

**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495
CORRECTION FACTORS						
Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21–25	1.08	1.05	1.04	1.08	1.05	1.04
26–30	1.00	1.00	1.00	1.00	1.00	1.00
31–35	0.91	0.94	0.96	0.91	0.94	0.96
36–40	0.82	0.88	0.91	0.82	0.88	0.91
41–45	0.71	0.82	0.87	0.71	0.82	0.87
46–50	0.58	0.75	0.82	0.58	0.75	0.82
51–55	0.41	0.67	0.76	0.41	0.67	0.76
56–60	—	0.58	0.71	—	0.58	0.71
61–70	—	0.33	0.58	—	0.33	0.58
71–80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).

**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495

#### CORRECTION FACTORS

Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21-25	1.08	1.05	1.04	1.08	1.05	1.04
26-30	1.00	1.00	1.00	1.00	1.00	1.00
31-35	0.91	0.94	0.96	0.91	0.94	0.96
36-40	0.82	0.88	0.91	0.82	0.88	0.91
41-45	0.71	0.82	0.87	0.71	0.82	0.87
46-50	0.58	0.75	0.82	0.58	0.75	0.82
51-55	0.41	0.67	0.76	0.41	0.67	0.76
56-60	—	0.58	0.71	—	0.58	0.71
61-70	—	0.33	0.58	—	0.33	0.58
71-80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).



**Table 3.10.15(b)(2)a Adjustment Factors for More Than Three Current-Carrying Conductors in a Raceway or Cable**

Number of Current-Carrying Conductors	Percent of Values in Tables 3.10.1.16 through 3.10.1.19 as Adjusted for Ambient Temperature if Necessary
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
41 and above	35

**Table 3.0.1.19(a) Spacings for Conductor Supports**

Size of Wire mm <sup>2</sup> (mm dia.)	Support of Conductors in Vertical Raceways	Conductors	
		Aluminum or Copper-Clad Aluminum (m)	Copper (m)
0.75(1.0) through 8.0(3.2)	Not greater than	30	30
14 through 50	Not greater than	60	30
60 through 100	Not greater than	55	25
Over 100 through 175	Not greater than	40	18
Over 175 through 250	Not greater than	35	15
Over 250 through 400	Not greater than	30	12
Over 400	Not greater than	25	11

**Table 3.0.1.5 Minimum Cover Requirements, 0 to 600 Volts, Nominal, Burial in Millimeters**

Location of Wiring Method or Circuit	Type of Wiring Method or Circuit				
	Column 1 Direct Burial Cables or Conductors (mm)	Column 2 Rigid Metal Conduit or Intermediate Metal Conduit (mm)	Column 3 Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement or Other Approved Raceways (mm)	Column 4 Residential Branch Circuits Rated 230 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes (mm)	Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in Other Identified Cable or Raceway (mm)
All locations not specified below	600	150	450	300	150
In trench below 50 mm thick concrete or equivalent	450	150	300	150	150
Under a building	0 (in raceway only)	0	0	0 (in raceway only)	0 (in raceway only)
Under minimum of 100 mm thick concrete exterior slab with no vehicular traffic and the slab extending not less than 150 mm beyond the underground installation	450	100	100	150 (direct burial)	150
				100 (in raceway)	
Under streets, highways, roads, alleys, driveways, and parking lots	600	600	600	600	600
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	450	450	450	300	450
In or under airport runways, including adjacent areas where trespassing prohibited	450	450	450	450	450

**Notes:**

1. Cover is defined as the shortest distance in millimeters measured between a point on the top surface of any direct-buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.
2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 50 mm thick.
3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
4. Where one of the wiring method types listed in Columns 1–3 is used for one of the circuit types in Columns 4 and 5, the shallowest depth of burial shall be permitted.
5. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in metal or nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 50 mm of concrete extending down to rock.

Conduit or Tubing Size	One Shot and Full Shoe Benders	Other Bends
Raceway Size (mm)	(mm)	(mm)
15	100	100
20	115	125
25	145	150
32	180	200
40	210	250
50	240	300
65	265	375
80	325	450
90	375	525
100	400	600
125	600	750
150	750	900

**Table 9.1.1.1 Percent of Cross Section of  
Conduit and Tubing for Conductors**

Number of Conductors	All Conductors Types
1	53
2	31
Over 2	40



**Table 4.50.1.3(b) Maximum Rating or Setting of Overcurrent  
Protection for Transformers**

**600 Volts and Less (as a Percentage of Transformer-Rated Current)**

	<b>Primary Protection</b>			<b>Secondary Protection (See Note 2.)</b>	
	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>	<b>Currents Less Than 2 Amperes</b>	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>
Primary only protection	125% (See Note 1.)	167%	300%	Not required	Not required
Primary and secondary protection	250% (See Note 3.)	250% (See Note 3.)	250% (See Note 3.)	125% (See Note 1.)	167%

**Table 4.30.4.2 Maximum Rating or Setting of Motor Branch-Circuit Short-Circuit and Ground-Fault Protective Devices**

Type of Motor	Percentage of Full-Load Current			
	Nontime Delay Fuse <sup>1</sup>	Dual Element (Time-Delay) Fuse <sup>1</sup>	Instantaneous Trip Breaker	Inverse Time Breaker <sup>2</sup>
Single-phase motors	300	175	800	250
AC polyphase motors other than wound-rotor				
Squirrel cage — other than Design B energy-efficient	300	175	800	250
Design B energy-efficient	300	175	1 100	250
Synchronous <sup>3</sup>	300	175	800	250
Wound rotor	150	150	800	150
Direct current (constant voltage)	150	150	250	150

Note: For certain exceptions to the values specified, see 4.30.4.4.

