

TABLE OF CONTENTS

About This Textbook	xv	110.17	Servicing and Maintenance of Equipment	81
Additional Products to Help You Learn	xviii	110.20	Reconditioned Equipment.....	82
How to Use the <i>National Electrical Code</i>	1	110.21	Hazard Markings.....	82
Article 90—Introduction to the <i>National Electrical Code</i>	7	110.22	Identification of Disconnecting Means	83
90.1 Scope.....	7	110.24	Available Fault Current Marking.....	83
90.2 Use and Application of the <i>NEC</i>	7	110.25	Lockable Disconnecting Means	84
90.3 Code Arrangement.....	11	Part II. 1000V, Nominal, or Less		84
90.4 <i>NEC</i> Enforcement	12	110.26	Spaces Around Electrical Equipment	84
90.5 Mandatory Requirements and Explanatory Material	13	110.27	Protection Against Physical Damage.....	95
90.7 Examination of Equipment for Safety	14	110.28	NEMA Enclosure Types.....	95
Article 90—Review Questions	15	Chapter 1—Review Questions		97
CHAPTER 1—GENERAL RULES	17	CHAPTER 2—WIRING AND PROTECTION		101
Article 100—Definitions	19	Article 200—Use and Identification of Grounded Conductors		103
Article 110—General Requirements for Electrical Installations	63	200.1 Scope		104
Part I. General Requirements	63	200.2 General.....		104
110.1 Scope	63	200.4 Neutral Conductor.....		104
110.2 Approval of Conductors and Equipment.....	64	200.6 Identification of Neutral and Grounded Conductors.....		105
110.3 Use of Equipment.....	64	200.7 Use of White or Gray Color		107
110.5 Conductor Material	66	200.10 Receptacle and Screw Shell Terminal		108
110.6 Conductor Sizes	66	Article 210—Branch Circuits		109
110.7 Wiring Integrity.....	66	Part I. General Provisions		109
110.8 Suitable Wiring Methods.....	66	210.1 Scope		109
110.9 Interrupting Rating of Overcurrent Protective Devices	67	210.3 Other Articles.....		109
110.10 Equipment Short-Circuit Current Rating	68	210.4 Multiwire Branch Circuits.....		109
Available Fault Current	69	210.5 Conductor Identification.....		113
110.11 Deteriorating Agents.....	70	210.6 Branch-Circuit Voltage.....		114
110.12 Mechanical Execution of Work	70	210.7 Multiple Branch Circuits		114
110.13 Mounting and Cooling of Equipment.....	72	210.8 GFCI Protection.....		114
110.14 Conductor Termination and Splicing.....	72	210.11 Branch Circuits Required		125
110.15 High-Leg Conductor Identification.....	79	210.12 Arc-Fault Circuit-Interrupter Protection		128
110.16 Arc-Flash Hazard Warning Label, Other Than Dwelling Units.....	79	210.17 Guest Rooms and Guest Suites.....		131
		Part II. Branch-Circuit Ratings		131
		210.19 Conductor Sizing.....		131
		210.20 Overcurrent Protection		135

