



National Electrical Code NEC (NFPA 70)

Ernie Gallo

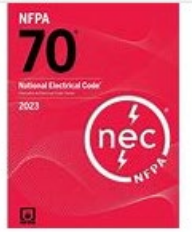
NEBScore

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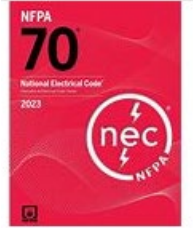


National Electrical Code (NEC)



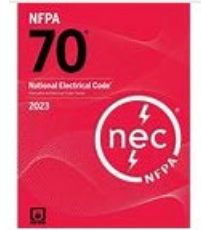
- Adopted in all 50 states, NFPA 70, the **National Electrical Code (NEC)** is the benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards.
- The **National Electrical Code (NEC)** is enforced by **local and state authorities** responsible for electrical safety regulations. These authorities include building inspectors, fire marshals, and electrical inspectors. They ensure that electrical installations comply with the NEC standards to prevent hazards and protect public safety.
- The **National Electrical Code (NEC)** is updated on a **three-year cycle**. The **National Fire Protection Association (NFPA)**, which publishes the NEC, reviews and revises it periodically to address emerging technologies, safety concerns, and industry advancements. The most recent version of the NEC is the **2023 edition**.
- Currently developing the 2026 NEC

National Electrical Code (NEC)



- **Where are we now**
- **Long-Term** – CC position on the long-term vision suggested by the Structure TG.
- **90.3** – Consider necessary changes to the NEC format to facilitate the implementation of the future structure.
- **2026 NEC** – Suggestions for the progression toward the 2029 NEC long-term vision.

National Electrical Code (NEC)



Founded to sell watches; evolved to sell everything	Founded to sell books; evolved to sell everything
1972	2017
sears	amazon
2 of every 3 Americans shopped in last 3 months	2 of every 3 Americans shopped in last 3 months
1987 Sales = 1% of GDP	2017 Sales = 1% of GDP

M Merriam
Associates

Source: Chicago Tribune

The 2020 Code Changes are here!

October 2020 ATLANTA November 2020

EC&M CodeChange CONFERENCES

NATIONAL ELECTRICAL CODE

NFPA Unveils New Virtual Reference Tool

Association to launch digital NFPA LiNK in September

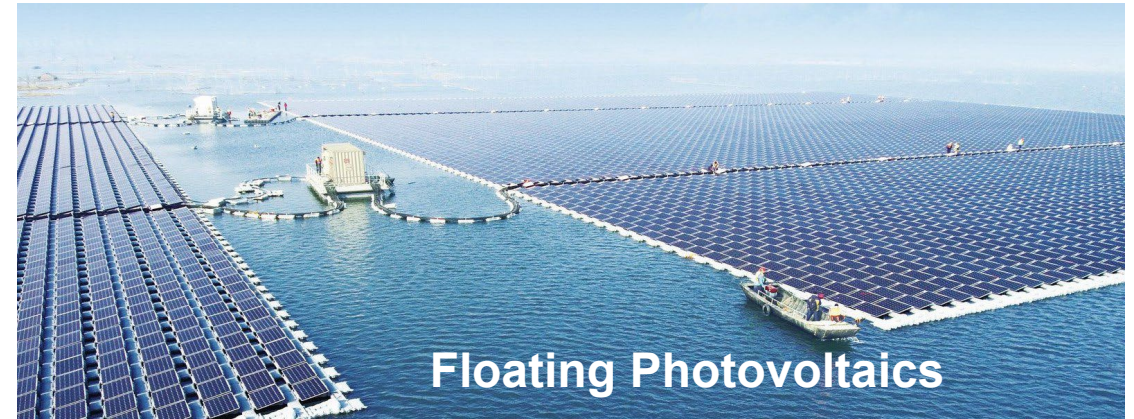
AUG 05, 2020

On August 4, NFPA announced the launch of a new virtual product coming soon. NFPA LiNK, a new digital subscription-based reference tool for codes and standards, will be available on Sept. 21, 2020,

Elevate your customer service. Get field service management.

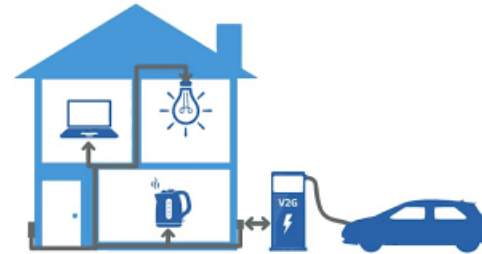
What Else is Coming Down the Pike?