<sup>1</sup>The values in the Nontime Delay Fuse column apply to Time-Delay Class CC fuses.

<sup>2</sup>The values given in the last column also cover the ratings of nonadjustable inverse time types of circuit breakers that may be modified as in 4.30.4.2(c), Exception No. 1 and No. 2.

<sup>3</sup>Synchronous motors of the low-torque, low-speed type (usually 450 rpm or lower), such as are used to drive reciprocating compressors, pumps, and so forth, that start unloaded, do not require a fuse rating or circuit-breaker setting in excess of 200 percent of full-load current.

Table 2.20.3.3 Lighting Load Demand Factors

Type of Occupancy	Portion of Lighting Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (Percent)
Dwelling units	First 3000 or less at	100
	From 3001 to 120,000 at	35
	Remainder over 120,000 at	25
Hospitals*	First 50,000 or less at	40
	Remainder over 50,000 at	20
Hotels and motels, including apartment houses without provision for cooking by tenants*	First 20,000 or less at	50
	From 20,001 to 100,000 at	40
	Remainder over 100,000 at	30
Warehouses (storage)	First 12,500 or less at	100
	Remainder over 12,500 at	50
All others	Total volt-amperes	100

\*The demand factors of this table shall not apply to the calculated load of feeders or services supplying areas in hospitals, hotels, and motels where the entire lighting is likely to be used at one time, as in operating rooms, ballrooms, or dining rooms.



**Table 2.20.3.5 Demand Factors for Non-dwelling Receptacle Loads**

Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (Percent)
First 10 kVA or less at	100
Remainder over 10 kVA at	50

**Table 2.10.2.6 Summary of Branch-Circuit Requirements**

Circuit Rating	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):					
Circuit wires <sup>1</sup>	2.0 (1.6)	5.5 (2.6)	5.5 (2.6)	8.0 (3.2)	14
Taps	2.0 (1.6)	2.0 (16)	2.0 (1.6)	3.5 (2.0)	3.5 (2.0)
Fixture wires and cords — see 2.40.1.5					
Overcurrent Protection	15 A	20 A	30 A	40 A	50 A
Outlet devices:					
Lampholders permitted	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating <sup>2</sup>	15 max. A	15 or 20 A	30 A	40 or 50 A	50 A
Maximum Load	15 A	20 A	30 A	40 A	50 A
Permissible load	See 2.10.2.5(a)	See 2.10.2.5(a)	See 2.10.2.5(b)	See 2.10.2.5(c)	See 2.10.2.5(c)

<sup>1</sup>These gauges are for copper conductors.

<sup>2</sup>For receptacle rating of cord-connected electric-discharge luminaires (lighting fixtures), see 4.10.6.9(c).

Table 2.20.2.3 General Lighting Loads by Occupancy

Type of Occupancy	Unit Load
	Volt-Amperes per Square Meter
Armories and auditoriums	8
Banks	28 <sup>b</sup>
Barber shops and beauty parlors	24
Churches	8
Clubs	16
Court rooms	16
Dwelling units <sup>a</sup>	24
Garages — commercial (storage)	4
Hospitals	16
Hotels and motels, including apartment houses without provision for cooking by tenants <sup>a</sup>	16
Industrial commercial (loft) buildings	16
Lodge rooms	12
Office buildings	28 <sup>b</sup>
Restaurants	16
Schools	24
Stores	24
Warehouses (storage)	2
In any of the preceding occupancies except one-family dwellings and individual dwelling units of two-family and multifamily dwellings:	
Assembly halls and auditoriums	8
Halls, corridors, closets, stairways	4
Storage spaces	2

<sup>a</sup>See 2.20.2.5(j).<sup>b</sup>See 2.20.2.5(k).

**(b) Electric Dryers and Household Electric Cooking Appliances.** Load calculations shall be permitted as specified in 2.20.3.15 for electric dryers and in 2.20.3.16 for electric ranges and other cooking appliances.

**(c) Motor Loads.** Outlets for motor loads shall be calculated in accordance with the requirements in 4.30.2.2, 4.30.2.4, and 4.40.1.6.