210.21	Receptacle Rating.....	136	220.55	Cooking Appliances in Dwelling Units	175
210.23	Multiple-Outlet Branch Circuits.....	137	220.56	Kitchen Equipment Load, Commercial	178
Part III. Required Outlets		137	220.57	Electric Vehicle Supply Equipment Load	179
210.50	Receptacle Outlets.....	137	220.60	Noncoincident Loads.....	179
210.52	Dwelling Unit Receptacle Outlet Requirements.....	138	220.61	Neutral Calculated Load.....	180
210.60	Receptacles in Guest Rooms, Guest Suites, Dormitory Units, and Similar Occupancies.....	145	220.70	Energy Management Systems.....	181
210.62	Show-Window Receptacles	146	Part IV. Optional Method—Feeder/Service Load Calculations	182	
210.63	Equipment Requiring Servicing.....	146	220.82	Optional Load Calculations, Dwellings.....	182
210.65	Meeting Rooms	147	220.84	Optional Load Calculations, Multifamily	183
210.70	Lighting Outlet Requirements.....	148	220.85	Optional Load Calculations, Two-Family Dwelling Units.....	184
			220.87	Determining Existing Loads	184
Article 215—Feeders		153	Part VII. Marinas, Boatyards, and Docking Facilities	185	
215.1	Scope	153	220.120	Shore Power Receptacle Loads	185
215.2	Conductor Sizing.....	154	Article 225—Outside Branch Circuits and Feeders	187	
215.3	Overcurrent Protection Sizing.....	158	Part I. General	187	
215.6	Feeder Equipment Grounding Conductor.....	159	225.1	Scope	187
215.10	Ground-Fault Protection of Equipment	159	225.6	Minimum Conductor Size and Support.....	187
215.12	Conductor Identification.....	159	225.17	Masts as Supports.....	189
215.15	Barriers	161	225.18	Clearance for Overhead Conductors.....	189
215.18	Surge Protection	161	225.19	Clearances from Buildings	190
Article 220—Branch-Circuit, Feeder, and Service Load Calculations		163	225.22	Raceways on Exterior Surfaces of Buildings	191
Part I. General		164	225.26	Trees for Conductor Support	191
220.1	Scope	164	225.27	Raceway Seals	192
220.3	Application of Other Articles.....	164	Part II. Buildings or Other Structures Supplied by a Feeder	192	
220.5	Calculations	164	225.30	Number of Supplies	192
Part II. Branch-Circuit Load Calculations		165	225.31	Disconnecting Means	193
220.11	Maximum Load	165	225.33	Maximum Number of Disconnects.....	194
220.14	Other Loads—Occupancies	166	225.34	Grouping of Disconnects.....	194
Part III. Standard Method—Feeder/Service Load Calculations		168	225.37	Identification of Multiple Supplies.....	194
220.40	General.....	168	225.39	Rating of Disconnecting Means.....	194
220.41	Dwelling Unit(s), Load Calculation	168	225.41	Emergency (Shutoff) Disconnects	194
220.42	Lighting Load for Non-Dwelling Occupancies	169	225.42	Surge Protection	195
220.43	Office Buildings	171	Article 230—Services	197	
220.44	Hotel and Motel Occupancies.....	171	230.1	Scope	198
220.45	General Lighting Demand Factors	171	Part I. General	199	
220.46	Show-Window and Track Lighting Loads, Commercial	172	230.2	Number of Services	199
220.47	Receptacle Demand Load, Commercial	172	230.3	Not to Pass Through a Building.....	200
220.50	Motor and Air-Conditioning Loads.....	173	230.6	Conductors Considered Outside a Building or Structure.....	200
220.51	Fixed Electric Space-Heating Load	173	230.7	Service Conductors Separate from Other Conductors	201
220.52	Small-Appliance and Laundry Loads, Dwelling	173	230.8	Raceway Seals	201
220.53	Appliance Demand Load, Dwelling	173	230.9	Clearances on Buildings.....	202
220.54	Clothes Dryer Demand Load, Dwelling	174	230.10	Vegetation as Support.....	202

