designing Chapter” and is used by engineers, electrical contractors, and electricians who have the responsibility of calculating loads and sizing the elements of the electrical system.

Chapter 2 is the starting point to begin calculating ampacities for branch circuits and feeders. Even the ampacity for sizing service-entrance conductors is calculated by applying the rules of **Article 220**, which are found in **Parts I**, **II**, and **III**, as well as **Part IV** of **Article 230**.

The key number for finding the requirements necessary for calculating loads in **Chapter 2** is 200. In other words, all articles and sections will be identified by using a 200 series number. When designing electrical systems, **Chapter 2** and the 200 series are utilized with other pertinent articles and sections. It is nearly impossible for a designer to calculate loads and determine the size of various elements of the electrical system, if he or she is not properly acquainted with the calculation requirements of **Chapter 2**.

For example, if the user wanted to calculate the load in amps for a motor feeder, he or she would refer to **220.14(C)** and **220.50**, and these section references **430.22** and **430.24** since **Article 220** does not list the rules for calculating loads for motor circuits. If **Article 220** does not contain the rules for calculating the load, it will refer the user to the required section in other articles of the National Electrical Code.

When calculating the load to size the conductors based on a reference section number, use **Table 210.3** as well as **Table 220.3**, and if the overcurrent protection device must be sized larger than the ampacity of the supply conductors and the equipment served, see **Table 240.4(G)** for the referenced section number and verify that such equipment is listed.

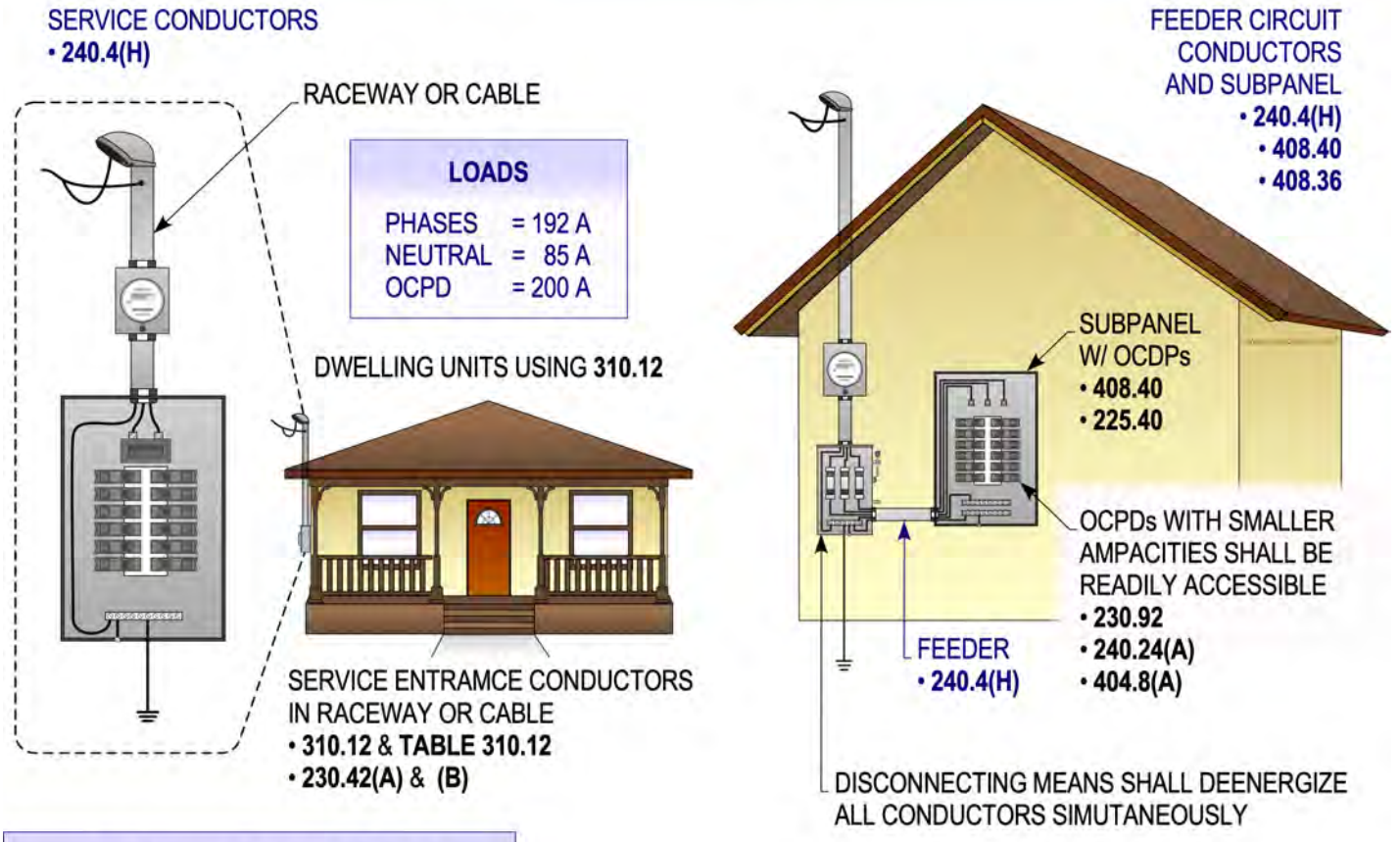
Note, for other code changes that are not included in this code change book, see the **2023 NEC** for a particular change of interest.

240.4 Protection of conductors.

(H) Dwelling Unit Service and Feeder Conductors. Dwelling unit service and feeder conductors shall be permitted to be protected against overcurrent at the ampacity values in **310.12**.

Stallcup's Comment: A new subsection has been added to recognize the requirements for dwelling unit service and feeder conductors permitted to be protected against overcurrent at the ampacity values in **310.12**.

OSHA 1910, Subpart S	NFPA 70B CH. 24	NFPA 70E 90.2(A) & (B)	UL HUD — Part I



CALCULATED FEEDER LOADS FOR A DWELLING UNIT

TABLE 310.12 TO TABLES 0 - 2000 V

PAHSES A AND B = 2 – 2/0 AWG THWN cu. BASED ON **310.12**

NOTE: NEUTRAL SHALL BE AT LEAST 85A.

QUICK CALC
310.12(A) AND **(B)**
192 A x 83% = 159 A

NOTE: FEEDER CIRCUIT CONDUCTORS SHALL BE PERMITTED TO BE PROTECTED AGAINST OVERCURRENT PER **310.12**.

DWELLING UNIT SERVICE AND FEEDER CONDUCTORS
NEC 240.4(H)

PURPOSE OF CHANGE: A NEW SUBSECTION WAS ACCEPTED AND ADDED TO RECOGNIZE AND CLARIFY THAT FEEDER CONDUCTORS AS WELL AS SERVICE CONDUCTORS ARE PERMITTED TO BE SIZED PER **310.12**. **NOTE,** THAT THE SIZE CONDUCTORS PER **TABLE 310.12** IS 2/0 ANDD NOT 3/0 PER PHASE OF 192 AMP ABOVE.

3

Wiring Methods

Chapter 3 of the National Electrical Code has always been referred to as the "**Installation Chapter**" and is used by electricians to install electrical systems in a safe, dependable, and reliable manner. **Chapter 3** covers the requirements needed by on-the-job electricians who are installing services, feeders, and branch circuits and thus providing electrical power to the end of branch circuits and on to the point of use.