**Table 2.10.2.3(b)(2) Maximum Cord-and-Plug-Connected Load to Receptacle**

<b>Circuit Rating (Amperes)</b>	<b>Receptacle Rating (Amperes)</b>	<b>Maximum Load (Amperes)</b>
15 or 20	15	12
20	20	16
30	30	24

**Table 2.10.2.3(b)(3) Receptacle Ratings for Various Size Circuits**

<b>Circuit Rating (Amperes)</b>	<b>Receptacle Rating (Amperes)</b>
15	Not over 15
20	15 or 20
30	30
40	40 or 50
50	50

**Table 3.14.2.2(b) Volume Allowance Required per Conductor**

<b>Size of Conductor mm<sup>2</sup>(mm dia.)</b>	<b>Free Space Within Box for Each Conductor cm<sup>3</sup></b>
0.75(1.0)	24
1.25(1.2)	28
2.0(1.6)	32
3.5(2.0)	36
5.5(2.6)	40
8.0(3.2)	50
14	82

Table 3.12.1.6(b) Minimum Wire-Bending Space at Terminals

Wire Size mm <sup>2</sup> (mm dia.)	Wires per Terminal			
	1	2	3	4 or more
	mm	mm	mm	mm
2.0(1.6)-5.5(2.6)	Not specified	—	—	—
8.0(3.2)	40	—	—	—
14	50	—	—	—
22	75	—	—	—
30	90	—	—	—
38	115	—	—	—
50	140	140	180	—
60	150	150	190	—
80	165 <sup>a</sup> (12)	165 <sup>a</sup> (12)	200	—
100	180 <sup>b</sup> (25)	190 <sup>c</sup> (38)	215 <sup>a</sup> (12)	—
125	215 <sup>d</sup> (50)	215 <sup>d</sup> (50)	230 <sup>b</sup> (25)	250
150	250 <sup>e</sup> (75)	250 <sup>d</sup> (50)	280 <sup>b</sup> (25)	300
175	305 <sup>e</sup> (75)	305 <sup>e</sup> (50)	330 <sup>e</sup> (25)	350 <sup>d</sup>
200	330 <sup>e</sup> (75)	330 <sup>e</sup> (75)	350 <sup>e</sup> (75)	380 <sup>e</sup> (75)
250	350 <sup>e</sup> (75)	350 <sup>e</sup> (75)	380 <sup>e</sup> (75)	400 <sup>e</sup> (75)
325	380 <sup>e</sup> (75)	400 <sup>e</sup> (75)	455 <sup>e</sup> (75)	480 <sup>e</sup> (75)
375	405 <sup>e</sup> (75)	460 <sup>e</sup> (75)	510 <sup>e</sup> (75)	560 <sup>e</sup> (75)
400	430 <sup>e</sup> (75)	480 <sup>e</sup> (75)	560 <sup>e</sup> (75)	610 <sup>e</sup> (75)
500	510	—	—	—
600	560	—	—	—
725	610	—	—	—
850	610	—	—	—
1000	610	—	—	—

1. Bending space at terminals shall be in accordance with the following table.



**Table 3.12.1.6(a) Minimum Wire-Bending Space at Terminals and Minimum Width of Wiring Gutters**

Wire Size mm <sup>2</sup> (mm dia.)	Wires per Terminal				
	1 (mm)	2 (mm)	3 (mm)	4 (mm)	5 (mm)
2.0(1.6) – 5.5(2.6)	Not specified	—	—	—	—
8.0(3.2) – 14	40	—	—	—	—
22	50	—	—	—	—
30	65	—	—	—	—
38	75	—	—	—	—
50 – 60	90	125	175	—	—
80 – 100	100	150	200	—	—
125	115	150	200	250	—
150 – 175	125	200	250	300	—
200 – 250	150	200	250	300	350
325 – 375	200	250	300	350	400
400	200	300	350	400	450
500 – 600	250	—	—	—	—
725 – 1000	300	—	—	—	—

Note: Bending space at terminals shall be measured in a straight line from the end of the lug or wire connector (in the direction that the wire leaves the terminal) to the wall, barrier, or obstruction.

**Table 3.0.1.19(a) Spacings for Conductor Supports**

Size of Wire mm <sup>2</sup> (mm dia.)	Support of Conductors in Vertical Raceways	Conductors	
		Aluminum or Copper-Clad Aluminum (m)	Copper (m)
0.75(1.0) through 8.0(3.2)	Not greater than	30	30
14 through 50	Not greater than	60	30
60 through 100	Not greater than	55	25
Over 100 through 175	Not greater than	40	18
Over 175 through 250	Not greater than	35	15
Over 250 through 400	Not greater than	30	12
Over 400	Not greater than	25	11

**Table 4.30.3.7 Overload Units**

Kind of Motor	Supply System	Number and Location of Overload Units, Such as Trip Coils or Relays
1-phase ac or dc	2-wire, 1-phase ac or dc ungrounded	1 in either conductor
1-phase ac or dc	2-wire, 1-phase ac or dc, one conductor grounded	1 in ungrounded conductor
1-phase ac or dc	3-wire, 1-phase ac or dc, grounded neutral	1 in either ungrounded conductor
1-phase ac	Any 3-phase	1 in ungrounded conductor
2-phase ac	3-wire, 2-phase ac, ungrounded	2, one in each phase
2-phase ac	3-wire, 2-phase ac, one conductor grounded	2 in ungrounded conductors
2-phase ac	4-wire, 2-phase ac, grounded or ungrounded	2, one per phase in ungrounded con- ductors
2-phase ac	Grounded neutral or 5-wire, 2-phase ac, ungrounded	2, one per phase in any ungrounded phase wire
3-phase ac	Any 3-phase	3, one in each phase*

\*Exception: An overload unit in each phase shall not be required where overload protection is provided by other approved means.