Part II. Overhead Service Conductors	202	240.13	Ground-Fault Protection of Equipment	232
230.23	Overhead Service Conductor Size and Rating	240.15	Overcurrent Protective Device, Handle Ties.....	232
230.24	Vertical Clearance for Overhead Service Conductors.....	Part II. Location of Overcurrent Protective Device	233	
230.26	Point of Attachment.....	240.21	Location of Overcurrent Protective Device in Circuit.....	233
230.27	Means of Attachment	240.22	Grounded-Phase Conductor on Overcurrent Device	240
230.28	Service Masts as Support.....	240.24	Location of Overcurrent Protective Devices.....	240
Part III. Underground Service Conductors	205	Part III. Enclosures Containing Overcurrent Protective Devices	241	
230.30	Installation	240.33	Vertical Position, Enclosures.....	241
230.31	Underground Service Conductor Ampacity	Part V. Plug Fuses, Fuseholders, and Adapters	242	
230.32	Protection Against Damage	240.51	Edison-Base Fuses.....	242
Part IV. Service-Entrance Conductors	207	Part VI. Cartridge Fuses and Fuseholders	242	
230.40	Number of Service-Entrance Conductor Sets.....	240.67	Arc-Energy Reduction—Fuses.....	242
230.42	Conductor Sizing	Part VII. Circuit Breakers	242	
230.43	Wiring Methods	240.81	Indicating	243
230.46	Spliced and Tapped Connections.....	240.83	Markings	243
230.50	Protection Against Physical Damage.....	240.85	Applications	243
230.51	Cable Supports.....	240.86	Series Ratings	244
230.53	Raceways to Drain	240.87	Arc-Energy Reduction—Circuit Breakers	244
230.54	Overhead Service Locations.....	Article 242—Overvoltage Protection	247	
230.56	High-Leg Conductor Identification.....	Part I. General	248	
Part V. Service Disconnect—General	213	242.1	Scope	248
230.62	Service Equipment—Barriers	Part II. Surge-Protective Devices (SPDs), 1000V or Less	248	
230.66	Marking for Service Equipment.....	242.6	Listing.....	248
230.67	Surge Protection	242.8	Short-Circuit Current Rating.....	248
Part VI. Service Disconnect—Disconnecting Means	215	242.9	Indicating	248
230.70	Service Disconnect Requirements.....	242.12	Uses Not Permitted.....	249
230.71	Number of Service Disconnects.....	242.13	Type 1 SPDs—Supply Side of Service Equipment.....	249
230.72	Grouping of Service Disconnects.....	242.14	Type 2 SPDs—Feeder Circuits	250
230.79	Rating of Disconnect	242.20	Number Required.....	251
230.82	Connected on Supply Side of the Service Disconnect.....	242.24	Routing of Surge-Protective Device Conductors	251
230.85	Emergency (Shutoff) Disconnect	Article 250—Grounding and Bonding	253	
Part VII. Service Conductor Overcurrent Protection	221	Part I. General	254	
230.90	Overload Protection—Where Required.....	250.1	Scope	254
230.91	Location	250.4	Performance Requirements for Grounding and Bonding	255
230.95	Ground-Fault Protection of Equipment	Earth Shells	259	
Article 240—Overcurrent Protection	223	250.6	Objectionable Current.....	260
Part I. General	224	Objectionable Current	260	
240.1	Scope	Dangers of Objectionable Current	262	
240.3	Other Articles (Overcurrent Protection of Equipment).....	250.8	Connection of Grounding and Bonding Conductors.....	263
240.4	Overcurrent Protection of Conductors.....	250.10	Protection of Ground Clamps and Fittings	263
240.5	Overcurrent Protection of Flexible Cords, Flexible Cables, and Fixture Wires	250.12	Clean Surfaces	263
240.6	Standard Ampere Ratings.....			
240.10	Supplementary Conductor Overcurrent Protection.....			

Part II. System Grounding and Bonding	264	Part VII. Equipment Grounding Conductor Connections	322
250.20 Systems Required to be Grounded	264	250.134 Equipment Connected by Permanent Wiring Methods.....	322
250.21 Ungrounded Systems	264	250.138 Cord-and-Plug-Connected	323
250.24 Service Grounding	265	250.140 Frames of Ranges, Ovens, and Clothes Dryers.....	323
250.28 Main Bonding Jumper and System Bonding Jumper.....	269	250.146 Connecting Receptacle Grounding Terminal to an Equipment Grounding Conductor.....	323
250.30 Transformer Separately Derived Systems.....	271	250.148 Continuity and Attachment of Equipment Grounding Conductors in Boxes.....	326
250.30 Generator Separately Derived Systems	277	Chapter 2—Review Questions	329
250.32 Buildings Supplied by a Feeder	278		
250.36 Impedance Grounded Systems—480V to 1000V.....	279		
Part III. Grounding Electrode System and Grounding Electrode Conductor	281		
250.50 Grounding Electrode System	281		
250.52 Grounding Electrode Types	281		
250.53 Grounding Electrode Installation	285		
Soil Resistivity	288		
250.54 Auxiliary Grounding Electrodes	288		
250.60 Lightning Protection Electrode	290		
250.62 Grounding Electrode Conductor	290		
250.64 Grounding Electrode Conductor Installation	290		
250.66 Sizing Grounding Electrode Conductors.....	295		
250.68 Grounding Electrode Conductor Connection to Grounding Electrodes	296		
250.70 Grounding Electrode Conductor Termination Fittings.....	298		
Part IV. Enclosure and Raceway	299		
250.80 Service Raceways and Enclosures	299		
250.86 Other than Service Enclosures and Raceways	300		
Part V. Bonding	300		
250.92 Bonding Metal Service Raceways and Enclosures	300		
250.94 Bonding for Communications Systems	303		
250.97 Bonding Metal Raceways and Metal Cables Containing 277V and 480V Circuits.....	304		
250.98 Bonding Loosely Jointed Metal Raceways.....	305		
250.100 Bonding in Hazardous (Classified) Locations	305		
250.102 Bonding Jumper Sizing.....	305		
250.104 Bonding of Piping Systems and Exposed Structural Metal.....	308		
250.106 Lightning Protection Systems.....	312		
Part VI. Equipment Grounding Conductors	312		
250.109 Metal Enclosures, Effective Ground-Fault Current Path.....	312		
250.114 Equipment Connected by Cord and Plug.....	313		
250.118 Types of Equipment Grounding Conductors.....	313		
250.119 Identification of Wire-Type Equipment Grounding Conductors	318		
250.120 Equipment Grounding Conductor Installation.....	319		
250.122 Sizing Wire-Type Equipment Grounding Conductors.....	319		
		Article 300—General Requirements for Wiring Methods and Materials	339
		Part I. General Requirements	339
		300.1 Scope	339
		300.3 Conductors	340
		300.4 Protection Against Physical Damage.....	342
		300.5 Underground Installations.....	345
		300.6 Protection Against Corrosion.....	348
		300.7 Raceways Exposed to Different Temperatures.....	349
		300.9 Raceways in Wet Locations Above Grade	350
		300.10 Electrical Continuity.....	351
		300.11 Securing and Supporting	351
		300.12 Mechanical Continuity.....	353
		300.13 Mechanical and Electrical Continuity of Conductors— Splices and Pigtails.....	353
		300.14 Conductor Length at Boxes	355
		300.15 Boxes or Fittings, Splices and Terminations	355
		300.17 Number and Size of Conductors in a Raceway.....	357
		300.18 Raceway Installations.....	358
		300.19 Supporting Conductors in Vertical Raceways.....	359
		300.20 Reducing Inductive Heating.....	359
		300.21 Spread of Fire or Products of Combustion	361
		300.22 Wiring in Ducts and Plenum Spaces.....	362
		300.23 Panels Designed to Allow Access	365
		300.25 Exit Stair Towers	365
		Article 310—Conductors for General Wiring	367
		Part I. General	367
		310.1 Scope	367
		310.3 Conductors, Minimum Size and Material.....	367
		Part II. Construction Specifications	369
		310.4 Conductor Construction and Application	369
		310.6 Conductor Identification.....	371