Sources are evolving quickly. Traditional Power Generation Facilities are being augmented by more “alternative” sources, many not owned by the utility, and many more bi-directional sources/loads.

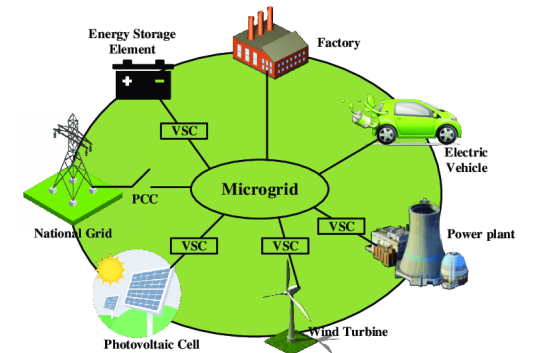


Floating Photovoltaics

Vehicle to Grid



Microgrids



Current NEC Structure - If we look at the NEC Structure in Buckets



Chapter 1
General



Chapter 2
Wiring & Protection



Chapter 3
Wiring Methods &
Materials



Chapter 4
Equipment for
General Use



Chapter 5
Special Occupancies




Chapter 6
Special Equipment



Chapter 7
Special Conditions



Chapter 8
Communications
Systems



1937-2023 (35 editions)

Introduction
(Identified as Article
90 starting in the
1959 edition)

Chapter 1 – General

Chapter 2 – Wiring
Design and
Protection

Chapter 4 has grown
from 10 articles in
the 1937 edition to
22 articles in the
2023 edition

Chapter 5 has grown
from 5 articles in the
1937 edition to 27
articles in the 2023
edition

Chapter 6 has grown
from 7 articles in the
1937 edition to 27
articles in the 2023
edition

Chapter 7 has grown
from 4 articles in the
1937 edition to 15
articles in the 2023
edition

Chapter 8 has grown
from 2 articles in the
1937 edition to 6
articles in the 2023
edition



Where do we want to go?

- Remain relevant with the quickly evolving electrical industry
- Improve usability
 - Eliminate redundancy
 - Place content where it makes sense
 - Logical/parallel structure
 - Improve Limited Energy content
 - Improve MV Content
 - Eliminate “Special Equipment” – Equipment is Equipment
 - Leverage the past to make the future even better
- Look to the future



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

National Electrical Code® Correlating Committee White Paper

Keeping the NEC® Relevant - Is Now the Time to Modernize?

The National Electrical Code® (NEC®) is the foundation of the electrical installation regulatory infrastructure for the United States, Mexico, and numerous other jurisdictions around the world. Growing demand for safe, reliable, resilient, and efficient use of electrical power to support society and the economy is aligning with technological advancement of power generation sources, electrical distribution, and new electrical power loads. It is critical the NEC be revised and implemented by the electrical community every three years to support the accelerating pace of change and technological advancement.

The structure of the NEC plays a critical role for personnel in learning, understanding, applying, and enforcing the requirements established within this regulatory code. While the current structure, first introduced in 1937, has provided tremendous success and stability and continues to be used by engineers, contractors, electricians and training programs, the ability to efficiently learn and quickly apply and inspect advancing technologies and uniquely configured electrical systems is a challenge for all electrical professionals. The existing NEC structure needs modernization to continue to support the advancing electrical infrastructure configurations and technological advancements. Therefore, it is imperative that the electrical industry actively pursue a revised NEC organizational structure to support ease of learning, understanding, and applying the NEC safety provisions in a rapidly advancing new energy landscape.



Keeping the
NEC Relevant.

Now is the
Time to
Modernize

Industry Trends

Medium Voltage

Limited Energy

Multi-Directional Power Flow

Digital Delivery of Content

Future Vision

Path Forward

Feedback



Medium Voltage

A Starting Point for Considering a New Approach

More difficult for AHJ's when inspecting

Less likely to have listed equipment since traditionally geared toward utility.

More likely to have requirements that are antiquated

Depth of knowledge of Technical Committees can be a challenge.

Wiring methods in Chapter 3 for >1000 volt systems are difficult to determine

With renewable energy and microgrids lines of distinction between NESC and NEC are blurred.