**Table 4.30.2.2(e) Duty-Cycle Service**

Classification of Service	Nameplate Current Rating Percentages			
	5-Minute Rated Motor	15-Minute Rated Motor	30- & 60-Minute Rated Motor	Continuous Rated Motor
Short-time duty operating valves, raising or lowering rolls, etc.	110	120	150	—
Intermittent duty and freight passenger elevators, tool heads, pumps, drawbridges, turntables, etc. (for arc welders, see 6.30.2.1)	85	85	90	140
Periodic duty rolls, ore- and coal-handling machines, etc.	85	90	95	140
Varying duty	110	120	150	200

Note: Any motor application shall be considered as continuous duty unless the nature of the apparatus it drives is such that the motor will not operate continuously with load under any condition of use.

Table 4.30.1.7(b) Locked-Rotor Indicating Code Letters

Code Letter	Kilovolt-Amperes per Horsepower with Locked Rotor
A	0–3.14
B	3.15–3.54
C	3.55–3.99
D	4.0–4.49
E	4.5–4.99
F	5.0–5.59
G	5.6–6.29
H	6.3–7.09
J	7.1–7.99
K	8.0–8.99
L	9.0–9.99
M	10.0–11.19
N	11.2–12.49
P	12.5–13.99
R	14.0–15.99
S	16.0–17.99
T	18.0–19.99
U	20.0–22.39
V	22.4 and up



**Table 3.54.2.15 Minimum Bending Radius for Nonmetallic Underground Conduit with Conductors (NUCC)**

<b>Raceway Size (mm)</b>	<b>Minimum Bending Radius (mm)</b>
15	250
20	300
25	350
32	450
40	500
50	650
65	900
80	1200
100	1500

**Table 3.52.2.21(b) Support of Rigid Nonmetallic Conduit (RNC)**

<b>Conduit Raceway Size (mm)</b>	<b>Maximum Spacing Between Supports (mm)</b>
15–25	900
32–50	1 500
65–80	1 800
90–125	2 100
150	2 400

**Table 3.44.2.21(b)(2) Supports for Rigid Metal Conduit**

<b>Conduit Size (mm)</b>	<b>Maximum Distance Between Rigid Metal Conduit Supports (mm)</b>
15–20	3 000
25	3 600
32–40	4 200
50–65	4 800
80 and larger	6 000





**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495
CORRECTION FACTORS						
Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21–25	1.08	1.05	1.04	1.08	1.05	1.04
26–30	1.00	1.00	1.00	1.00	1.00	1.00
31–35	0.91	0.94	0.96	0.91	0.94	0.96
36–40	0.82	0.88	0.91	0.82	0.88	0.91
41–45	0.71	0.82	0.87	0.71	0.82	0.87
46–50	0.58	0.75	0.82	0.58	0.75	0.82
51–55	0.41	0.67	0.76	0.41	0.67	0.76
56–60	—	0.58	0.71	—	0.58	0.71
61–70	—	0.33	0.58	—	0.33	0.58
71–80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).

**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495

#### CORRECTION FACTORS

Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21-25	1.08	1.05	1.04	1.08	1.05	1.04
26-30	1.00	1.00	1.00	1.00	1.00	1.00
31-35	0.91	0.94	0.96	0.91	0.94	0.96
36-40	0.82	0.88	0.91	0.82	0.88	0.91
41-45	0.71	0.82	0.87	0.71	0.82	0.87
46-50	0.58	0.75	0.82	0.58	0.75	0.82
51-55	0.41	0.67	0.76	0.41	0.67	0.76
56-60	—	0.58	0.71	—	0.58	0.71
61-70	—	0.33	0.58	—	0.33	0.58
71-80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).



**Table 3.10.15(b)(2)a Adjustment Factors for More Than Three Current-Carrying Conductors in a Raceway or Cable**

Number of Current-Carrying Conductors	Percent of Values in Tables 3.10.1.16 through 3.10.1.19 as Adjusted for Ambient Temperature if Necessary
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
41 and above	35

**Table 3.0.1.19(a) Spacings for Conductor Supports**

Size of Wire mm <sup>2</sup> (mm dia.)	Support of Conductors in Vertical Raceways	Conductors	
		Aluminum or Copper-Clad Aluminum (m)	Copper (m)
0.75(1.0) through 8.0(3.2)	Not greater than	30	30
14 through 50	Not greater than	60	30
60 through 100	Not greater than	55	25
Over 100 through 175	Not greater than	40	18
Over 175 through 250	Not greater than	35	15
Over 250 through 400	Not greater than	30	12
Over 400	Not greater than	25	11

**Table 3.0.1.5 Minimum Cover Requirements, 0 to 600 Volts, Nominal, Burial in Millimeters**

Location of Wiring Method or Circuit	Type of Wiring Method or Circuit				
	Column 1 Direct Burial Cables or Conductors (mm)	Column 2 Rigid Metal Conduit or Intermediate Metal Conduit (mm)	Column 3 Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement or Other Approved Raceways (mm)	Column 4 Residential Branch Circuits Rated 230 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes (mm)	Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in Other Identified Cable or Raceway (mm)
All locations not specified below	600	150	450	300	150
In trench below 50 mm thick concrete or equivalent	450	150	300	150	150
Under a building	0 (in raceway only)	0	0	0 (in raceway only)	0 (in raceway only)
Under minimum of 100 mm thick concrete exterior slab with no vehicular traffic and the slab extending not less than 150 mm beyond the underground installation	450	100	100	150 (direct burial)  100 (in raceway)	150
Under streets, highways, roads, alleys, driveways, and parking lots	600	600	600	600	600
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	450	450	450	300	450
In or under airport runways, including adjacent areas where trespassing prohibited	450	450	450	450	450

**Notes:**

1. Cover is defined as the shortest distance in millimeters measured between a point on the top surface of any direct-buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.
2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 50 mm thick.
3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
4. Where one of the wiring method types listed in Columns 1–3 is used for one of the circuit types in Columns 4 and 5, the shallowest depth of burial shall be permitted.
5. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in metal or nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 50 mm of concrete extending down to rock.