Part III. Installation	372	Part II. Installation	417
310.10 Uses Permitted.....	372	320.10 Uses Permitted.....	417
310.12 Dwelling Services and Feeders	374	320.12 Uses Not Permitted.....	418
310.14 Ampacities for Conductors Rated 0V to 2000V	377	320.15 Exposed Work.....	418
310.15 Ampacity Tables.....	378	320.17 Through or Parallel to Framing Members.....	418
310.16 Ampacities of Insulated Conductors.....	385	320.23 In Roof Spaces	419
Article 312—Cabinets, Cutout Boxes, and Meter Socket Enclosures	387	320.24 Bending Radius	419
Part I. General	387	320.30 Securing and Supporting	419
312.1 Scope	387	320.40 Boxes and Fittings.....	420
312.2 Damp or Wet Locations	388	320.80 Conductor Ampacity.....	421
312.3 Position in Walls	389	Part III. Construction Specifications	422
312.4 Repairing Gaps in Noncombustible Surfaces	389	320.100 Construction	422
312.5 Cable Termination to Enclosures.....	389	320.108 Equipment Grounding Conductor.....	422
312.6 Deflection of Conductors.....	390	Article 330—Metal-Clad Cable (Type MC)	423
312.8 Overcurrent Device Enclosures	391	Part I. General	424
312.10 Screws or Other Fasteners	392	330.1 Scope	424
Part II. Construction Specifications	393	330.6 Listing Requirements	424
312.100 Enclosure Material	393	Part II. Installation	424
Article 314—Boxes, Conduit Bodies, and Handhole Enclosures	395	330.10 Uses Permitted.....	424
Part I. General	396	330.12 Uses Not Permitted.....	425
314.1 Scope	396	330.15 Exposed Work.....	425
314.3 Nonmetallic Boxes	396	330.17 Through or Parallel to Framing Members.....	425
314.4 Metal Boxes	396	330.23 In Roof Spaces	426
314.5 Screws or Other Fasteners	396	330.24 Bending Radius	426
Part II. Installation	397	330.30 Securing and Supporting	426
314.15 Wet Locations.....	397	330.80 Conductor Ampacities.....	427
314.16 Outlet Box Sizing	397	Part III. Construction Specifications	428
314.17 Cables That Enter Boxes	404	330.108 Equipment Grounding Conductor.....	428
314.20 Flush-Mounted Boxes	405	Article 334—Nonmetallic-Sheathed Cable (Type NM)	431
314.21 Repairing Noncombustible Surfaces.....	405	Part I. General	432
314.22 Surface Extensions	406	334.1 Scope	432
314.23 Securing Boxes.....	406	334.6 Listing Requirements	432
314.27 Box Requirements.....	409	Part II. Installation	432
314.28 Pull Boxes, Junction Boxes, and Conduit Bodies.....	411	334.10 Type NM Cable, Uses Permitted	432
314.29 Wiring to be Accessible	414	334.12 Uses Not Permitted.....	433
314.30 Handhole Enclosures.....	414	334.15 Exposed Work.....	434
Article 320—Armored Cable (Type AC)	417	334.17 Through or Parallel to Framing Members.....	435
Part I. General	417	334.19 Cables Entering Enclosures	436
320.1 Scope	417	334.23 Accessible Roof Spaces	436
320.6 Listing Requirements	417	334.24 Bending Radius	436
		334.30 Securing and Supporting	436
		334.40 Boxes and Fittings.....	437
		334.80 Conductor Ampacity.....	437