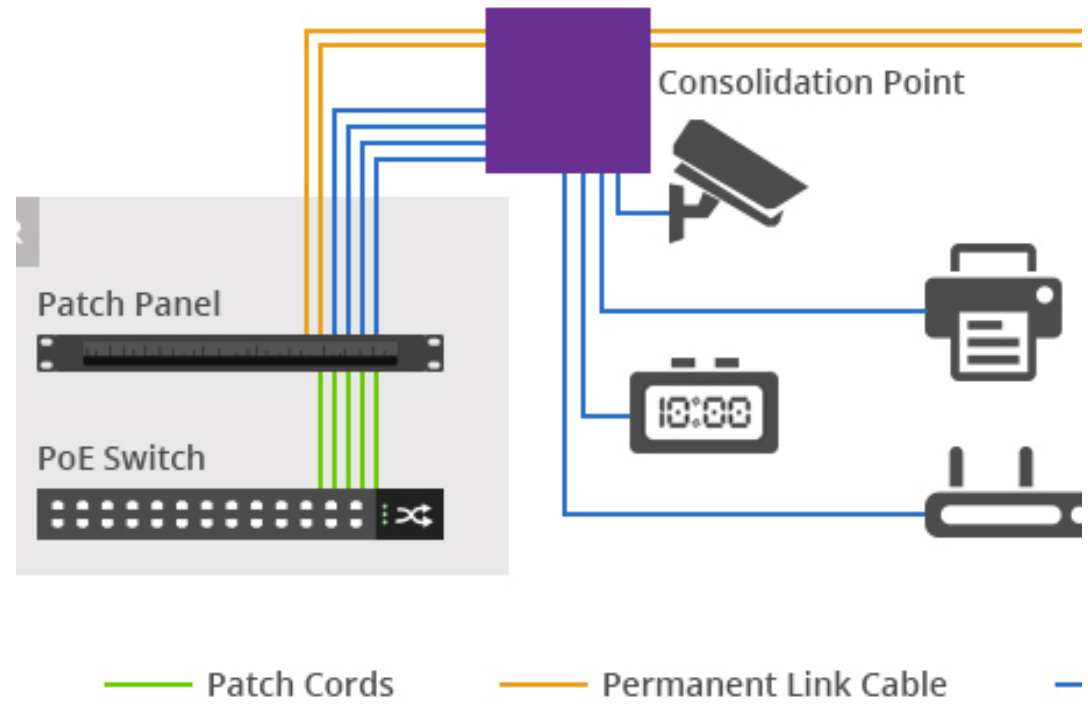
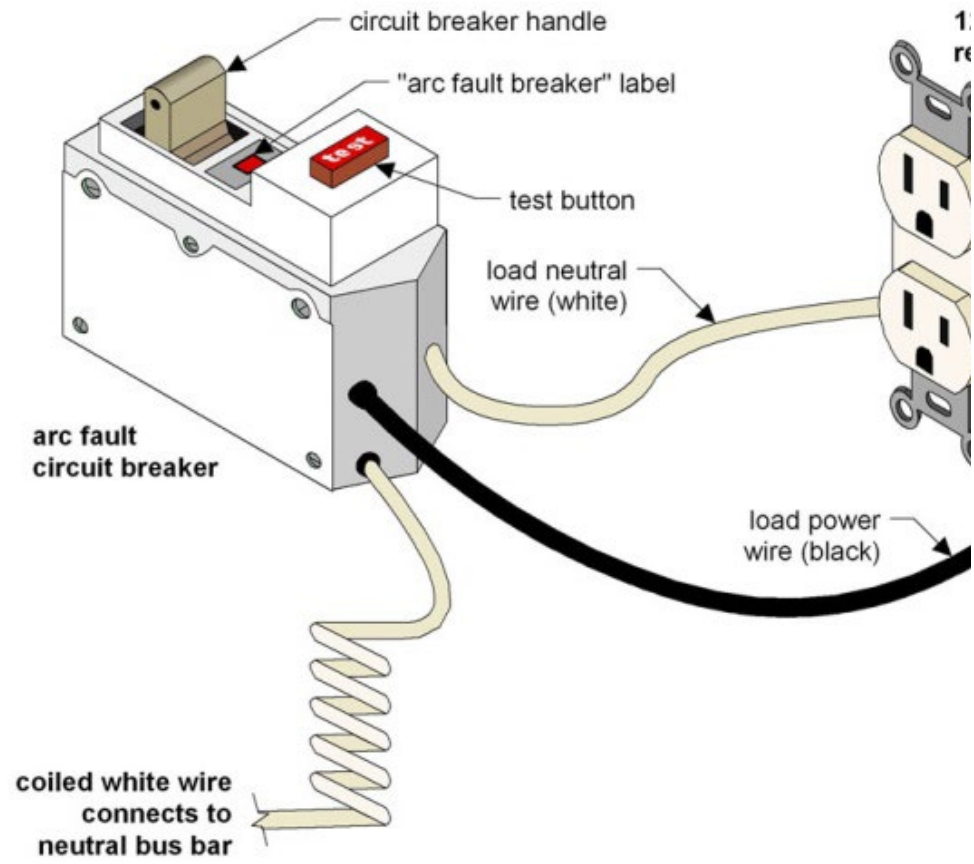
Past

- Confusing
- No more Ma Bell
- Everything communicates
- Independence Chapter 8 vs. Dependence Chapter 1-7
- Cat 5/6 Cable Article 725 and 805
- How do we maintain relevance?