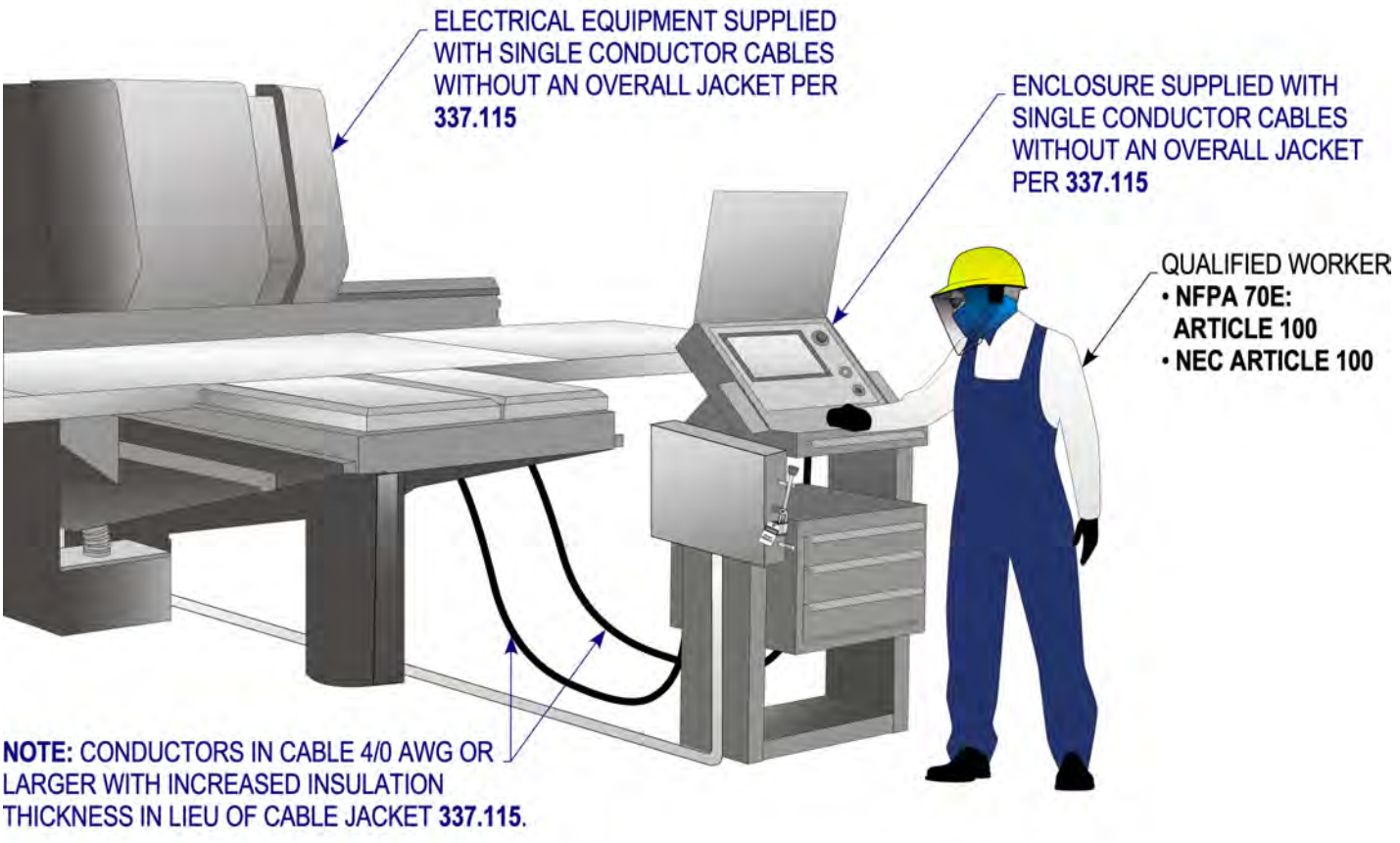
Chapter 3 is also called the "**Rough-In Chapter**" by electricians. All articles in **Chapter 3** are of the **300 series**, and each contains the rules that pertain to installing electrical wiring methods and accessories. On-the-job work procedures of the average electrician bring them into almost daily contact with an article in **Chapter 3** concerning these installation rules.

For example, when installing wiring in cable trays, electricians cannot install and fill cable trays with different wiring, cables, and systems without knowing the requirements of **Article 392**. The same is true for electricians installing rigid metal conduit. Installers would not know how many 90° bends are permitted or how often supports are required for rigid metal conduit without first studying **Article 344**.

337.115 Jacket. Multiconductor cables shall have an overall nonmetallic jacket that is impervious to moisture, corrosion resistant, and sunlight resistant. When installed external to an enclosure or industrial machinery, single conductor cables shall have an overall nonmetallic jacket that is impervious to moisture, corrosion resistant, and sunlight resistant. Single conductor cables rated 2000 volts with conductor sizes equal to or larger than 4/0 AWG shall be permitted to use an increased insulation thickness in lieu of using a separate cable jacket. When the increased insulation thickness is used, the insulation material shall be sunlight resistant.

Stallcup's Comment: A revision was made to permit single conductor cables, without an overall jacket for installation in enclosures or machinery, or larger conductors with increased insulation thickness. Additional requirements were established for these applications.

OSHA 1910.305	NFPA 70B CH. 19	NFPA 70E 110.9(B)	UL 1581



JACKET
NEC 337.115

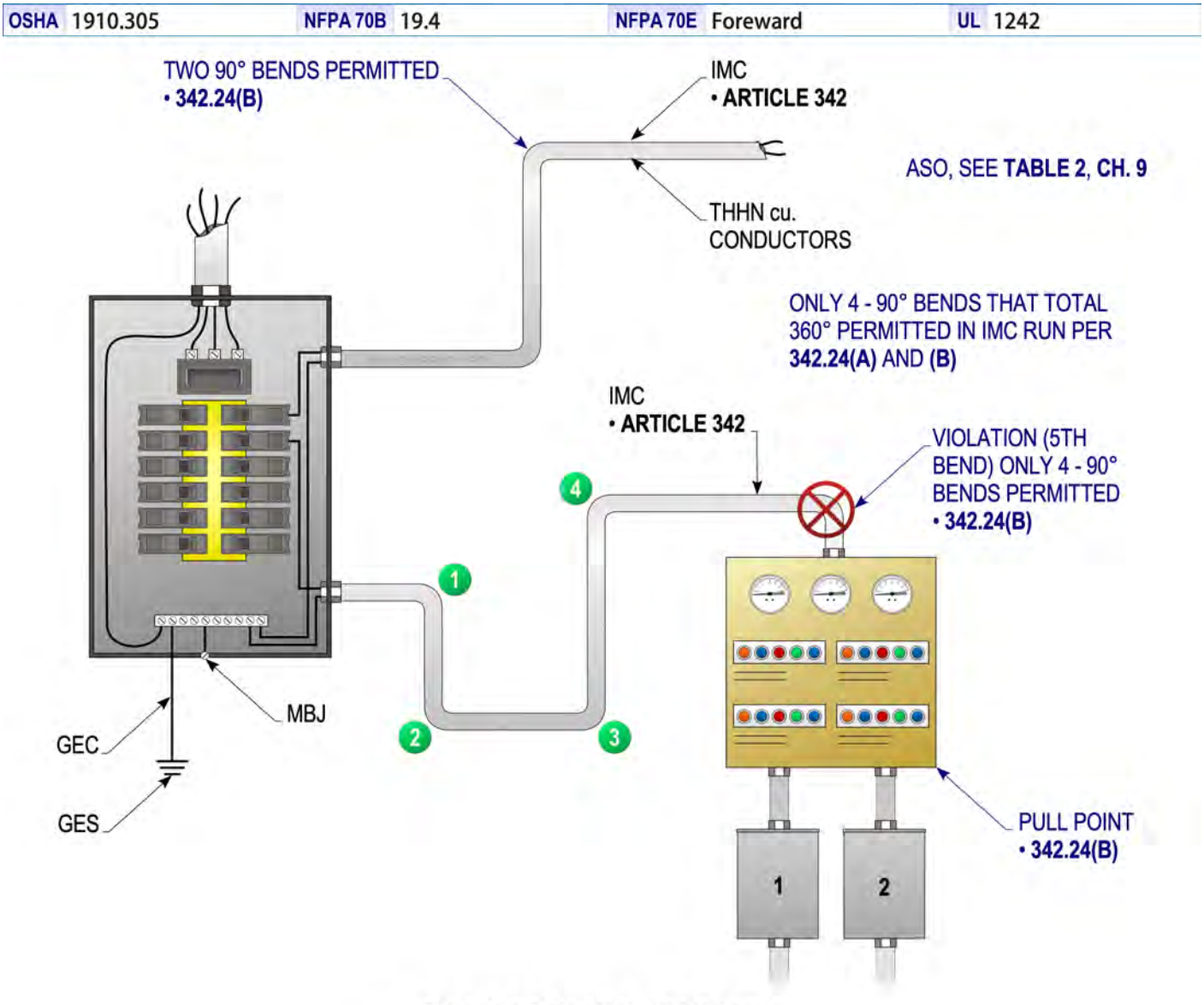
PURPOSE OF CHANGE: THIS REVISION WAS ADDED TO ADDRESS THE REQUIREMENTS FOR CONDUCTORS IN CABLES WITHOUT AN OVERALL JACKET.

342.24 Bends.

(A) How Made. Bends of IMC shall be so made that the conduit will not be damaged and the internal diameter of the conduit will not be effectively reduced. The radius of the curve of any field bend to the centerline of the conduit shall not be less than indicated in **Table 2, Chapter 9**.

(B) Number in One Run. The total degrees of bends in a conduit run shall not exceed 360 degrees between pull points.

Stallcup's Comment: A revision has been made to clarify that the total degrees of bends (360 degrees) permitted to be used in intermediate metal conduit run between pull points. Also, review **344.24** (rigid metal conduit), **348.24** (flexible metal conduit: **Type FMC**), **350.24** (liquidtight flexible metal conduit: **Type LFMC**), **353.24** (high density polyethylene conduit: **Type HDPE Conduit**), **354.24** (nonmetallic underground conduit wIth conductors: **Type NUCC**), **355.24** (reinforced thermosetting resin conduit: **Type RTRC**), **356.24** (liquidtight flexible nonmetallic conduit: **Type LFNC**), **358.24** (electrical metallic tubing: **Type EMT**), and **362.24** (flexible metallic tubing: **Type FMT**) for same change.