Part III. Construction Specifications	439	342.24	Bends	455
334.108 Equipment Grounding Conductor.....	439	342.28	Reaming.....	455
Article 336—Power and Control Tray Cable (Type TC) ...	441	342.30	Securing and Supporting	456
Part I. General	441	342.42	Couplings and Connectors.....	457
336.1 Scope	441	342.46	Bushings	458
336.6 Listing Requirements	442	342.60	Equipment Grounding Conductor.....	459
Part II. Installation	442	Article 344—Rigid Metal Conduit (RMC)	461	
336.10 Uses Permitted.....	442	Part I. General	462	
336.12 Uses Not Permitted.....	443	344.1 Scope	462	
336.24 Bending Radius	443	344.6 Listing Requirements	462	
Article 338—Service-Entrance Cable (Types SE and USE)	445	Part II. Installation	462	
Part I. General	445	344.10 Uses Permitted.....	462	
338.1 Scope	445	344.14 Dissimilar Metals.....	463	
338.6 Listing Requirements	446	344.20 Trade Size	463	
Part II. Installation	446	344.22 Number of Conductors	463	
338.10 Uses Permitted.....	446	344.24 Bends	463	
338.12 Uses Not Permitted.....	447	344.28 Reaming and Threading.....	463	
338.24 Bending Radius	447	344.30 Securing and Supporting	464	
Article 340—Underground Feeder and Branch-Circuit Cable (Type UF)	449	344.42 Couplings and Connectors.....	465	
Part I. General	449	344.46 Bushings	465	
340.1 Scope	449	344.60 Equipment Grounding Conductor.....	466	
340.6 Listing Requirements	450	Article 348—Flexible Metal Conduit (FMC)	467	
Part II. Installation	450	Part I. General	467	
340.10 Uses Permitted.....	450	348.1 Scope	467	
340.12 Uses Not Permitted.....	450	348.6 Listing Requirements	468	
340.24 Bends	450	Part II. Installation	468	
340.80 Ampacity.....	450	348.10 Uses Permitted.....	468	
Part III. Construction Specifications	451	348.12 Uses Not Permitted.....	468	
340.108 Equipment Grounding Conductor.....	451	348.20 Trade Size	468	
340.112 Insulation	451	348.22 Number of Conductors	469	
Article 342—Intermediate Metal Conduit (IMC)	453	348.24 Bends	469	
Part I. General	454	348.28 Trimming.....	469	
342.1 Scope	454	348.30 Securing and Supporting	470	
342.6 Listing Requirements	454	348.42 Couplings and Connectors.....	471	
Part II. Installation	454	348.60 Equipment Grounding and Bonding Conductors.....	471	
342.10 Uses Permitted.....	454	Article 350—Liquidtight Flexible Metal Conduit (LFMC) ... 473		
342.14 Dissimilar Metals.....	455	Part I. General	474	
342.20 Trade Size	455	350.1 Scope	474	
342.22 Number of Conductors	455	350.6 Listing Requirements	474	
		Part II. Installation	474	
		350.10 Uses Permitted.....	474	
		350.12 Uses Not Permitted.....	474	
		350.20 Trade Size	475	