Conduit or Tubing Size	One Shot and Full Shoe Benders	Other Bends
Raceway Size (mm)	(mm)	(mm)
15	100	100
20	115	125
25	145	150
32	180	200
40	210	250
50	240	300
65	265	375
80	325	450
90	375	525
100	400	600
125	600	750
150	750	900

**Table 9.1.1.1 Percent of Cross Section of  
Conduit and Tubing for Conductors**

Number of Conductors	All Conductors Types
1	53
2	31
Over 2	40

**Table 4.50.1.3(b) Maximum Rating or Setting of Overcurrent  
Protection for Transformers**

**600 Volts and Less (as a Percentage of Transformer-Rated Current)**

	<b>Primary Protection</b>			<b>Secondary Protection (See Note 2.)</b>	
	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>	<b>Currents Less Than 2 Amperes</b>	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>
Primary only protection	125% (See Note 1.)	167%	300%	Not required	Not required
Primary and secondary protection	250% (See Note 3.)	250% (See Note 3.)	250% (See Note 3.)	125% (See Note 1.)	167%

**Table 4.30.4.2 Maximum Rating or Setting of Motor Branch-Circuit Short-Circuit and Ground-Fault Protective Devices**

Type of Motor	Percentage of Full-Load Current			
	Nontime Delay Fuse <sup>1</sup>	Dual Element (Time-Delay) Fuse <sup>1</sup>	Instantaneous Trip Breaker	Inverse Time Breaker <sup>2</sup>
Single-phase motors	300	175	800	250
AC polyphase motors other than wound-rotor				
Squirrel cage — other than Design B energy-efficient	300	175	800	250
Design B energy-efficient	300	175	1 100	250
Synchronous <sup>3</sup>	300	175	800	250
Wound rotor	150	150	800	150
Direct current (constant voltage)	150	150	250	150

Note: For certain exceptions to the values specified, see 4.30.4.4.

<sup>1</sup>The values in the Nontime Delay Fuse column apply to Time-Delay Class CC fuses.

<sup>2</sup>The values given in the last column also cover the ratings of nonadjustable inverse time types of circuit breakers that may be modified as in 4.30.4.2(c), Exception No. 1 and No. 2.

<sup>3</sup>Synchronous motors of the low-torque, low-speed type (usually 450 rpm or lower), such as are used to drive reciprocating compressors, pumps, and so forth, that start unloaded, do not require a fuse rating or circuit-breaker setting in excess of 200 percent of full-load current.



**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495
CORRECTION FACTORS						
Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21–25	1.08	1.05	1.04	1.08	1.05	1.04
26–30	1.00	1.00	1.00	1.00	1.00	1.00
31–35	0.91	0.94	0.96	0.91	0.94	0.96
36–40	0.82	0.88	0.91	0.82	0.88	0.91
41–45	0.71	0.82	0.87	0.71	0.82	0.87
46–50	0.58	0.75	0.82	0.58	0.75	0.82
51–55	0.41	0.67	0.76	0.41	0.67	0.76
56–60	—	0.58	0.71	—	0.58	0.71
61–70	—	0.33	0.58	—	0.33	0.58
71–80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).

**Table 3.10.1.16 Allowable Ampacities of Insulated Conductors Rated 0 Through 2 000 Volts, 60°C Through 90°C. Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C**

Conductor Size mm <sup>2</sup> (mm dia.)	Temperature Rating of Conductor (See Table 3.10.1.13.)					
	60°C	75°C	90°C	60°C	75°C	90°C
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM		
2.0(1.6)*	20	20	25	—	—	—
3.5(2.0)*	25	25	30	20	20	25
5.5(2.6)*	30	35	40	25	30	35
8.0(3.2)	40	50	55	30	40	45
14	55	65	70	40	50	65
22	70	85	90	55	65	80
30	90	110	115	65	80	90
38	100	125	130	75	90	105
50	120	145	150	95	110	125
60	135	160	170	100	120	135
80	160	195	205	120	145	165
100	185	220	225	140	170	190
125	210	255	265	165	200	225
150	240	280	295	185	225	250
175	260	305	345	205	245	275
200	280	330	355	220	265	300
250	315	375	400	255	305	345
325	370	435	470	305	365	410
375	395	470	530	315	380	430
400	405	485	515	335	405	460
500	445	540	580	370	440	495

#### CORRECTION FACTORS

Ambient Temp. (°C)	For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities shown above by the appropriate factor shown below.					
21-25	1.08	1.05	1.04	1.08	1.05	1.04
26-30	1.00	1.00	1.00	1.00	1.00	1.00
31-35	0.91	0.94	0.96	0.91	0.94	0.96
36-40	0.82	0.88	0.91	0.82	0.88	0.91
41-45	0.71	0.82	0.87	0.71	0.82	0.87
46-50	0.58	0.75	0.82	0.58	0.75	0.82
51-55	0.41	0.67	0.76	0.41	0.67	0.76
56-60	—	0.58	0.71	—	0.58	0.71
61-70	—	0.33	0.58	—	0.33	0.58
71-80	—	—	0.41	—	—	0.41

\* See 2.40.1.4(d).