NUMBER OF BENDS IN ONE RUN
NEC 342.24(A) AND (B)

PURPOSE OF CHANGE: THIS REVISION ACCEPTED BY CMP CLARIFIES ONLY 4 - 90° DEGREE BENDS (TOTALING 360° DEGREES) PERMITTED IN RACEWAYS SUCH AS AN IMC RUN WITHOUT THE ADDITION OF A PULL POINT.

4

Equipment for General Use

Chapter 4 of the **National Electrical Code** has always been utilized by users and maintainers who have the responsibility of installing general-use electrical equipment, luminaires, motors, and similar equipment.

If an electrician or user is replacing a ballast in a fluorescent luminaire, **410.130** must be reviewed to ensure the correct ballast and installation procedures are used. Consider a three-phase, 460 volt, U-frame motor that has been replaced with a T-frame motor.

In order to verify that the overloads are the proper size, **430.32(A)(1)** must be used. Switches are covered in **Article 404**, receptacles in **Article 406**, and panelboards or switchboards in **Article 408**.

Electricians must not get confused when installing specialized equipment not included in **Chapter 4**. **Chapter 4** applies to general-use electrical equipment and **Chapter 6** applies to special electrical equipment.

For example, where installing a crane or a hoist, electricians must reference **Article 610**, which covers special equipment. For installing an elevator, **Article 620** must be referenced, not **Chapter 4**.

Article 445 applies to the installation of generators. If generators greater than 1000 volts are being installed, **Article 235** covers general equipment operating at over 1000 volts as well as other applicable **Articles** in the **NEC**.

Part IV. Portable Power Feeder Cables Over 2000 Volts, Nominal

400.40 General.
400.41 Portable Power Feeder Cables.
400.42 Uses Permitted.
400.43 Uses Not Permitted.
400.44 Construction.
400.45 Shielding.
400.46 Equipment Grounding Conductors.
400.47 Minimum Bending Radii.
400.48 Fittings.
400.49 Splices and Terminations.
400.50 Types.
400.51 Ampacities for Portable Power Feeder Cables Rated Greater Than 2000 Volts.
400.52 Markings

Stallcup's Comment: A new **Part IV** has been added to **Article 400** to address the requirements for portable power feeder cables over 2000 volts, nominal.

OSHA 1910.305	NFPA 70B CH. 19	NFPA 70E CH. 1	UL 508 A

SELECT YOUR SUBJECT FROM THE FOLLOWING:

400.40 GENERAL.
400.41 PORTABLE POWER FEEDER CABLES.
400.42 USES PERMITTED.
400.43 USES NOT PERMITTED.
400.44 CONSTRUCTION.
400.45 SHIELDING.
400.46 EQUIPMENT GROUNDING CONDUCTORS.
400.47 MINIMUM BENDING RADII.
400.48 FITTINGS.
400.49 SPLICES AND TERMINATIONS.
400.50 TYPES.
400.51 AMAPCITIES FOR PORTABLE POWER FEEDER CABLES RATED GREATER THAN 2000 VOLTS.
400.52 MARKINGS.

PART IV. PORTABLE POWER FEEDER CABLES OVER 2000 VOLTS, NOMINAL
400.51

PURPOSE OF CHANGE: THE CMP ACCEPTED AND ADDED TO THE **400 SERIES** A NEW **PART IV** THAT ADDRESS PORTABLE POWER FEEDER CABLES OVER 2000 VOLTS, NOMINAL.

404.1 Scope. This article covers all switches, switching devices, and circuit breakers used as switches operating at 1000 volts and below, unless specifically referenced elsewhere in this Code for higher voltages.

This article does not cover wireless control equipment to which circuit conductors are not connected.

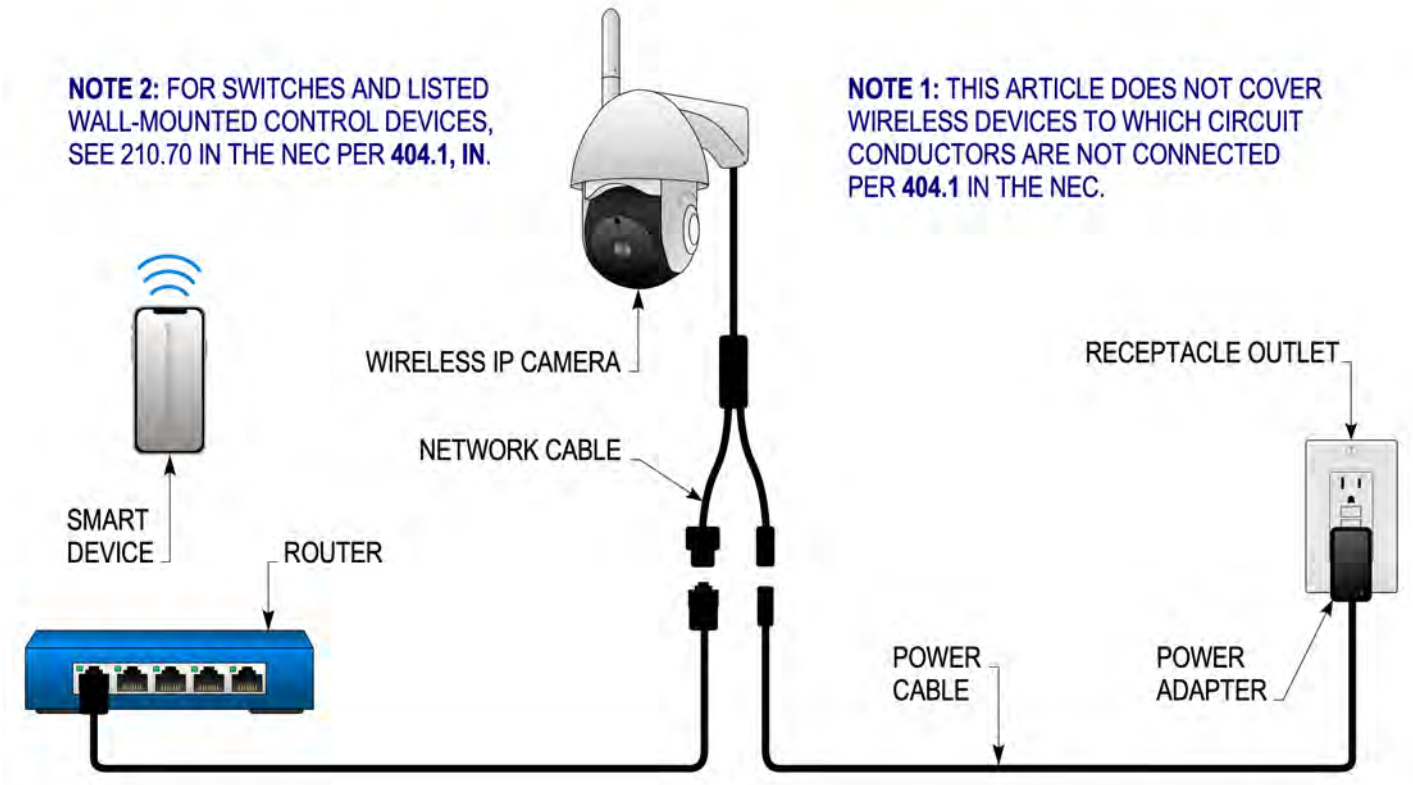
Informational Note: See **210.70** for additional information related to branch circuits that include switches or listed wall-mounted control devices.

Stallcup's Comment: A new sentence has been added to clarify that Article 404 does not apply to wireless control equipment to which circuit conductors are not connected. The scope of **Article 404** covers all switches, switching devices, and circuit breakers used as switches. The addition of the term "wall-mounted control devices" would be incorrect. A wireless control device that initiates the switching function but does not connect to circuit conductors to operate, is not a "switching device", and therefore is not under the preview of **Article 404**.

An **Informational Note** is added to reference Section **210.70** as it has information on wireless devices.

There is no need to reference connection to building wiring since it specifically indicates the scope does not apply to wireless control equipment to which circuit conductors are not connected.

OSHA 1910.269	NFPA 70B CH. 7	NFPA 70E Foreward	UL 60950



SCOPE
NEC 404.1

PURPOSE OF CHANGE: THE CMP ADDED A SENTENCE AND **INFORMATIONAL NOTE (IN)** TO CLARIFY **ARTICLE 404** DOES NOT INCLUDE WIRELESS CONTROL EQUIPMENT.