350.22 Number of Conductors475
 350.24 Bends476
 350.28 Trimming476
 350.30 Securing and Supporting476
 350.60 Equipment Grounding and Bonding Conductors477

Article 352—Rigid Polyvinyl Chloride Conduit (PVC).....479

Part I. General480
 352.1 Scope480
 352.6 Listing.....480
Part II. Installation480
 352.10 Uses Permitted.....480
 352.12 Uses Not Permitted.....481
 352.20 Trade Size482
 352.22 Number of Conductors482
 352.24 Bends482
 352.28 Trimming483
 352.30 Securing and Supporting483
 352.44 Expansion Fittings.....484
 352.46 Bushings485
 352.48 Joints.....485
 352.60 Equipment Grounding Conductor.....485

Article 356—Liquidtight Flexible Nonmetallic Conduit (LFNC).....487

Part I. General488
 356.1 Scope488
 356.6 Listing Requirements488
Part II. Installation488
 356.10 Uses Permitted.....488
 356.12 Uses Not Permitted.....489
 356.20 Trade Size489
 356.22 Number of Conductors489
 356.24 Bends489
 356.30 Securing and Supporting489
 356.42 Fittings490
 356.60 Equipment Grounding Conductor.....490

Article 358—Electrical Metallic Tubing (EMT).....493

Part I. General494
 358.1 Scope494
 358.6 Listing Requirements494
Part II. Installation494
 358.10 Uses Permitted.....494
 358.12 Uses Not Permitted.....495

358.20 Trade Size495
 358.22 Number of Conductors495
 358.24 Bends496
 358.28 Reaming496
 358.30 Securing and Supporting497
 358.42 Couplings and Connectors.....497
 358.60 Equipment Grounding Conductor.....498

Article 362—Electrical Nonmetallic Tubing (ENT).....499

Part I. General500
 362.1 Scope500
 362.6 Listing.....500
Part II. Installation500
 362.10 Uses Permitted.....500
 362.12 Uses Not Permitted.....502
 362.20 Trade Sizes.....502
 362.22 Number of Conductors502
 362.24 Bends503
 362.28 Trimming503
 362.30 Securing and Supporting503
 362.46 Bushings504
 362.48 Joints.....504
 362.60 Equipment Grounding Conductor.....504

Article 376—Metal Wireways.....505

Part I. General506
 376.1 Scope506
Part II. Installation506
 376.10 Uses Permitted.....506
 376.12 Uses Not Permitted.....506
 376.20 Conductors Connected in Parallel.....506
 376.21 Size of Conductors.....507
 376.22 Number of Conductors and Ampacity507
 376.23 Wireway Sizing509
 376.30 Supports509
 376.56 Splices, Taps, and Power Distribution Blocks.....510
 376.60 Equipment Grounding Conductor.....511

Article 380—Multioutlet Assemblies.....513

Part I. General514
 380.1 Scope514
Part II. Installation514
 380.10 Uses Permitted.....514
 380.12 Uses Not Permitted.....514
 380.76 Through Partitions514