Future

- Improve usability.
- Create structure that is technology agnostic.
- Eliminate redundancy.
- Parallel Structure

Arc fault circuit interrupter





Short-Term Goals (2026)

MV /Limited Energy

- Move from Medium voltage structure to Medium Voltage Technical changes
- Work on Limited Energy

Create parallel structure for Limited Energy

- Make it look like the front of the book.
- (Protection scheme, wire and a load)

Begin Implementation

- Create certain chapters to start long-term road map implementation



90.3 (2023 NEC)

Introduction
Definitions and General Requirements Chapter 1
Wiring and Protection Chapter 2
Wiring Methods and Materials Chapter 3
Equipment for General Wiring Chapter 4
Special Occupancies Chapter 5
Special Equipment Chapter 6
Special Conditions Chapter 7
Communication Systems Chapter 8
Tables Chapter 9
Informative Annex A through Informative Annex K

Applies generally to electrical installations

Requirements that Supplement or Modify Chapters 1 through 7

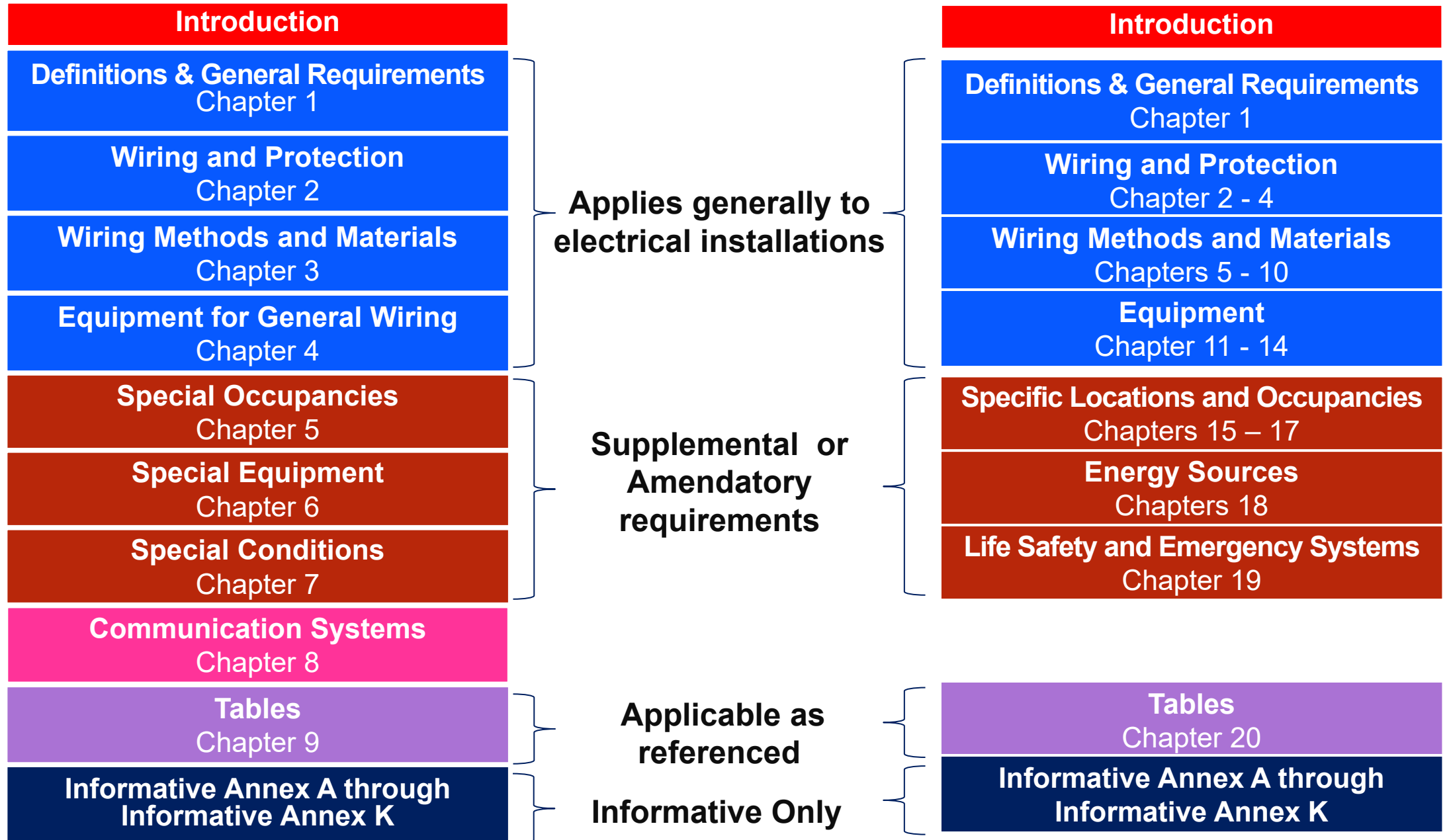
Chapter 8 is not subject to the requirements of Chapters 1 through 7 except where referenced in Chapter 8 {excerpt}