Table 450.3(A) Maximum Rating or Setting of Overcurrent Protection for Transformers Over 1000 Volts (as a Percentage of Transformer-Rated Current)

Stallcup's Comment: A revison has been made to **Table 450.3(A)** and **Notes** will no longer be referenced in the **Table**.

OSHA	1910.305(j)(5)	NFPA 70B	2.2 & 2.4	NFPA 70E	Foreward	UL	5085

Table 450.3(A) Maximum Rating or Setting of Overcurrent Protection for Transformers Over 1000 Volts (as a Percentage of Transformer-Rated Current)

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Location Limitations	Transformer Rated Impedance	Primary Protection over 1000 Volts		Secondary Protection[2] ~~(See Note 2)~~		
				Over 1000 Volts		1000 Volts or Less
		Circuit Breaker[4] ~~(See Note 4)~~	Fuse Rating	Circuit Breaker[4] ~~(See Note 4)~~	Fuse Rating	Circuit breaker or Fuse Rating
Any Location	Not more than 6%	600%[1] ~~(See Note 1)~~	300%[1] ~~(See Note 1)~~	300%[1] ~~(See Note 1)~~	250%[1] ~~(See Note 1)~~	125%[1] ~~(See Note 1)~~
	More than 6% and not more than 10%	400%[1] ~~(See Note 1)~~	300%[1] ~~(See Note 1)~~	250%[1] ~~(See Note 1)~~	225%[1] ~~(See Note 1)~~	125%[1] ~~(See Note 1)~~
Supervised Locations Only[3] ~~(See Note 3)~~	Any	300%[1] ~~(See Note 1)~~	250%[1] ~~(See Note 1)~~	Not required	Not required	Not required
	Not more than 6%	600%	300%	300%[5] ~~(See Note 5)~~	250%[5] ~~(See Note 5)~~	250%[5] ~~(See Note 5)~~
	More than 6% and not more than 10%	400%	300%	250%[5] ~~(See Note 5)~~	225%[5] ~~(See Note 5)~~	250%[5] ~~(See Note 5)~~

~~Notes:~~

~~1.~~ 1 Where the required fuse rating or circuit breaker setting does not correspond to a standard rating or setting, a higher rating or setting that does not exceed the following shall be permitted.

~~a.~~ (1) The next higher standard rating or setting for fuses and circuit breakers 1000 volts and below, or

~~b.~~ (2) The next higher commercially available rating or setting for fuses and circuit breakers above 1000 volta.

~~2.~~ 2 Where secondary overcurrent protection is required, the secondary overcurrent device shall be permitted to consist of not more than six circuit breakers or six sets of fuses grouped in one location. Where multiple overcurrent devices are utilized, the total of all the device ratings shall not exceed the allowed value of a single overcurrent device. If both circuit breakers and fuses are used as the overcurrent device, the total of the device ratings shall not exceed that allowed for fuses.

~~3.~~ 3 A supervised location is a location where conditions of maintenance and supervision ensure that only qualified persons monitor and service the transformer installation.

~~4.~~ 4 Electronically actuated fuses may be set to open at a specific current shall be set in accordance with settings for circuit breakers.

~~5.~~ 5 A transformer equipped with a coordinated thermal overload protection by the manufacturer shall be permitted to have separate secondary protection omitted.

MAXIMUM RATING OR SETTING OF OVERCURRENT PROTECTION FOR TRANSFORMERS OVER 1000 VOLTS NEC TABLE 450.3(A)

PURPOSE OF CHANGE: A REVISION HAS BEEN MADE TO **TABLE 450.3(A)** AND **NOTES** WILL NO LONGER BE REFRENCED IN THE TABLE.

5

Special Occupancies

Chapter 5 of the **National Electrical Code** has always been known as the special chapter, covering specific subjects that have particular functions or purposes. **Chapter 5** deals with places or locations where people work, and such occupancies can have built-in electrical hazards.

The main function of this chapter is to protect personnel and equipment from electrical hazards that could occur in a particular work area, based on the type of occupancy.

For example, designers, installers, and inspectors use the requirements of **Chapter 5** to design, install, and inspect the electrical wiring methods and equipment located in hazardous areas.

Chapter 5 is special because it is based on occupancies that prohibit a large portion of the design and installation techniques from falling under the requirements of **Chapters 1** through **4**.

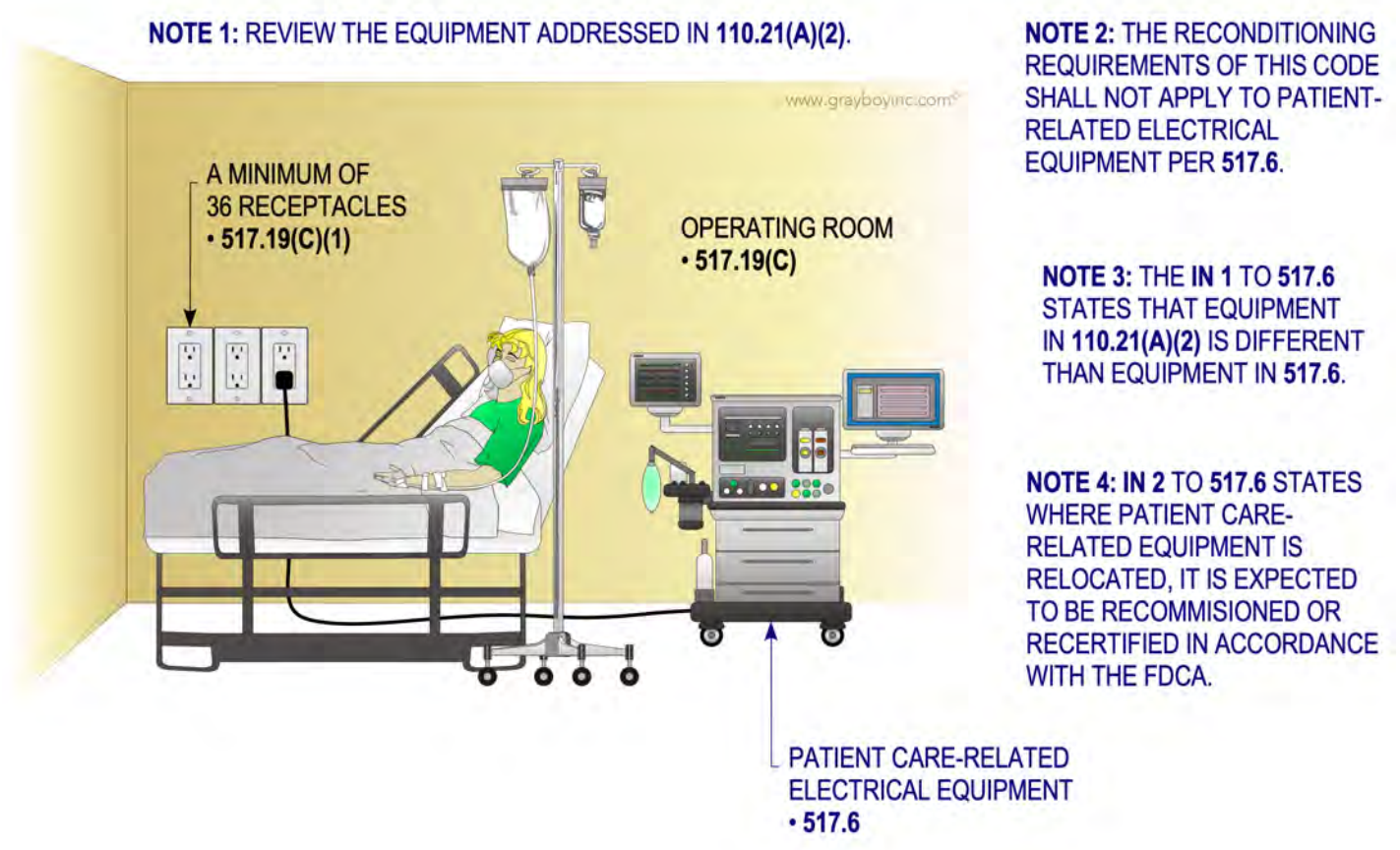
517.6 Patient Care–Related Electrical Equipment. The reconditioning requirements of this Code shall not apply to patient care–related electrical equipment.

Informational Note No. 1: Patient care–related electrical equipment is differentiated from electrical equipment as described in **110.21(A)(2).**

Informational Note No. 2: If patient care–related electrical equipment is relocated, it is expected to be recommissioned or recertified in accordance with the U.S. Federal Food, Drug, and Cosmetic Act (FDCA).

Stallcup's Comment: A new section has been added to clarify that patient care-related electrical equipment is different than electrical equipment in **110.21(A),** as it is expected to be recommissioned or recertified when it is relocated. The informational notes add clarity that this type of equipment is highly specialized and is not covered in this Code.

