

Ampacity per National Electric Code (USA)

Calculation of the max. ampacity, based on "NEC 2011 Edition"

According to NEC Tabelle 310.15(B), Edition 2011

Allowable Ampacities of Insulated Conductors Rated 0 Through 2000 Volts, 60 °C – 90 °C (140 °F – 194 °F). Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30 °C (86 °F)

Size AWG or kcmil	Temperature Rating of Conductor		
	60 °C (140 °F)	75 °C (167 °F)	90 °C (194 °F)
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW COPPER	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
18	–	–	14
16	–	–	18
14**	15	20	25
12**	20	25	30
10**	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	5	100	115
2	95	115	130
1	110	130	145
1/0	125	150	170
2/0	145	175	195
3/0	165	200	225
4/0	195	230	260

* Refer to 310.15(b)(2) for the ampacity correction factors where the ambient temperature is other than 30 °C (86 °F)

* Refer to 240.4(d) for conductor overcurrent protection limitations

Correction Factors

Ambient temperature (Based on 310.15(B)(2))

Ambient temp. (°C)	For ambient temperatures other than 30 °C (86 °F), multiply the allowable ampacities shown above by the appropriate factor shown below.			Ambient temp. (°F)
21-25	1.08	1.05	1.04	70-77
26-30	1	1	1	78-86
31-35	0.91	0.94	0.96	87-95
36-40	0.82	0.88	0.91	96-104
41-45	0.71	0.82	0.87	105-113
46-50	0.58	0.75	0.82	114-122
51-55	0.41	0.67	0.76	123-131
56-60	–	0.58	0.71	132-140
61-70	–	0.33	0.58	141-158
71-80	–	–	0.41	159-176

Number of current carrying conductors

Per NEC Table 310.15(B)(3)A

Adjustment Factors for more than three current carrying conductors in Raceway or cable.

Number of Current-Carrying Conductors	Percent of Values in Tables 310.15(B) through 310.15(B)(19) as Adjusted for Ambient Temperature if Necessary
1-3	100
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
40 and more	35

Number of conductors is the total number of conductors in the raceway or cable adjusted in accordance with 310.15(B)(5) and (6)

Example:

Application with a LÜTZE SUPERFLEX PLUS M (C) PUR UL SERVO 0,6/1 kV with control pair and an ambient temperature of 50 °C and a required ampacity of 12,5 Ampere.

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|---------------------------------------|------|---|---|
| 1. Factor ambient temperature | 0,75 | → | 25 A x 0,75 x 0,8 = 15 A > 12,5 A |
| 2. Factor current carrying conductors | 80 | | Our recommendation is a AWG12/4mm ² , Item no. 111422 |

Note: The given values are reference numbers to calculate the required cable sizes. Friedrich Lütze GmbH is not responsible for the conformity of the values provided by the NEC.

Current loads

The stated values in the following tables are standard values and in simplified form extracted from VDE 0298 section 4 or extract from VDE 0100 section 430 and 523. In border cases, the VDE terms are to be taken into account. Valid for industrial machines VDE 0113, section 1 (EN 60204 section 1/IEC 204-1); for telecommunication and information systems VDE 0891 section 1; for telecommunication aerial cable VDE 0891 section 8; for flat cables VDE 0891 section 10. You can find general terms/requirements and recommended values in VDE 0298 section 2 and section 4. Amperage range, after 1.5 – 120 mm² (for group 3 up to 35 mm²) according to VDE 0100 section 430 for an ambient temperature of up to + 30 °C

Nominal cross section mm ²	Group 1		Group 2		Group 3	
	Cu conductor	Protection	Cu conductor	Protection	Cu conductor	Protection
	A	A	A	A	A	A
0.05	0.7		1		1	
0.14	1.4		2		2.8	
0.25	2.8		4.5		5	
0.34	4		6		7.5	
0.5	6		7.5		10	
0.75	9		12	6	15	10
1.0	11	6	15	10	19	10
1.5	16.5	16	16.5	16	21	20
2.5	21	20	22	20	29	25
4.0	28	25	30	25	39	35
6.0	36	35	38	35	51	50
10.0	49	40	53	50	70	63
16.0	65	63	72	63	94	80
25.0	85	80	94	80	125	100
35.0	105	100	118	100	154	125
50.0	126	125	142	125	198	160
70.0	160	160	181	160	245	200
95.0	193	160	219	200	292	250
120.0	223	200	253	250	344	315
150.0			335	250	391	315
185.0			382	315	448	400
240.0			453	400	528	400
300.0			504	400	608	500
400.0					726	630

Group 1	one or multiple single strand cables in conduit, e.g. PVC single core cable H 03V.../ H 05V.../ H 07V... according to VDE 0281.	Group 3	single strand, run free in the air, whereby the cables are run with an interspace of at least one time the cable diameter as well as single strand wiring in switching and distribution equipment and rail distributors.
Group 2	multi-core cables e.g. sheathed cable, moving cables, conduit cables in open or ventilated ducts.		

Amperage range of isolated cables and cables not run in the area of the ground at ambient temperatures over 30 °C (excerpt from VDE 0100 section 523, table 3).

Amperage range of the above stated table		
Ambient temperature °C	Rubber isolation permitted conductor temperature 60 °C %	PVC insulation permitted conductor temperature 70 °C %
over 30 to 35	91	92
over 35 to 40	82	87
over 40 to 45	71	79
over 45 to 50	58	71
over 50 to 55	41	61

Amperage range of cables with increased thermal-resistance for ambient temperature over 55 °C (excerpt from VDE 0100 section 523, table 4).

Ambient temperature for cables with		Amperage range of the above stated table
permitted conductor temperature 100 °C	permitted conductor temperature 180 °C	
°C	°C	%
over 55 to 65	over 55 to 145	100
over 65 to 70	over 145 to 150	92
over 70 to 75	over 150 to 155	85
over 75 to 80	over 155 to 160	75
over 80 to 85	over 160 to 165	65
over 85 to 90	over 165 to 170	53
over 90 to 95	over 170 to 175	38