Article 386—Surface Metal Raceways	515	402.5	Ampacity of Fixture Wires.....	539
Part I. General	515	402.6	Minimum Size.....	540
386.1 Scope	515	402.7	Raceway Size.....	540
386.6 Listing Requirements	516	402.8	Neutral Conductor.....	540
Part II. Installation	516	402.10	Uses Permitted.....	540
386.10 Uses Permitted.....	516	402.12	Uses Not Permitted.....	540
386.12 Uses Not Permitted.....	516	Article 404—Switches		543
386.21 Size of Conductors.....	516	Part I. Installation		543
386.22 Number of Conductors	516	404.1 Scope		543
386.30 Securing and Supporting	517	404.2 Switch Connections		544
386.56 Splices and Taps	517	404.3 Circuit Breaker Enclosures.....		546
386.60 Equipment Grounding Conductor.....	517	404.4 Damp or Wet Locations		546
Article 392—Cable Trays	519	404.7 Indicating		547
Part I. General	520	404.8 Accessibility and Grouping		547
392.1 Scope	520	404.9 General-Use Snap Switches, Dimmers, and Control Switches		549
Part II. Installation	520	404.10 Mounting of Snap Switches, Dimmers, and Control Switches		550
392.10 Uses Permitted.....	520	404.12 Bonding of Enclosures.....		551
392.12 Uses Not Permitted.....	521	404.14 Rating and Use of Snap Switches		551
392.18 Cable Tray Installations	522	Part II. Construction Specifications		552
392.20 Cable and Conductor Installation	522	404.20 Switch Marking		552
392.30 Securing and Supporting	523	Article 406—Receptacles, Attachment Plugs, and Flanged Inlets		553
392.44 Expansion Splice Plates	523	406.1 Scope		554
392.46 Bushed Conduit and Tubing.....	523	406.3 Receptacle Rating and Type		554
392.56 Cable Splices.....	523	406.4 General Installation Requirements.....		555
392.60 Equipment Grounding Conductor.....	524	406.5 Receptacle Mounting.....		557
Chapter 3—Review Questions	525	406.6 Receptacle Faceplates		560
CHAPTER 4—EQUIPMENT FOR GENERAL USE	531	406.7 Attachment Plugs and Flanged Surface Inlets		560
Article 400—Flexible Cords	533	406.9 Receptacles in Damp or Wet Locations.....		561
400.1 Scope	534	406.11 Connecting Receptacle Grounding Terminal to Equipment Grounding Conductor		563
400.3 Suitability	534	406.12 Tamper-Resistant Receptacles.....		563
400.4 Types of Flexible Cords.....	534	Article 408—Switchboards and Panelboards		565
400.5 Ampacity of Flexible Cords.....	534	Part I. General		566
400.10 Uses Permitted.....	534	408.1 Scope		566
400.12 Uses Not Permitted.....	536	408.3 Arrangement of Busbars and Conductors.....		566
400.13 Splices.....	537	408.4 Circuit Directory and Description		567
400.14 Pull at Joints and Terminals.....	537	408.5 Clearance for Conductors Entering Bus Enclosures		569
400.17 Protection from Damage	537	408.6 Short-Circuit Current Rating.....		569
Article 402—Fixture Wires	539	408.7 Unused Openings		569
402.1 Scope	539	408.9 Replacement Panelboards.....		569
402.2 Other Articles.....	539			
402.3 Types	539			

Part II. Switchboards	569	Article 411—Low-Voltage Lighting	585
408.18 Clearances.....	569	411.1 Scope.....	585
Part III. Panelboards	570	411.2 Listing Required.....	585
408.30 Panelboard Rating.....	570	411.3 Voltage Limitations.....	586
408.36 Overcurrent Protection.....	570	411.4 Low-Voltage Lighting Systems.....	586
408.37 Panelboards in Damp or Wet Locations.....	571	411.6 Specific Location Requirements.....	586
408.38 Enclosure.....	571	411.8 Branch Circuit.....	587
408.40 Equipment Grounding Conductor.....	571	Article 422—Appliances	589
408.41 Neutral Conductor Terminations.....	572	Part I. General	589
408.43 Panelboard Orientation.....	572	422.1 Scope.....	589
Article 410—Luminaires	573	422.6 Listing Required.....	589
Part I. General	574	Part II. Branch-Circuit Requirements	590
410.1 Scope.....	574	422.10 Branch Circuits.....	590
410.6 Listing Required.....	574	422.11 Overcurrent Protection.....	590
Part II. Luminaire Locations	574	422.12 Central Heating Equipment.....	591
410.10 Luminaires in Specific Locations.....	574	422.13 Storage Water Heaters.....	591
410.16 Luminaires in Clothes Closets.....	576	422.16 Flexible Cords.....	591
Part III. Luminaire Outlet Boxes and Covers	577	422.18 Support of Ceiling-Suspended (Paddle) Fans.....	594
410.22 Outlet Boxes to be Covered.....	577	422.20 Outlet Boxes to be Covered.....	594
410.24 Connection of Electric-Discharge and LED Luminaires.....	578	Part III. Disconnecting Means	594
Part IV. Luminaire Supports	578	422.30 Disconnect—General.....	594
410.30 Supports.....	578	422.31 Permanently Connected Appliance Disconnects.....	594
410.36 Means of Support.....	579	422.33 Cord-and-Plug-Connected Appliances.....	595
Part V. Grounding (Bonding)	580	Article 424—Fixed Electric Space-Heating Equipment	597
410.44 Connection to the Equipment Grounding Conductor.....	580	Part I. General	597
Part VI. Wiring of Luminaires	581	424.1 Scope.....	597
410.62 Cord-Connected Luminaires.....	581	424.3 Other Articles.....	597
410.71 Disconnecting Means for Fluorescent or LED Luminaires that Utilize Double-Ended Lamps.....	581	424.4 Branch Circuits.....	598
Part X. Special Provisions for Flush and Recessed Luminaires	582	Part III. Electric Space-Heating Equipment	599
410.115 Temperature.....	582	424.19 Disconnecting Means.....	599
410.116 Clearance and Installation.....	582	Part VI. Duct Heaters	599
Part XIV. Track Lighting	583	424.65 Location of Disconnecting Means for Electric Duct Heater.....	599
410.150 Installation.....	583	Article 430—Motor Circuits, Controllers, and Adjustable-Speed Drives	601
410.154 Fastening.....	583	Part I. General	602
Part XVI. Special Provisions for Horticultural Lighting Equipment	583	430.1 Scope.....	602
410.170 General.....	583	430.6 Motor Table FLC versus Motor Nameplate Current Rating.....	602
410.172 Listing.....	583	430.14 Location of Motors.....	603
410.174 Installation and Use.....	583	430.17 Highest Rated Motor.....	603
410.176 Locations Not Permitted.....	583	Part II. Conductor Ampacity	604
410.178 Flexible Cord.....	583	430.22 Motor Conductor Ampacity.....	604
410.180 Fittings and Connectors.....	584	430.24 Several Motors—Conductor Ampacity.....	606
410.182 Equipment Grounding Conductor.....	584		
410.184 GFCI and Special Purpose GFCI Protection.....	584		
410.186 Support.....	584		