OSHA	1910.30, 32, & 34	NFPA 70B	2.2 & 2.4	NFPA 70E	Foreward	UL	61010



PATIENT CARE – RELATED ELECTRICAL EQUIPMENT
NEC 517.6 AND IN 1 AND IN 2

PURPOSE OF CHANGE: THE CMP ACCEPTED A NEW SECTION THAT DEALS WITH THE RECONDITIONING REQUIREMENTS PERTAINING TO PATIENT CARE-RELATED ELECTRICAL EQUIPMENT.

6

Special Equipment

Chapter 6 has always been utilized by designers, installers, and inspectors when dealing with special equipment that is located in specifi c occupancies. Special equipment, due to the specialized rules and regulations that are needed for its safe design and installation, cannot be located in **Chapter 4**, which covers equipment for general use. Specialized equipment ranges from such diverse equipment as electric signs and outline lighting to elevators to electric vehicle chargers.

If an engineer is designing an electrical system where elevators are to be installed in an office building. **Article 620** will contain the requirements necessary for such specialized equipment and its associated apparatus. **Note:** Anytime special equipment is designed, installed, and inspected, one of the **600** (series) article numbers of **Chapter 6** will be selected, based on the specialized equipment involved.

For example, an electrician designing an electrical circuit for a welder must consult **Article 630** and comply with the requirements pertaining to the type of welder being used.

For those users interested in the requirements necessary to design and install disconnects for deenergizing power circuits supplying cranes, they must utilize **Article 610** to find these rules.

620.12 Minimum Size of Conductors.

(A) Traveling Cables.

(4) Paralleled Conductors. Where ampacity requirements or voltage drop conditions in a traveling cable circuit prevent the use of a single conductor of AWG 14 or smaller, conductors shall be permitted in parallel in compliance with all the following:

(1) Each conductor shall be no smaller than 20 AWG copper.

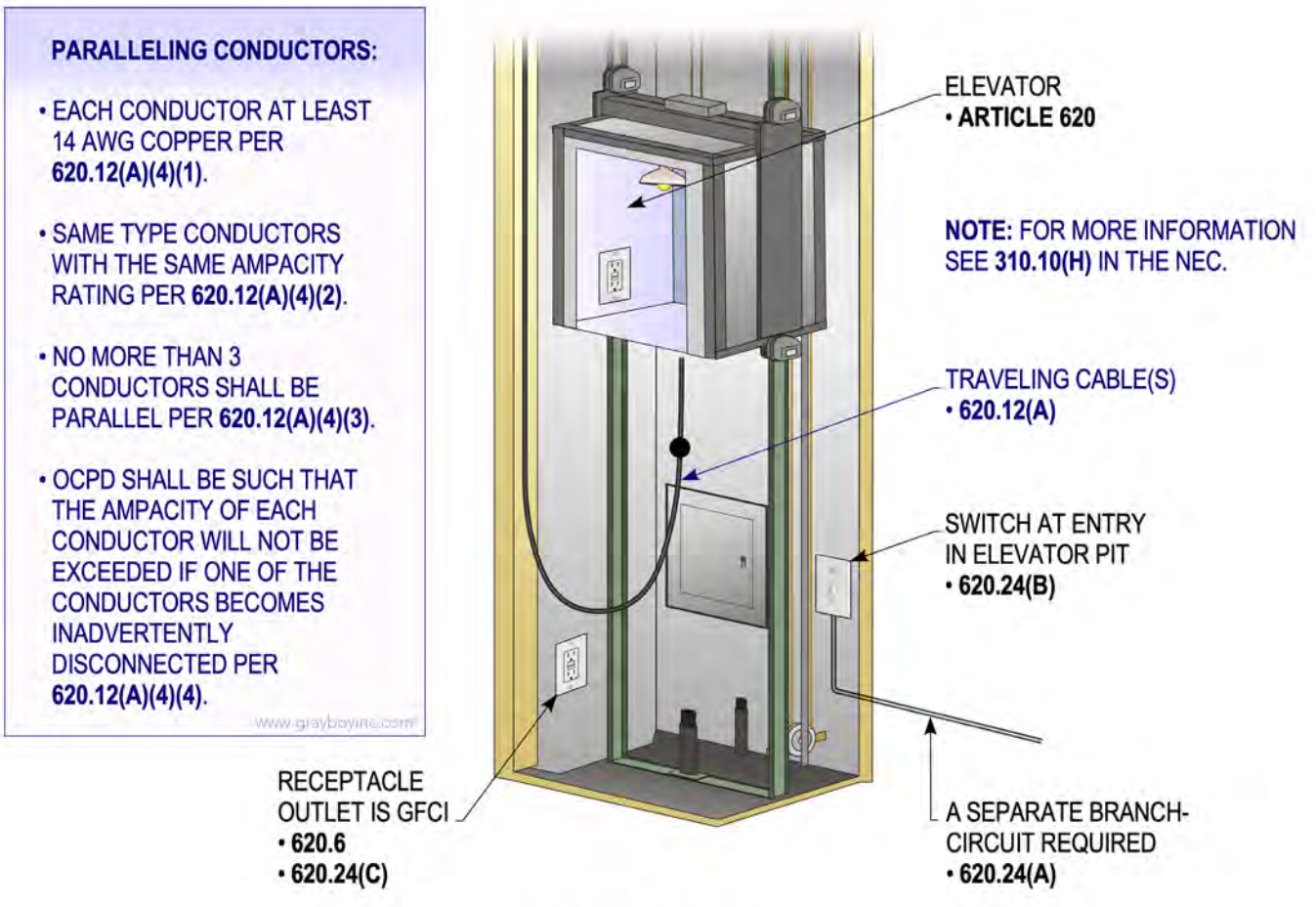
(2) The paralleled conductors shall be the same type and have the same ampacity rating.

(3) No more than 3 conductors shall be paralleled.

(4) The overcurrent protection shall be such that the ampacity of each individual conductor will not be exceeded if one of the parallel conductors becomes inadvertently disconnected.

Stallcup's Comment: A new subdivision has been added to clarify that parallel conductors are permitted in elevator traveling cables and to specify the conditions under which they are permitted.

OSHA	1910.146 & 1917.116	NFPA 70B	2.2 & 2.4	NFPA 70E	Foreward	UL	104



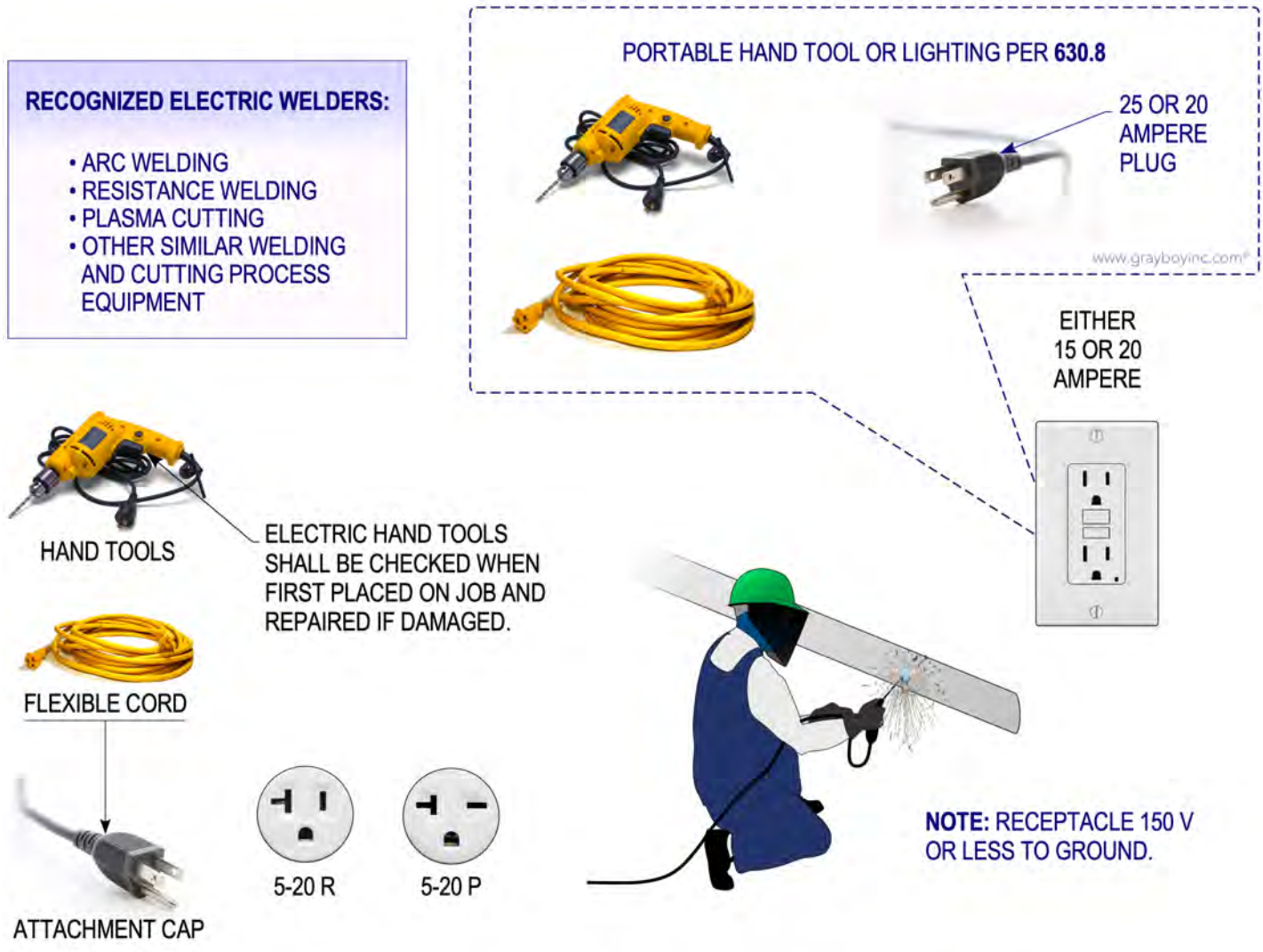
TRAVELING CABLES
NEC 620.12(1)(4)(1) THRU (A)(4)(4)

