



EDITION 2
VOLUME 2

MAXIMUM PULLING TENSION FOR ELECTRICAL CONDUCTORS

Composed by:
Edwin Marquez, Director of Applications Engineering
Matthew Williamson, Chief Applications Engineer
Mark Dulik, Principal Applications and Consulting Engineer

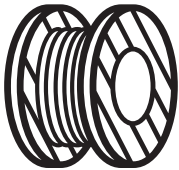


ALLOWABLE TENSION ON PULLING DEVICE

Do not exceed the maximum allowable tension stated by the manufacturer of the pulling device. Pulling devices include pulling ropes, swivels, pulling eyes, and pulling grips (crimp-on and basket type).

MAXIMUM TENSION ON CABLE CONDUCTORS

The conductors of the cable are generally the only members that can bear the pulling forces without damage. Do not consider metallic shielding wires, tapes, braids, or armors not designed for the purpose when calculating cable pulling tensions.

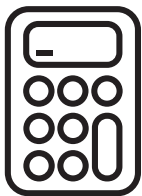


Equations for Pulling Tension

- $T = S \times \text{cmil} \times n$, (if $n \leq 3$)
- $T = S \times \text{cmil} \times n \times 0.8$, (if $n > 3$)

Where:

- T = Maximum tension in the conductors (lbs)
- S = Maximum allowable conductor stress
(for copper 0.008 lb/cmil and for aluminum 3/4 hard and AA-8000 use 0.006 lb/cmil)
- n = Number of conductors



When pulling phase and neutral conductors along with a much smaller equipment grounding conductor (EGC), the EGC is normally ignored in the calculation. The values in the tables apply for cables rated 46kV and below.

Even though pulling devices and conductors can have allowable tension ratings above 10,000 pounds, other factors typically limit the allowable tension of a pull. Such factors include structural supports, sheave and pulley ratings, and the maximum sidewall bearing pressure of the cable.



WARNING:

The maximum sidewall pressure (SWP) of large single conductors is usually exceeded before the maximum pulling tension. The maximum SWP is 1,000 lbs for sizes 8 AWG and larger, and 500 lbs for sizes 14, 12, and 10 AWG.



*Southwire offers the SIMpull® Cable Pull Calculator at www.southwire.com/calculator-simpull. This tool will calculate cable pulling tensions, cable sidewall pressure, and more.





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MAXIMUM ALLOWABLE PULLING TENSION ON CABLE WITH COPPER CONDUCTORS (LBS)

AWG/ KCMIL	NUMBER OF CONDUCTORS								
	1	2	3	4	5	6	7	8	9
18	13	26	39	41	52	62	73	83	93
16	21	41	62	66	83	99	116	132	149
14	33	66	99	105	132	158	184	210	237
12	52	104	157	167	209	251	293	334	376
10	83	166	249	266	332	399	465	531	598
9	105	209	314	335	419	503	586	670	754
8	132	264	396	423	528	634	740	845	951
6	210	420	630	672	840	1008	1176	1343	1511
5	265	529	794	847	1059	1271	1482	1694	1906
4	334	668	1002	1069	1336	1603	1870	2137	2404
3	421	842	1263	1347	1684	2021	2357	2694	3031
2	531	1062	1593	1699	2124	2548	2973	3398	3822
1	670	1339	2009	2142	2678	3214	3749	4285	4821
1/0	845	1690	2534	2703	3379	4055	4731	5407	6083
2/0	1065	2130	3194	3407	4259	5111	5963	6815	7667
3/0	1342	2685	4027	4296	5370	6444	7517	8591	9665
4/0	1693	3386	5078	5417	6771	8125	9480	10834	12188
250	2000	4000	6000	6400	8000	9600	11200	12800	14400
300	2400	4800	7200	7680	9600	11520	13440	15360	17280
350	2800	5600	8400	8960	11200	13440	15680	17920	20160
400	3200	6400	9600	10240	12800	15360	17920	20480	23040
450	3600	7200	10800	11520	14400	17280	20160	23040	25920
500	4000	8000	12000	12800	16000	19200	22400	25600	28800
550	4400	8800	13200	14080	17600	21120	24640	28160	31680
600	4800	9600	14400	15360	19200	23040	26880	30720	34560
650	5200	10400	15600	16640	20800	24960	29120	33280	37440
700	5600	11200	16800	17920	22400	26880	31360	35840	40320
750	6000	12000	18000	19200	24000	28800	33600	38400	43200
800	6400	12800	19200	20480	25600	30720	35840	40960	46080
900	7200	14400	21600	23040	28800	34560	40320	46080	51840
1000	8000	16000	24000	25600	32000	38400	44800	51200	57600
1250	10000	20000	30000	32000	40000	48000	56000	64000	72000
1500	12000	24000	36000	38400	48000	57600	67200	76800	86400
1750	14000	28000	42000	44800	56000	67200	78400	89600	100800
2000	16000	32000	48000	51200	64000	76800	89600	102400	115200



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MAXIMUM ALLOWABLE PULLING TENSION ON CABLE WITH ALUMINUM (ALUMAFLEX™) CONDUCTORS (LBS)

AWG/ KCMIL	NUMBER OF CONDUCTORS								
	1	2	3	4	5	6	7	8	9
8	99	198	297	317	396	475	555	634	713
6	157	315	472	504	630	756	882	1008	1134
4	250	501	751	801	1002	1202	1402	1603	1803
3	316	631	947	1010	1263	1515	1768	2021	2273
2	398	796	1194	1274	1593	1911	2230	2548	2867
1	502	1004	1506	1607	2009	2410	2812	3214	3615
1/0	634	1267	1901	2028	2534	3041	3548	4055	4562
2/0	799	1597	2396	2556	3194	3833	4472	5111	5750
3/0	1007	2014	3020	3222	4027	4833	5638	6444	7249
4/0	1270	2539	3809	4063	5078	6094	7110	8125	9141
250	1500	3000	4500	4800	6000	7200	8400	9600	10800
300	1800	3600	5400	5760	7200	8640	10080	11520	12960
350	2100	4200	6300	6720	8400	10080	11760	13440	15120
400	2400	4800	7200	7680	9600	11520	13440	15360	17280
450	2700	5400	8100	8640	10800	12960	15120	17280	19440
500	3000	6000	9000	9600	12000	14400	16800	19200	21600
550	3300	6600	9900	10560	13200	15840	18480	21120	23760
600	3600	7200	10800	11520	14400	17280	20160	23040	25920
650	3900	7800	11700	12480	15600	18720	21840	24960	28080
700	4200	8400	12600	13440	16800	20160	23520	26880	30240
750	4500	9000	13500	14400	18000	21600	25200	28800	32400
800	4800	9600	14400	15360	19200	23040	26880	30720	34560
900	5400	10800	16200	17280	21600	25920	30240	34560	38880
1000	6000	12000	18000	19200	24000	28800	33600	38400	43200
1250	7500	15000	22500	24000	30000	36000	42000	48000	54000
1500	9000	18000	27000	28800	36000	43200	50400	57600	64800
1750	10500	21000	31500	33600	42000	50400	58800	67200	75600
2000	12000	24000	36000	38400	48000	57600	67200	76800	86400



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