**Table 3.10.15(b)(2)a Adjustment Factors for More Than Three Current-Carrying Conductors in a Raceway or Cable**

Number of Current-Carrying Conductors	Percent of Values in Tables 3.10.1.16 through 3.10.1.19 as Adjusted for Ambient Temperature if Necessary
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
41 and above	35

**Table 3.0.1.19(a) Spacings for Conductor Supports**

Size of Wire mm <sup>2</sup> (mm dia.)	Support of Conductors in Vertical Raceways	Conductors	
		Aluminum or Copper-Clad Aluminum (m)	Copper (m)
0.75(1.0) through 8.0(3.2)	Not greater than	30	30
14 through 50	Not greater than	60	30
60 through 100	Not greater than	55	25
Over 100 through 175	Not greater than	40	18
Over 175 through 250	Not greater than	35	15
Over 250 through 400	Not greater than	30	12
Over 400	Not greater than	25	11



**Table 3.0.1.5 Minimum Cover Requirements, 0 to 600 Volts, Nominal, Burial in Millimeters**

Location of Wiring Method or Circuit	Type of Wiring Method or Circuit				
	Column 1 Direct Burial Cables or Conductors (mm)	Column 2 Rigid Metal Conduit or Intermediate Metal Conduit (mm)	Column 3 Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement or Other Approved Raceways (mm)	Column 4 Residential Branch Circuits Rated 230 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes (mm)	Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in Other Identified Cable or Raceway (mm)
All locations not specified below	600	150	450	300	150
In trench below 50 mm thick concrete or equivalent	450	150	300	150	150
Under a building	0 (in raceway only)	0	0	0 (in raceway only)	0 (in raceway only)
Under minimum of 100 mm thick concrete exterior slab with no vehicular traffic and the slab extending not less than 150 mm beyond the underground installation	450	100	100	150 (direct burial)	150
				100 (in raceway)	
Under streets, highways, roads, alleys, driveways, and parking lots	600	600	600	600	600
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	450	450	450	300	450
In or under airport runways, including adjacent areas where trespassing prohibited	450	450	450	450	450

**Notes:**

1. Cover is defined as the shortest distance in millimeters measured between a point on the top surface of any direct-buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.
2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 50 mm thick.
3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
4. Where one of the wiring method types listed in Columns 1–3 is used for one of the circuit types in Columns 4 and 5, the shallowest depth of burial shall be permitted.
5. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in metal or nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 50 mm of concrete extending down to rock.

Conduit or Tubing Size	One Shot and Full Shoe Benders	Other Bends
Raceway Size (mm)	(mm)	(mm)
15	100	100
20	115	125
25	145	150
32	180	200
40	210	250
50	240	300
65	265	375
80	325	450
90	375	525
100	400	600
125	600	750
150	750	900

**Table 9.1.1.1 Percent of Cross Section of  
Conduit and Tubing for Conductors**

Number of Conductors	All Conductors Types
1	53
2	31
Over 2	40



**Table 4.50.1.3(b) Maximum Rating or Setting of Overcurrent  
Protection for Transformers**

**600 Volts and Less (as a Percentage of Transformer-Rated Current)**

	<b>Primary Protection</b>			<b>Secondary Protection (See Note 2.)</b>	
	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>	<b>Currents Less Than 2 Amperes</b>	<b>Currents of 9 Amperes or More</b>	<b>Currents Less Than 9 Amperes</b>
Primary only protection	125% (See Note 1.)	167%	300%	Not required	Not required
Primary and secondary protection	250% (See Note 3.)	250% (See Note 3.)	250% (See Note 3.)	125% (See Note 1.)	167%

**Table 4.30.4.2 Maximum Rating or Setting of Motor Branch-Circuit Short-Circuit and Ground-Fault Protective Devices**

Type of Motor	Percentage of Full-Load Current			
	Nontime Delay Fuse <sup>1</sup>	Dual Element (Time-Delay) Fuse <sup>1</sup>	Instantaneous Trip Breaker	Inverse Time Breaker <sup>2</sup>
Single-phase motors	300	175	800	250
AC polyphase motors other than wound-rotor				
Squirrel cage — other than Design B energy-efficient	300	175	800	250
Design B energy-efficient	300	175	1 100	250
Synchronous <sup>3</sup>	300	175	800	250
Wound rotor	150	150	800	150
Direct current (constant voltage)	150	150	250	150

Note: For certain exceptions to the values specified, see 4.30.4.4.

<sup>1</sup>The values in the Nontime Delay Fuse column apply to Time-Delay Class CC fuses.