Applicable as referenced

Information only; not mandatory

90.3 (2023 NEC)

Proposed 90.3 (2029 NEC)





1

Title		2023 Reference	2026 CMP	2029 CMP
90	Introduction	90	1	1
Chapter 1. Definitions and General Requirements				
100	Definitions	100	1	1
110	Requirements for Electrical Installations	110	1	1
120	Load Calculations	220	2	2
130	Energy Management Systems	750	13	13
140	Temporary Installations	590	3	3


2

Title		2023 Reference	2026 CMP	2029 CMP
Chapter 2. Wiring and Protection for Systems 1000 VAC, 1500 VDC and Below				
200	General Requirements	300	3	3
205	Conductors	310	6	6
206	Use and Identification of Grounded Conductors	200	5	5
210	Branch Circuits	210	2	2
215	Feeders	215	10	10
225	Outside Branch Circuits and Feeders	225	10	10
230	Services	230	10	10
240	Overcurrent Protection	240	10	10
242	Overvoltage Protection (Part I and II)	242	10	10
250	Grounding and Bonding	250	5	5

3

Title		2023 Reference	2026 CMP	2029 CMP
Chapter 3. Wiring and Protection for Systems Over 1000 VAC, 1500 VDC		Chapt.13 in 2026 NEC; relocated to Chapt. 3 in 2029 NEC		
300	General Requirements	305	9	9
305	Conductors and Cables	315	9	9
306	Use and Identification of Grounded Conductors	205	5	9
310	Branch Circuits	235	9	9
315	Feeders	235	9	9
325	Outside Branch Circuits and Feeders	235	9	9
330	Services	235	9	9
342	Overvoltage Protection	242 (Part III)	10	9
350	Grounding and Bonding	250 (Part X)	5	5



4

Title		2023 Reference	2026 CMP	2029 CMP
Chapter 4. Wiring and Protection for Limited Energy Systems		Chapter 14 in 2026 NEC; relocated to Chapter 4 in 2029 NEC		
400	Wiring Requirements and Materials		3	3
405	Conductors and Cables (Including Listing and Flammability)	722	3	3
406	Use and Identification of Conductors		3	3
430	Interior Cabling Systems Part I- Class 1 Power-Limited Circuits Part II- Class 2 and Class 3 Part III- Class 4	724, 725, 726	3	3
435	Exterior Cabling Systems (Outside Plant) Part I- Communication Circuits Part II- Antenna Systems Part III- CATV Part IV- Networked-Powered Broadband Communication Systems Part V- Premises-Powered Broadband Communication Systems		16	16
440	Overcurrent Protection Part I- Class 1 Power-Limited Circuits Part II- Class 2 and Class 3 Part III- Class 4	724, 725, 726	3	3
442	Overvoltage Protection		3	3
450	Grounding and Bonding		16	5

Are limited energy circuits mainly DC circuits? And if so, we will need to identify them as such in the title or scope to align with the objective of PI 4287?

Add optical fiber systems of Article 770 to these limited energy system articles either as new Article 470 Optical Fiber Systems or integrate with other articles above as separate parts or sections of the new Articles 400, 405, 406, 430, 435, and 450 here since Article 770 is written with parallel language to Chapter 8 articles and would be straightforward to add to the new articles.