PURPOSE OF CHANGE: THE CMP ACCEPTED A NEW SUBDIVISION THAT ADDESSES THE PARALLELING OF CONDUCTORS IN THE TRAVELING CABLES AS OUTLINED IN **620.12(A)(4)(1)** THRU **(A)(4)(4)**.

630.8 Ground-Fault Circuit-Interrupter Protection for Personnel. All 125-volt, 15- and 20-ampere receptacles for electrical hand tools or portable lighting equipment, supplied by single-phase branch circuits rated 150 volts or less to ground, installed in work areas where welders are operated shall have ground-fault circuit-interrupter protection for personnel.

Stallcup's Comment: A new section has been added to require GFCI protection for personnel for all electric welder applications. Elevated risks exist in areas where welders are used, and this requirement adds the necessary safety.

OSHA	1910.304	**NFPA 70B**	13.2.4	**NFPA 70E**	110.10	**UL**	943



GROUND-FAULT CIRCUIT INTERRUPTING PROTECTION FOR PERSONNEL
NEC 630.8

PURPOSE OF CHANGE: THE CMP ACCEPTED AND ADDED A NEW SECTION THAT REQUIRES GFCI PROTECTION ON ALL PORTABLE HAND TOOLS AS WELL AS PORTABLE LIGHTING.

7

Special Conditions

The requirements of Chapter 7 have been used to design and install the electrical elements related to emergency and other special condition power sources. Emergency systems and their power sources are mandated by codes other than the National Electrical Code. The National Electrical Code establishes the provisions for the installation of emergency systems once these systems are required. **Article 724** and **725** covers remote control, signaling, and power-limited circuits. **Article 760** provides wiring requirements for fire alarm systems. Fiber optics are provided in **Article 770**.

Emergency systems shall operate automatically and supply illumination to designated areas and power to designated equipment, and their wiring shall not be run with the normal power system. Legally required standby systems shall also operate automatically, but unlike emergency systems, their wiring shall be permitted to be run with the wiring of the normal power system.

Optional standby systems shall not be required to operate automatically, and their wiring shall be permitted to be run with the wiring of the normal power system.

Articles and Sections of the **700** series govern wiring methods and equipment related to special conditions and use.

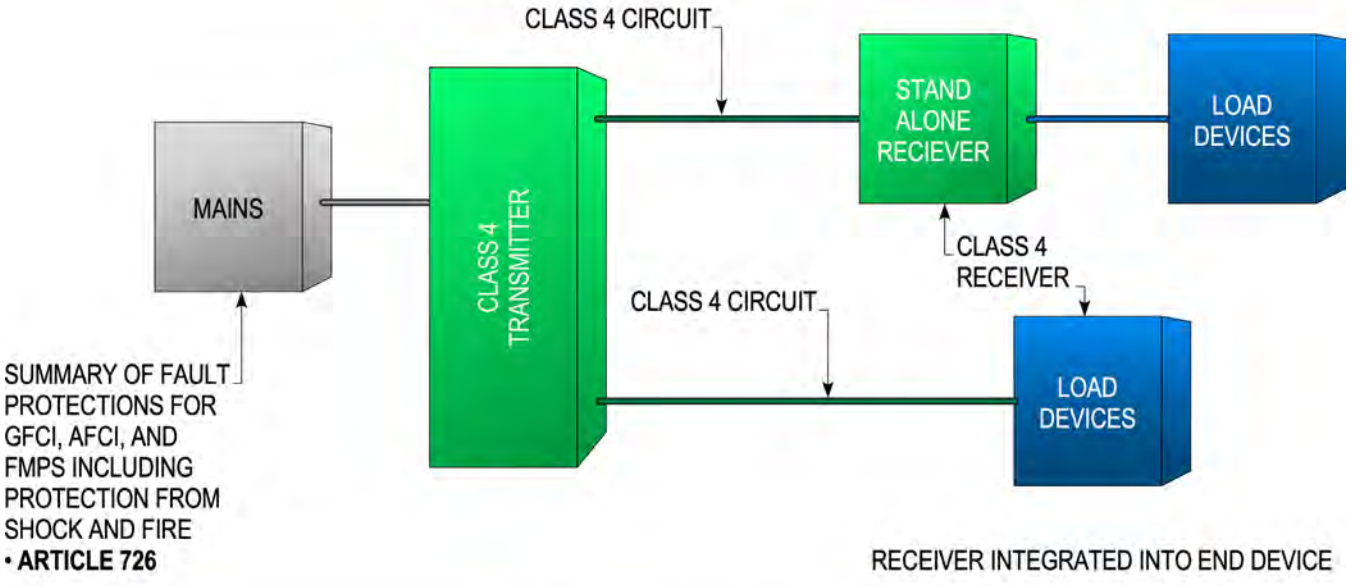
Article 726 Class 4 Fault-Managed Power Systems.

Part II. Class 4 Circuits.

726.121 Power Sources for Class 4 Circuits.
726.122 Class 4 Loads.
726.124 Class 4 Marking.
726.130 Terminals and Connectors.
726.136 Separation from Electric Light, Power, Class 1, Non–Power-Limited Fire Alarm Circuit, and Medium-Power Network-Powered Broadband Communications Cables.
726.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.
726.144 Ampacity

Stallcup's Comment: A new article has been added to address **Class 4** fault-managed power systems.

OSHA 1910.303	NFPA 70B 2.2 & 2.4	NFPA 70E Foreward	UL 1400-2



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PART II. CLASS 4 CIRCUITS

- POWER SOURCES FOR CLASS 4 CIRCUITS PER **726.121**
- CLASS 4 LOADS PER **726.122**
- CLASS 4 MARKINGS PER **726.124**
- TERMINALS AND CONNECTORS PER **726.130**
- SEPARATIONFROM ELECTRIC LIGHT, POWER, CLASS 1, NON-POWER-LIMITED FIRE ALARM CIRCUIT, AND MEDIUM-POWER NETWORK-POWERED, BROADBAND COMMUNICATIONS CABLES PER **726.136**
- INSTALLATION OF CONDUCTORS OF DIFFERENT CIRCUITS IN THE SAME CABLE, ENCLOSURE, CABLE TRAY, RACEWAY, OR CABLE ROUTING ASSEMBLY PER **726.139**
- AMPACITY PER **726.144**

CLASS 4 FAULT-MANAGED POWER SYSTEMS
NEC NEW ARTICLE 726

PURPOSE OF CHANGE: THE CMP ACCEPTED AND ADDED A NEW ARTICLE THAT ADDRESSES CLASS 4 FAULT-MANAGED POWER SYSTEMS.