Part III. Motor and Branch-Circuit Overload Protection	607	Article 445—Generators	629
430.31 Overload Protection	607	445.1 Scope	629
430.32 Overload Protection for Continuous-Duty Motors.....	608	445.6 Listing.....	630
Part IV. Branch-Circuit Short-Circuit and Ground-Fault Protection ...	609	445.11 Marking.....	630
430.51 General.....	609	445.13 Conductor Ampacity.....	630
430.52 Branch-Circuit Short-Circuit and Ground-Fault Protection.....	610	445.19 Emergency Shutdown of Prime Mover	631
430.55 Combined Overcurrent Protective Device	613	Article 450—Transformers	633
Part V. Feeder Short-Circuit and Ground-Fault Protection	613	450.1 Scope	633
430.62 Motor Feeder Protection	613	450.3 Primary Overcurrent Protection.....	634
Part VI. Motor Control Circuits	615	450.9 Ventilation	636
430.72 Overcurrent Protection for Control Circuits.....	615	450.10 Grounding and Bonding.....	636
430.75 Disconnect for Control Circuits.....	615	450.13 Transformer Accessibility.....	636
Part VII. Motor Controllers	616	450.14 Disconnecting Means	637
430.83 Motor Controller Horsepower Rating.....	616	Article 480—Stationary Standby Batteries	639
Part IX. Disconnecting Means	616	480.1 Scope	639
430.102 Disconnect Location.....	616	480.4 Battery and Cell Terminations	640
430.107 Motor or Controller Disconnect, Readily Accessible.....	617	480.9 Battery Support Systems.....	640
430.109 Type of Disconnecting Means.....	618	480.10 Battery Locations.....	640
Part X. Adjustable-Speed Drive Systems	619	480.12 Battery Interconnections.....	641
430.120 General.....	619	Chapter 4—Review Questions	643
430.122 Conductor Ampacity.....	619	FINAL EXAM A—STRAIGHT ORDER	649
430.124 Overload Protection	620	FINAL EXAM B—RANDOM ORDER	659
430.128 Disconnecting Means	620	INDEX	669
430.130 Branch-Circuit Short-Circuit and Ground-Fault Protection.....	620	About the Author	678
Part XIV. Tables	620	About the Illustrator	679
Table 430.248 Full-Load Current, Single-Phase Motors.....	620	About the Mike Holt Team	680
Table 430.250 Full-Load Current, Three-Phase Motors	621		
Article 440—Air-Conditioning Equipment	623		
Part I. General	624		
440.1 Scope	624		
440.4 Marking on Hermetic Motor-Compressors and Equipment....	624		
440.8 Bathtub and Shower Space	625		
440.9 Equipment Grounding Conductor.....	625		
Part II. Disconnecting Means	626		
440.11 General.....	626		
440.14 Location	626		
Part III. Overcurrent Protection	626		
440.22 Short-Circuit and Ground-Fault Protective Device Size.....	626		
Part IV. Conductor Ampacity	627		
440.33 Conductor Ampacity.....	627		