5

Title		2023 Reference	2026 CMP	2029 CMP
Chapter 5. Enclosures and Wiring Support Structures				
500	Cabinets, Cutout Boxes, and Meter Socket Enclosures	312	8	8
502	Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Handhole Enclosures	314	8	8
504	Cable Trays	392	8	8
506	Auxiliary Gutters	366	8	8
508	Metal Wireways	376	8	8
510	Nonmetallic Wireways	378	8	8
512	Nonmetallic Extensions	382	6	8

6

Title		2023 Reference	2026 CMP	2029 CMP
Chapter 6. Wire and Cable				
600	Armored Cable: Type AC	320	6	6
602	Flat Cable Assemblies: Type FC	322	6	6
604	Flat Conductor Cable: Type FCC	324	6	6
606	Integrated Gas Spacer Cable: Type IGS	326	6	6
608	Metal-Clad Cable: Type MC	330	6	6
610	Mineral-Insulated, Metal-Sheathed Cable: Type MI	332	6	6
612	Nonmetallic-Sheathed Cable: Types NM and NMC	334	6	6
614	Optical Fiber Cables	770	16	16
616	Instrumentation Tray Cable: Type ITC	335	6	6
618	Power and Control Tray Cable: Type TC	336	6	6
620	Type P Cable	337	6	6
622	Service-Entrance Cable: Types SE and USE	338	6	6
624	Underground Feeder and Branch-Circuit Cable: Type UF	340	6	6
626	Flexible Cords and Flexible Cables	400	6	6
628	Fixture Wires	402	6	6

Belongs with limited energy articles



7,
8

Chapter 7. Circular Raceways (Conduit and Tubing)				
700	Intermediate Metal Conduit: Type IMC	342	8	8
702	Rigid Metal Conduit: Type RMC	344	8	8
704	Flexible Metal Conduit: Type FMC	348	8	8
706	Liquidtight Flexible Metal Conduit: Type LFMC	350	8	8
708	Rigid Polyvinyl Chloride Conduit: Type PVC	352	8	8
710	High Density Polyethylene Conduit: Type HDPE Conduit	353	8	8
712	Nonmetallic Underground Conduit with Conductors: Type NUCC	354	8	8
714	Reinforced Thermosetting Resin Conduit: Type RTRC	355	8	8
716	Liquidtight Flexible Nonmetallic Conduit: Type LFNC	356	8	8
718	Electrical Metallic Tubing: Type EMT	358	8	8
720	Flexible Metallic Tubing: Type FMT	360	8	8
722	Electrical Nonmetallic Tubing: Type ENT	362	8	8
724	Raceways for Limited Energy Systems (Communication Raceways)	800, 805, 810, 820, 830, 840	16	16
Chapter 8. Non-Circular Raceways				
800	Cellular Concrete Floor Raceways	372	8	8
802	Cellular Metal Floor Raceways	374	8	8
804	Strut-Type Channel Raceway	384	8	8
806	Surface Metal Raceways	386	8	8
808	Surface Nonmetallic Raceways	388	8	8
810	Underfloor Raceways	390	8	8


9,
10,
11

Chapter 9. Power and Lighting Systems				
900	Busways	368	8/9	8
902	Cablebus	370	8	8
904	Insulated Bus Pipe (IBP) and Tubular Covered Conductors (TCC) (New)	369	8	8
906	Flexible Bus System (New)	371	8	8
908	Multioutlet Assembly	380	8	8
910	Low-Voltage Suspended Ceiling Power Distribution Systems	393	18	18
912	Manufactured Wiring Systems	604	7	7
916	Office Furnishings	605	18	18
Chapter 10. Open Wiring				
1000	Concealed Knob-and-Tube Wiring	394	6	6
1002	Messenger-Supported Wiring	396	6	6
1004	Open Wiring on Insulators	398	6	6
Chapter 11. Devices				
1100	Switches	404	9/10	10
1102	Wiring Devices	406	18	18
1104	Switchboards, Switchgear and Panelboards	408	10	10
1106	Industrial Control Panels	409	11	11
1108	Transformers and Transformer Vaults	450	9	9
1110	Phase Converters	455	13	13
1112	Capacitors	460	9/11	11
1114	Resistors and Reactors	470	9/11	11