<sup>2</sup>The values given in the last column also cover the ratings of nonadjustable inverse time types of circuit breakers that may be modified as in 4.30.4.2(c), Exception No. 1 and No. 2.

<sup>3</sup>Synchronous motors of the low-torque, low-speed type (usually 450 rpm or lower), such as are used to drive reciprocating compressors, pumps, and so forth, that start unloaded, do not require a fuse rating or circuit-breaker setting in excess of 200 percent of full-load current.



Table 2.20.3.3 Lighting Load Demand Factors

Type of Occupancy	Portion of Lighting Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (Percent)
Dwelling units	First 3000 or less at	100
	From 3001 to 120,000 at	35
	Remainder over 120,000 at	25
Hospitals*	First 50,000 or less at	40
	Remainder over 50,000 at	20
Hotels and motels, including apartment houses without provision for cooking by tenants*	First 20,000 or less at	50
	From 20,001 to 100,000 at	40
	Remainder over 100,000 at	30
Warehouses (storage)	First 12,500 or less at	100
	Remainder over 12,500 at	50
All others	Total volt-amperes	100

\*The demand factors of this table shall not apply to the calculated load of feeders or services supplying areas in hospitals, hotels, and motels where the entire lighting is likely to be used at one time, as in operating rooms, ballrooms, or dining rooms.

**Table 2.20.3.5 Demand Factors for Non-dwelling Receptacle Loads**

Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (Percent)
First 10 kVA or less at	100
Remainder over 10 kVA at	50

**Table 2.10.2.6 Summary of Branch-Circuit Requirements**

Circuit Rating	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):					
Circuit wires <sup>1</sup>	2.0 (1.6)	5.5 (2.6)	5.5 (2.6)	8.0 (3.2)	14
Taps	2.0 (1.6)	2.0 (16)	2.0 (1.6)	3.5 (2.0)	3.5 (2.0)
Fixture wires and cords — see 2.40.1.5					
Overcurrent Protection	15 A	20 A	30 A	40 A	50 A
Outlet devices:					
Lampholders permitted	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating <sup>2</sup>	15 max. A	15 or 20 A	30 A	40 or 50 A	50 A
Maximum Load	15 A	20 A	30 A	40 A	50 A
Permissible load	See 2.10.2.5(a)	See 2.10.2.5(a)	See 2.10.2.5(b)	See 2.10.2.5(c)	See 2.10.2.5(c)

<sup>1</sup>These gauges are for copper conductors.

<sup>2</sup>For receptacle rating of cord-connected electric-discharge luminaires (lighting fixtures), see 4.10.6.9(c).

Table 2.20.2.3 General Lighting Loads by Occupancy

Type of Occupancy	Unit Load
	Volt-Amperes per Square Meter
Armories and auditoriums	8
Banks	28 <sup>b</sup>
Barber shops and beauty parlors	24
Churches	8
Clubs	16
Court rooms	16
Dwelling units <sup>a</sup>	24
Garages — commercial (storage)	4
Hospitals	16
Hotels and motels, including apartment houses without provision for cooking by tenants <sup>a</sup>	16
Industrial commercial (loft) buildings	16
Lodge rooms	12
Office buildings	28 <sup>b</sup>
Restaurants	16
Schools	24
Stores	24
Warehouses (storage)	2
In any of the preceding occupancies except one-family dwellings and individual dwelling units of two-family and multifamily dwellings:	
Assembly halls and auditoriums	8
Halls, corridors, closets, stairways	4
Storage spaces	2

<sup>a</sup>See 2.20.2.5(j).<sup>b</sup>See 2.20.2.5(k).

**(b) Electric Dryers and Household Electric Cooking Appliances.** Load calculations shall be permitted as specified in 2.20.3.15 for electric dryers and in 2.20.3.16 for electric ranges and other cooking appliances.

**(c) Motor Loads.** Outlets for motor loads shall be calculated in accordance with the requirements in 4.30.2.2, 4.30.2.4, and 4.40.1.6.



**Table 2.10.2.3(b)(2) Maximum Cord-and-Plug-Connected Load to Receptacle**

<b>Circuit Rating (Amperes)</b>	<b>Receptacle Rating (Amperes)</b>	<b>Maximum Load (Amperes)</b>
15 or 20	15	12
20	20	16
30	30	24

**Table 2.10.2.3(b)(3) Receptacle Ratings for Various Size Circuits**

<b>Circuit Rating (Amperes)</b>	<b>Receptacle Rating (Amperes)</b>
15	Not over 15
20	15 or 20
30	30
40	40 or 50
50	50

**Table 3.14.2.2(b) Volume Allowance Required per Conductor**

<b>Size of Conductor mm<sup>2</sup>(mm dia.)</b>	<b>Free Space Within Box for Each Conductor cm<sup>3</sup></b>
0.75(1.0)	24
1.25(1.2)	28
2.0(1.6)	32
3.5(2.0)	36
5.5(2.6)	40
8.0(3.2)	50
14	82