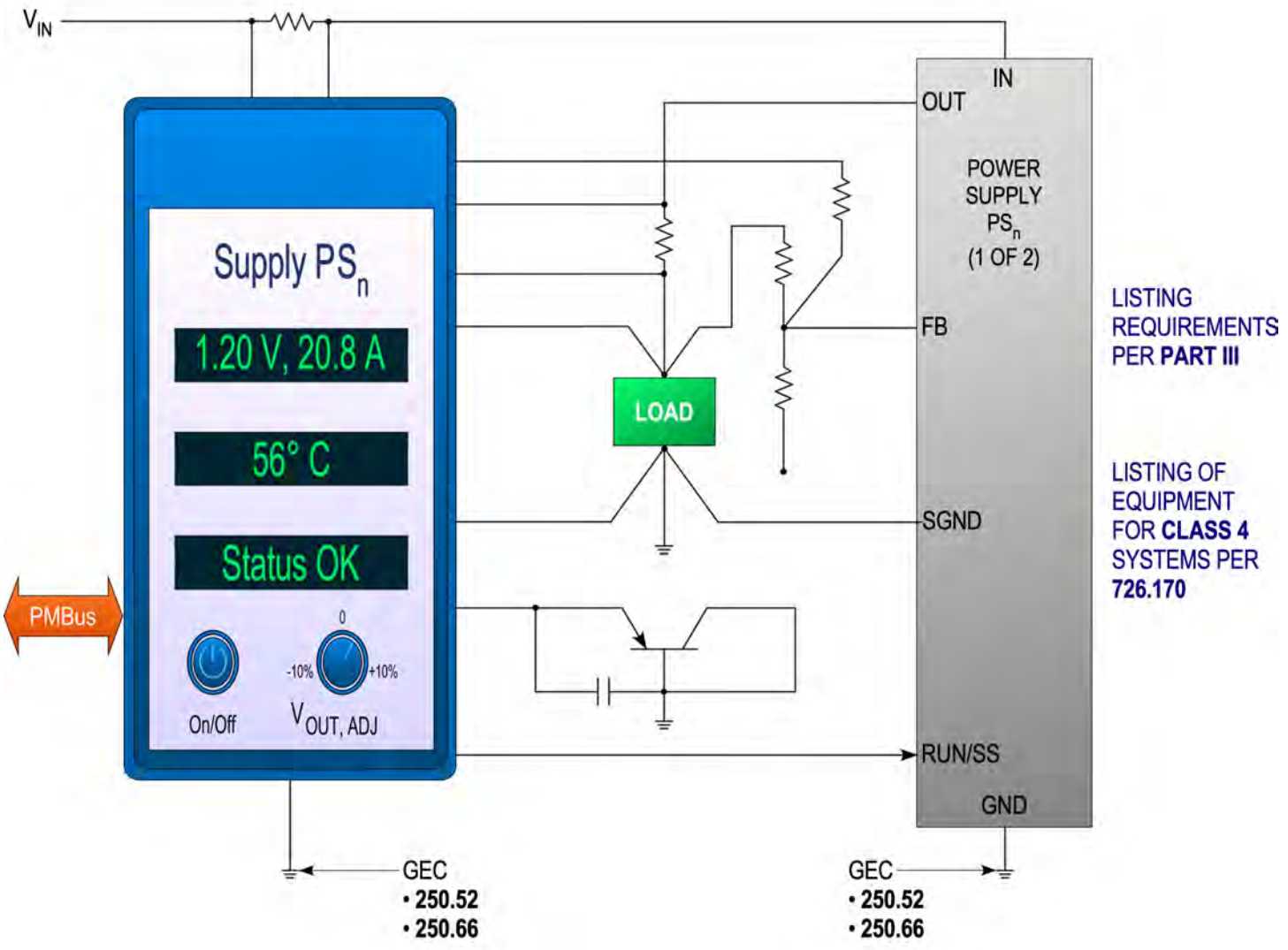
Article 726 Class 4 Fault-Managed Power Systems.

Part III. Listing Requirements.

726.170 Listing of Equipment for Class 4 Systems.

Stallcup's Comment: A new article has been added to address **Class 4** fault-managed power systems.

OSHA 1910.303	NFPA 70B 2.2 & 2.4	NFPA 70E Foreward	UL 1400-2



CLASS 4 FAULT-MANAGED POWER SYSTEMS
NEC NEW ARTICLE 726

PURPOSE OF CHANGE: THE CMP ACCEPTED AND ADDED A NEW ARTICLE THAT ADDRESSES CLASS 4 FAULT-MANAGED RELATED SYSTEMS.

8

Communications Systems

Chapter 8 of the National Electrical Code covers communications systems. Articles and sections of this chapter stand alone and are independent from **Chapters 1** through **7**, except in specific cases where they are referenced. Communications systems include such systems as telephone, cable TV, radio, and broadband communications.

The rules and regulations in this article are mainly applied to those systems that are connected to a central station and operate as elements of such systems. When communications are involved, one of the articles in the **800** series must be selected, based on the system utilized.

Chapter 8 also includes **Article 810**, which deals with radio, television, receiving equipment, and amateur radio transmitting and receiving equipment, but not equipment and antenna used for coupling (carrier) carrying current to power line conductors.

Article 820 covers coaxial cable distribution of radio frequency signals typically employed in community antenna television (CATV) systems.

Article 830 covers network-powered broadband communications where a carrier frequency has multiple signals impressed on the carrier. At the network interface unit, the signals are converted into individual signals and then distributed for phone, TV, burglar alarm, and other similar uses.

800.47 Underground Systems Entering Buildings. Underground communications wires and cables, CATV-type coaxial cables, and network-powered broadband communications cables entering buildings shall comply with **800.47(A)** and **(B)**. The requirements of **310.10(C)** shall not apply to communications wires and cables and CATV-type coaxial cables.

(A) Underground Systems with Electric Light, Power, Class 1, or Non-Power-Limited Fire Alarm Circuit Conductors. Underground communications wires and cables, CATV-type coaxial cables, and network-powered broadband communications cables in a raceway, pedestal, handhole enclosure, or manhole containing electric light, power, **Class 1**, or non-power-limited fire alarm circuit conductors shall be in a section separated from such conductors by means of brick, concrete, or tile partitions or by means of a suitable barrier.

(B) Direct-Buried Cables and Raceways. Direct-buried communications wires and cables, CATV-type coaxial cables, and network-powered broadband communications cables shall be separated at least 300 mm (12 in.) from conductors of any light or power, non-power-limited fire alarm circuit conductors, or **Class 1** circuit.

Exception No. 1: *Separation shall not be required if electric service conductors or all the direct-buried communications wires and cables, CATV-type coaxial cables, and network-powered broadband communications cables are installed in raceways or have metal cable armor.*

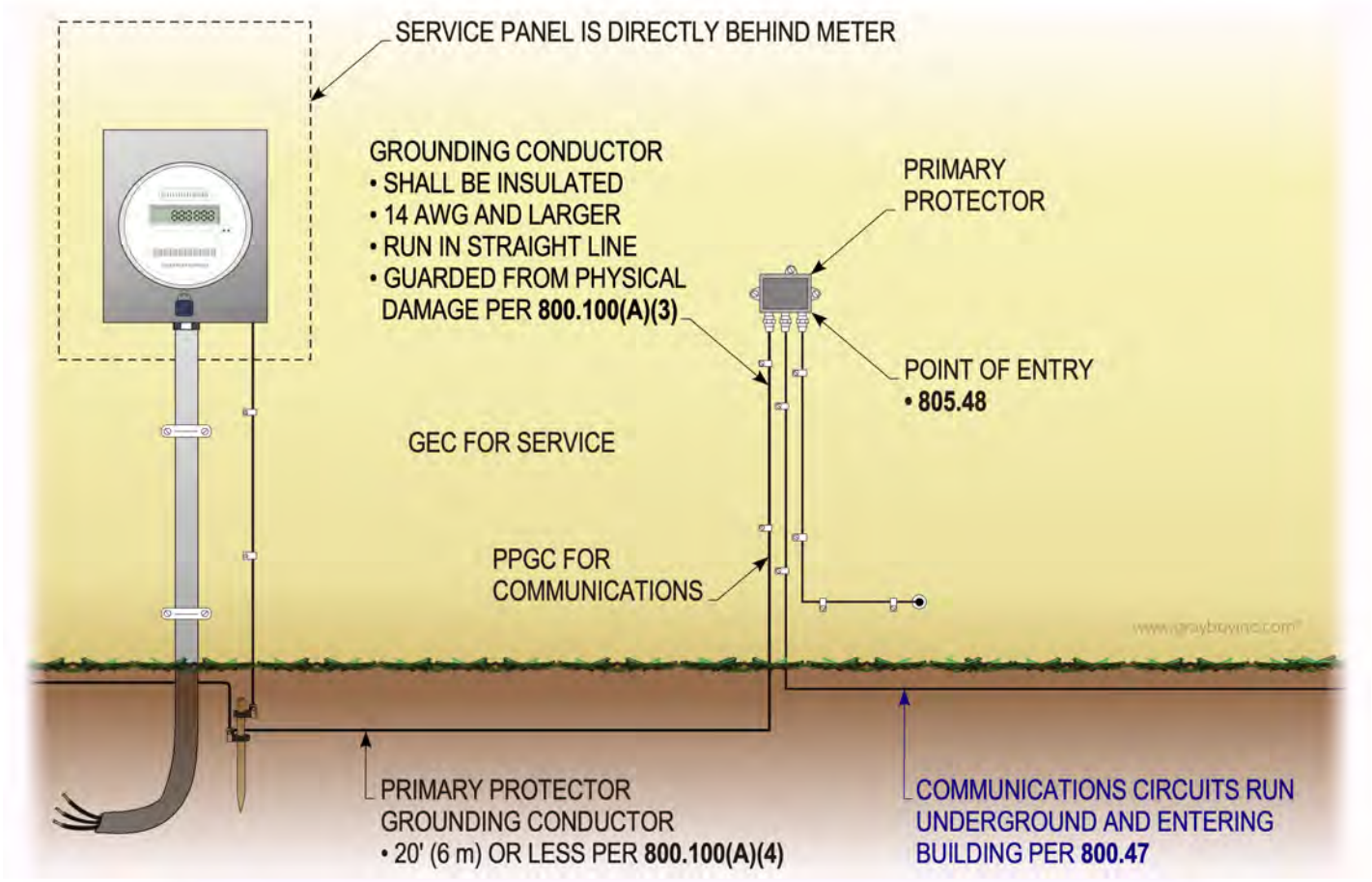
Exception No. 2: *Separation shall not be required under one of the following conditions:*