12

Chapter 12. Utilization Equipment				
1200	Luminaires, Lampholders and Lamps	410	18	18
1202	Low-Voltage Lighting	411	18	18
1204	Electric Signs and Outline Lighting	600	18	18
1206	Motors, Motor Circuits, and Controller	430	11	11
1208	Cranes and Hoists	610	12	12
1210	Elevators, Dumbwaiters, Escalators, Moving Walks, Platform Lifts, and Stairway Chairlifts	620	12	12
1212	Electrically Driven or Controlled Irrigation Machines	675	7	7
1214	Appliances	422	17	17
1216	Fixed Electric Space Heating Equipment	424	17	17
1218	Fixed Resistance and Electrode Industrial Process Heating Equipment	425	17	17
1220	Fixed Outdoor Electric Deicing and Snow-Melting Equipment	426	17	17
1222	Fixed Electric Heating Equipment for Pipelines and Vessels	427	17	17
1224	Air-Conditioning and Refrigeration Equipment	440	11	11
1226	Induction and Dielectric Heating Equipment	665	12	12
1228	Electric Welders	630	12	12
1230	Pipe Organs	650	12	12
1232	Information Technology Equipment	645	12	12
1234	Sensitive Electronic Equipment	647	12	12
1236	X-Ray Equipment	660	12	12



13, 14

Chapter 13. Systems (Equipment)				
1300	Electric Vehicle Power Transfer System	625	12	12
1302	Electrified Truck Parking Spaces	626	12	12
1304	Audio Signal Processing, Amplification, and Reproduction Equipment	640	12	12
1306	Modular Data Centers	646	12	12
1308	Electrolytic Cells	668	12	12
1310	Electroplating	669	12	12
1312	Industrial Machinery	670	12	12
1314	Integrated Electrical Systems	685	12	12
Chapter 14. Equipment Over 1000 VAC, 1500 VDC				
1400	General	495 (Part I & II)	9	9
1402	Switchgear and Industrial Control Assemblies	495 (Part III)	9	9
1404	Mobile and Portable Equipment	495 (Part IV)	9	9
1406	Boilers	495 (Part V)	9	9
1408	Motors, Motor Circuits, and Controllers	430 (Part XI)	11	9
1410	Capacitors	460 (Part III)	11	9
1412	Resistors and Reactors	470 (Part III)	11	9



15

Chapter 15. Hazardous Locations				
1500	Hazardous (Classified) Locations, Classes I, II, and III, Divisions 1 and 2	500	14	14
1501	Class I Locations	501	14	14
1502	Class II Locations	502	14	14
1503	Class III Locations	503	14	14
1504	Intrinsically Safe Systems	504	14	14
1505	Zone 0, 1, and 2 Locations	505	14	14
1506	Zone 20, 21, and 22 Locations for Combustible Dusts or Ignitable Fibers/Flyings	506	14	14
1511	Commercial Garages, Repair and Storage	511	14	14
1512	Cannabis Oil Equipment and Cannabis Oil Systems Using Flammable or Combustible Materials	512	14	14
1513	Aircraft Hangars	513	14	14
1514	Motor Fuel Dispensing Facilities	514	14	14
1515	Bulk Storage Plants	515	14	14
1516	Spray Application, Dipping, Coating, and Printing Processes Using Flammable or Combustible Materials	516	14	14


16

Chapter 16. Occupancies				
1600	Health Care Facilities	517	15	15
1602	Assembly Occupancies	518	15	15
1604	Theaters, Audience Areas of Motion Picture and Television Studios, Performance Areas, and Similar Locations	520	15	15
1606	Control Systems for Permanent Amusement Attractions	522	15	15
1608	Carnivals, Circuses, Fairs, and Similar Events	525	15	15
1610	Motion Picture and Television Studios and Similar Locations	530	15	15
1612	Motion Picture Projection Rooms	540	15	15
1614	Manufactured Buildings and Relocatable Structures	545	7	7
1616	Agricultural Buildings	547	7	7
1618	Mobile Homes, Manufactured Homes, and Mobile Home Parks	550	7	7
1620	Recreational Vehicles and Recreational Vehicle Parks	551	7	7
1622	Park Trailers	552	7	7

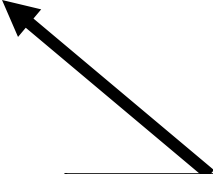
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Chapter 17. Installations Associated with Bodies of Water				
1700	Swimming Pools, Fountains, and Similar Installations	680	17	17
1702	Natural and Artificially Made Bodies of Water	682	7	7
1704	Marinas, Boatyards, Floating Buildings, and Commercial and Noncommercial Docking Facilities	555	7	7
Chapter 18. Power Production and Energy Storage Systems				
1800	Interconnected Systems	705	13	13
1802	Generators	445	13	13
1804	Stationary Standby Batteries	480	13	13
1806	Solar Photovoltaic (PV) Systems	690	4	4
1808	Large-Scale Photovoltaic (PV) Electric Supply Stations	691	4	4
1810	Fuel Cell Systems	692	4	4
1812	Wind Electric Systems	694	4	4
1814	Energy Storage Systems	706	13	13
1816	Stand Alone Systems	710	4	4
1818	Optional Standby Systems	702	13	13
Chapter 19. Life Safety and Emergency Systems				
1900	Emergency Systems	700	13	13
1902	Legally Required Standby Systems	701	13	13
1904	Fire Pumps	695	13	13
1906	Fire Alarm Systems	760	3	3
1908	Circuit Integrity Cables and Electrical Protective Systems (Fire-Resistive Cable Systems)	728	3	3
1910	Critical Operations Power Systems (COPS)	708	13	13