Table 3.12.1.6(b) Minimum Wire-Bending Space at Terminals

Wire Size mm <sup>2</sup> (mm dia.)	Wires per Terminal			
	1	2	3	4 or more
	mm	mm	mm	mm
2.0(1.6)-5.5(2.6)	Not specified	—	—	—
8.0(3.2)	40	—	—	—
14	50	—	—	—
22	75	—	—	—
30	90	—	—	—
38	115	—	—	—
50	140	140	180	—
60	150	150	190	—
80	165 <sup>a</sup> (12)	165 <sup>a</sup> (12)	200	—
100	180 <sup>b</sup> (25)	190 <sup>c</sup> (38)	215 <sup>a</sup> (12)	—
125	215 <sup>d</sup> (50)	215 <sup>d</sup> (50)	230 <sup>b</sup> (25)	250
150	250 <sup>e</sup> (75)	250 <sup>d</sup> (50)	280 <sup>b</sup> (25)	300
175	305 <sup>e</sup> (75)	305 <sup>e</sup> (50)	330 <sup>e</sup> (25)	350 <sup>d</sup>
200	330 <sup>e</sup> (75)	330 <sup>e</sup> (75)	350 <sup>e</sup> (75)	380 <sup>e</sup> (75)
250	350 <sup>e</sup> (75)	350 <sup>e</sup> (75)	380 <sup>e</sup> (75)	400 <sup>e</sup> (75)
325	380 <sup>e</sup> (75)	400 <sup>e</sup> (75)	455 <sup>e</sup> (75)	480 <sup>e</sup> (75)
375	405 <sup>e</sup> (75)	460 <sup>e</sup> (75)	510 <sup>e</sup> (75)	560 <sup>e</sup> (75)
400	430 <sup>e</sup> (75)	480 <sup>e</sup> (75)	560 <sup>e</sup> (75)	610 <sup>e</sup> (75)
500	510	—	—	—
600	560	—	—	—
725	610	—	—	—
850	610	—	—	—
1000	610	—	—	—

1. Bending space at terminals shall be in accordance with the following table.

**Table 3.12.1.6(a) Minimum Wire-Bending Space at Terminals and Minimum Width of Wiring Gutters**

Wire Size mm <sup>2</sup> (mm dia.)	Wires per Terminal				
	1 (mm)	2 (mm)	3 (mm)	4 (mm)	5 (mm)
2.0(1.6) – 5.5(2.6)	Not specified	—	—	—	—
8.0(3.2) – 14	40	—	—	—	—
22	50	—	—	—	—
30	65	—	—	—	—
38	75	—	—	—	—
50 – 60	90	125	175	—	—
80 – 100	100	150	200	—	—
125	115	150	200	250	—
150 – 175	125	200	250	300	—
200 – 250	150	200	250	300	350
325 – 375	200	250	300	350	400
400	200	300	350	400	450
500 – 600	250	—	—	—	—
725 – 1000	300	—	—	—	—

Note: Bending space at terminals shall be measured in a straight line from the end of the lug or wire connector (in the direction that the wire leaves the terminal) to the wall, barrier, or obstruction.



Table 3.0.1.19(a) Spacings for Conductor Supports

Size of Wire mm <sup>2</sup> (mm dia.)	Support of Conductors in Vertical Raceways	Conductors	
		Aluminum or Copper-Clad Aluminum (m)	Copper (m)
0.75(1.0) through 8.0(3.2)	Not greater than	30	30
14 through 50	Not greater than	60	30
60 through 100	Not greater than	55	25
Over 100 through 175	Not greater than	40	18
Over 175 through 250	Not greater than	35	15
Over 250 through 400	Not greater than	30	12
Over 400	Not greater than	25	11

Table 4.30.3.7 Overload Units

Kind of Motor	Supply System	Number and Location of Overload Units, Such as Trip Coils or Relays
1-phase ac or dc	2-wire, 1-phase ac or dc ungrounded	1 in either conductor
1-phase ac or dc	2-wire, 1-phase ac or dc, one conductor grounded	1 in ungrounded conductor
1-phase ac or dc	3-wire, 1-phase ac or dc, grounded neutral	1 in either ungrounded conductor
1-phase ac	Any 3-phase	1 in ungrounded conductor
2-phase ac	3-wire, 2-phase ac, ungrounded	2, one in each phase
2-phase ac	3-wire, 2-phase ac, one conductor grounded	2 in ungrounded conductors
2-phase ac	4-wire, 2-phase ac, grounded or ungrounded	2, one per phase in ungrounded con- ductors
2-phase ac	Grounded neutral or 5-wire, 2-phase ac, ungrounded	2, one per phase in any ungrounded phase wire
3-phase ac	Any 3-phase	3, one in each phase*

\*Exception: An overload unit in each phase shall not be required where overload protection is provided by other approved means.

**Table 4.30.2.2(e) Duty-Cycle Service**

Classification of Service	Nameplate Current Rating Percentages			
	5-Minute Rated Motor	15-Minute Rated Motor	30- & 60-Minute Rated Motor	Continuous Rated Motor
Short-time duty operating valves, raising or lowering rolls, etc.	110	120	150	—
Intermittent duty and freight passenger elevators, tool heads, pumps, drawbridges, turntables, etc. (for arc welders, see 6.30.2.1)	85	85	90	140
Periodic duty rolls, ore- and coal-handling machines, etc.	85	90	95	140
Varying duty	110	120	150	200

Note: Any motor application shall be considered as continuous duty unless the nature of the apparatus it drives is such that the motor will not operate continuously with load under any condition of use.