(1) *If the electric light or power branch-circuit or feeder conductors or Class 1 circuit conductors are installed in a raceway or in metal-sheathed, metal-clad, or Type UF or Type USE cables*

(2) *If all the direct-buried communications wires cables, CATV-type coaxial cables, and network-powered broadband communications cables have metal cable armor or are installed in raceway*

Stallcup's Comment: A new section has been added to address the continued consolidation of common requirements from **Articles 805**, **820**, and **830** into new general requirements of **Article 800**.

OSHA	1926.965	NFPA 70B	2.2 & 2.4	NFPA 70E	130.10	UL	967 & 1581



UNDERGROUND SYSTEMS ENTERING BUILDINGS PER 800.47:

UNDERGROUND SYSTEMS WITH ELECTRIC LIGHT, POWER, CLASS 1, OR NON-POWER-LIMITED FIRE ALARM CIRCUIT CONDUCTORS PER **800.47(B)(1); (2)**.

- PROVIDE PROPER SEPARATION DIRECT-BURIED CABLES AND RACEWAYS PER **800.47(B)**.
- REQUIREMENTS FOR 12" SEPARATION RULE

REVIEW EXCEPTIONS 1 AND AS WELL AS **(1)** AND **(2)** TO **EXCEPTION 2**.

UNDERGROUND SYSTEMS ENTERING BUILDING NEC 800.47(A) AND (B)

PURPOSE OF CHANGE: THE CMP ACCEPTED A NEW SECTION THAT COVER REQUIREMENTS IN ARTICLES **800**, **805**, AND **830** RESPECTFULLY.

800.48 Unlisted Cables Entering Buildings. Unlisted outside plant communications cables and unlisted outside plant CATV-type coaxial cables shall be permitted to be installed in building spaces other than risers, ducts used for environmental air, plenums used for environmental air, and other spaces used for environmental air if all of the following applies:

(1) The length of the cable within the building, measured from its point of entrance, does not exceed 15 m (50 ft).

(2) The cable enters the building from the outside.

(3) The unlisted outside plant communications cable is terminated in an enclosure or on a listed primary protector, or the unlisted outside plant CATV type coaxial cable is terminated at a grounding block.

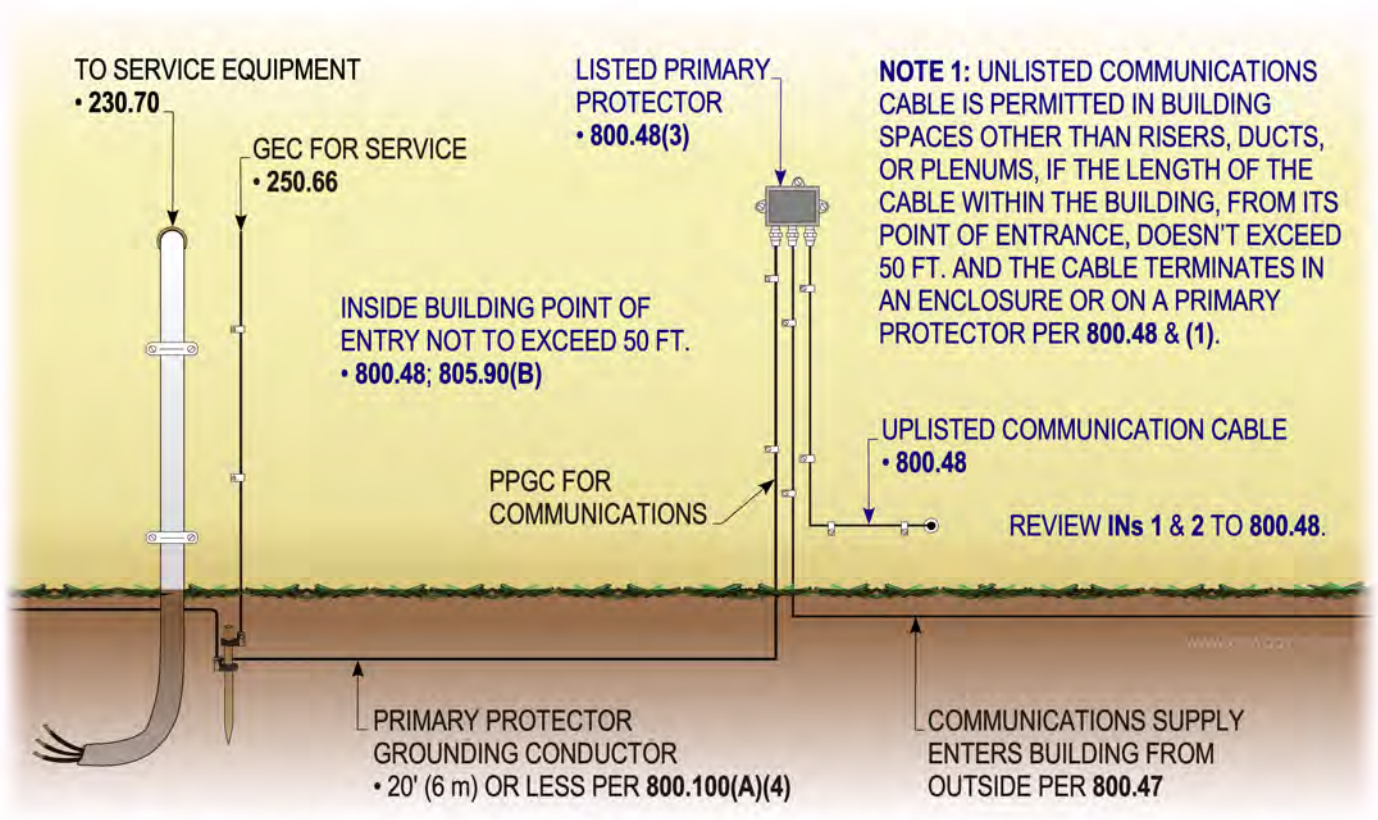
The point of entrance shall be permitted to be extended from the penetration of the external wall, roof, or floor slab by continuously enclosing the entrance cables in rigid metal conduit (RMC) or intermediate metal conduit (IMC) to the point of emergence.

Informational Note No. 1: Splice cases or terminal boxes, both metallic and plastic types, are typically used as enclosures for splicing or terminating communications cables.

Informational Note No. 2: This section limits the length of unlisted outside plant cable to 15 m (50 ft) from the point of entrance, while **805.90(B)** requires that the primary protector be located as close as practicable to the point of entrance of the cable. Therefore, in installations requiring a primary protector, the outside plant cable may not extend 15 m (50 ft) into the building if it is practicable to place the primary protector closer to the point of entrance.

Stallcup's Comment: A new section has been added to address the continued consolidation of common requirements from **Articles 805** and **820** into new general requirements of **Article 800**.

OSHA	1926.965	NFPA 70B	2.2 & 2.4	NFPA 70E	130.10	UL	967 & 1581



NOTE 2: OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE-RESISTANT RATED WALLS, FLOORS, AND CEILINGS MUST BE FIRESTOPPED USING APPROVED METHODS TO MAINTAIN THE FIRE-RESISTANCE RATING OF THE ASSEMBLY. FOR PHYSICAL PROTECTION, USE RMC OR IMC PER **800.48**.

UNLISTED CABLES ENTERING BUILDINGS
NEC 800.48(1) THRU (3)

PURPOSE OF CHANGE: THE CMP ACCEPTED A NEW SECTION THAT CONSOLIDATES COMMON REQUIREMENTS FROM **ARTICLES 805** AND **820**.