2026 NEC Structure

Introduction
Definitions and General Requirements Chapter 1
Wiring and Protection Chapter 2
Wiring Methods and Materials Chapter 3
Equipment for General Wiring Chapter 4
Special Occupancies Chapter 5
Special Equipment Chapter 6
Special Conditions Chapter 7
Limited Energy Chapter 8
Tables Chapter 9
Informative Annex A through Informative Annex K

2026 NEC		2023 Reference
Chapter 1. Definitions and General Requirements		
100	Definitions	100
110	Requirements for Electrical Installations	110
120	Load Calculations	220
130	Energy Management Systems	750
140	Temporary Installations	590



2026 NEC Structure

Introduction
Definitions and General Requirements Chapter 1
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Informative Annex A through Informative Annex K

2026 NEC		2023 NEC Reference
Wiring and Protection for Systems Over 1000 VAC, 1500 VDC		
xxx	General Requirements	305
xxx	Conductors and Cables	315
xxx	Branch Circuits	235
xxx	Feeders	235
xxx	Outside Branch Circuits and Feeders	235
xxx	Services	235
xxx	Grounding and Bonding	250 (Part X)

2026 NEC STRUCTURE

Introduction
Definitions and General Requirements Chapter 1
Wiring and Protection Chapter 2
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Limited Energy Chapter 8
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Informative Annex A through Informative Annex K

2026 NEC		2023 NEC Reference
Chapter 8 Wiring and Protection for Limited Energy Systems		
800	Wiring Requirements and Materials	
805	Conductors and Cables (Including Listing and Flammability)	722
810	Use and Identification of Conductors	
820	Interior Cabling Systems Part I- Class 1 Power-Limited Circuits Part II- Class 2 and Class 3 Part III- Class 4	724, 725, 726
830	Exterior Cabling Systems (Outside Plant) Part I- Communication Circuits Part II- Antenna Systems Part III- CATV Part IV- Networked-Powered Broadband Communication Systems Part V- Premises-Powered Broadband Communication Systems	
840	Overcurrent Protection Part I- Class 1 Power-Limited Circuits Part II- Class 2 and Class 3 Part III- Class 4	724, 725, 726
842	Overvoltage Protection	



There are no PIs that I am aware of to accomplish this rearrangement for 2026 code and to delete all current articles in chapter 8

I note that no changes are made to Chapter 7



Introduction
Definitions and General Requirements Chapter 1
Wiring and Protection Chapters 2 – 4
Wiring Methods and Materials Chapters 5 – 10
Equipment Chapters 11 – 14
Specific Locations and Occupancies Chapters 15 – 17
Energy Sources Chapters 18
Life Safety and Emergency Systems Chapter 19
Tables Chapter 20
Informative Annex A through Informative Annex K

Proposed 2029 NEC Structure

Applies generally to electrical installations

Supplemental or Amendatory Requirements

Applicable as referenced

Information only; not mandatory



NEC Restructuring Side Effects

Initial restructuring efforts may result in power wiring requirements now being misapplied to communications installation; such as

Green, white and gray insulated communications conductors are not grounded wires as may be required under sections of Article 200

Communications cables need not be enclosed in conduit or protected with steel plates as per various parts of Article 300

Correlation efforts in task groups may be needed to avoid confusion between the new proposed articles, current technical requirements and exemptions in Chapter 8, and the power supply wiring in other chapters 1-4.

Related actions by CMP16 in this cycle may offer a different approach or contribution to the restructuring effort

CMP 16 has expanded and consolidated general and common requirements into for last 3 code cycles under -

Article 800, *General Requirements for Communications Systems*,

The background of the slide is a dense, overlapping collage of small, colorful sticky notes. Each note is a different color (red, blue, green, yellow, pink, light blue) and features a large, black question mark. The notes are scattered across the entire frame, creating a vibrant and busy visual texture.

Thank You & Questions