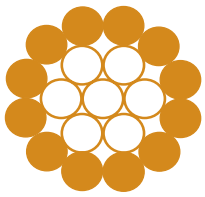
COPPERWELD® AND COPPERWELD®/COPPER CONDUCTORS, WIRE TABLES AND N.E.S.C. LOADING TABLES

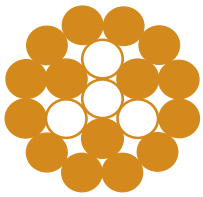
Comprised of a copper cladding metallurgically bonded to a steel core, Copperweld® wire from Copperweld effectively combines the strength of steel with the conductivity and corrosion resistance of copper. Standard copper cladding thicknesses result in 21%, 30%, or 40% IACS composite conductivity. The core steel employed in the composite depends specifically upon the application requirement for mechanical properties and typically ranges from AISI 1006 to AISI 1060.

Copperweld® CCS wire and strand provide efficient and economical overhead line construction and are typically used for power conductors, overhead communication lines (including telephone, telegraph and signal lines), overhead ground wires, guy wires, aerial cable messenger, and catenary cables for railroad electrification. When combined with copper wires in Copperweld®-copper conductors, a wide range of strengths and conductive options is available, permitting the selection of conductors which will meet the requirements for practically all types of overhead line designs.

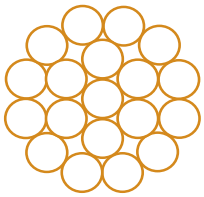
NOTE: Properties noted in these data sheets are typical values for standard applications. If your application requires performance values beyond those noted, please contact Copperweld's Engineering Support Center at **engineering@copperweld.com** or **+1.615.377.4200**. Material selection, varying composition and processing conditions all provide flexibility in how Copperweld can deliver exactly the product you need. Bimetallic conductors from Copperweld offer many distinct advantages, and our engineering team works in concert with our clients to determine the proper components for the stringent requirements of their products.



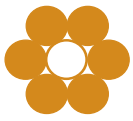
TYPE "E"
7 CW Wires
12 Cu Wires



TYPE "EK"
4 CW Wires
15 Cu Wires



19 Wire
Copperweld
Strand



TYPE "F"
1 CW Wire
6 Cu Wires

TYPE "G"
2 CW Wires
5 Cu Wires

TYPE "J"
3 CW Wires
4 Cu Wires

TYPE "K"
4 CW Wires
3 Cu Wires

TYPE "N"
5 CW Wires
2 Cu Wires

TYPE "P"
6 CW Wires
1 Cu Wire

7 Wire
Copperweld
Strand

TYPE "A"
1 CW Wire
2 Cu Wires

TYPE "D"
2 CW Wires
1 Cu Wire

3 Wire
Copperweld
Strand

Solid
Copperweld
Wire

Wire Tables – US/Imperial

BARE STRANDED COPPERWELD®-COPPER CONDUCTORS SIZES 350000 CIRCULAR MILS TO NO. 8 AWG EQUIVALEND CONDUCTANCE						
TYPE OF CONDUCTOR	DIAMETER (inch)	DESIGN OF CONDUCTOR		MINIMUM BREAKING LOAD (lbs)	WEIGHT (lbs/kft)	CROSS SECTION AREA (in^2)
		NUMBER AND DIAMETER EHS 30% COPPERWELD WIRES	NUMBER AND DIAMETER HARD-DRAWN COPPER WIRES			
350000 Circular Mils Copper Equivalent-.0302 Ohms/kft at 68°F.						
E	0.788	7 x .1576	12 x .1576	31474	1403	0.3706
EK	0.735	4 x .1470	15 x .1470	23141	1238	0.3225
300000 Circular Mils Copper Equivalent-.0353 Ohms/kft at 68°F.						
E	0.729	7 x .1459	12 x .1459	26974	1203	0.3177
EK	0.680	4 x .1361	15 x .1361	20338	1061	0.2764
250000 Circular Mils Copper Equivalent-.0423 Ohms/kft at 68°F.						
E	0.666	7 x .1332	12 x .1332	23226	1002	0.2648
EK	0.621	4 x .1242	15 x .1242	17302	884.2	0.2302
4/0 AWG Copper Equivalent (211600 Circular Mils) .0500 Ohms/kft at 68°F.						
E	0.613	7 x .1225	12 x .1225	20114	848.3	0.2239
EK	0.571	4 x .1143	15 x .1143	14881	748.4	0.1950
F	0.550	1 x .1833	6 x .1833	11593	710.2	0.1847
2/0 AWG Copper Equivalent (133100 Circular Mils) .0795 Ohms/kft at 68°F.						
K	0.534	4 x .1780	3 x .1780	17071	645.9	0.1742
J	0.494	3 x .1648	4 x .1648	13420	560.6	0.1493
F	0.436	1 x .1454	6 x .1454	7686	446.8	0.1162
1/0 AWG Copper Equivalent (105600 Circular Mils) .100 Ohms/kft at 68°F.						
K	0.475	4 x .1585	3 x .1585	14064	512.0	0.1381
J	0.440	3 x .1467	4 x .1467	10640	444.3	0.1183
F	0.388	1 x .1294	6 x .1294	6252	354.1	0.0921
No. 1 AWG Copper Equivalent (83690 Circular Mils) .127 Ohms/kft at 68°F.						
K	0.423	4 x .1412	3 x .1412	11554	406.2	0.1096
J	0.392	3 x .1307	4 x .1307	8735	352.5	0.0939
F	0.346	1 x .1153	6 x .1153	5067	280.9	0.0731
No. 2 AWG Copper Equivalent (66370 Circular Mils) .159 Ohms/kft at 68°F.						
K	0.377	4 x .1257	3 x .1257	9439	322.1	0.0869
J	0.349	3 x .1164	4 x .1164	7107	279.5	0.0745
A	0.366	1 x .1699	2 x .1699	5703	256.8	0.0680
F	0.308	1 x .1026	6 x .1026	4070	222.8	0.0579
No. 4 AWG Copper Equivalent (41740 Circular Mils) .253 Ohms/kft at 68°F.						
D	0.348	2 x .1615	1 x .1615	7120	225.5	0.0615
A	0.290	1 x .1347	2 x .1347	3809	161.5	0.0428
No. 6 AWG Copper Equivalent (26250 Circular Mils) .403 Ohms/kft at 68°F.						
D	0.276	2 x .1281	1 x .1281	4796	141.8	0.0387
A	0.230	1 x .1068	2 x .1068	2499	101.6	0.0269
C	0.225	1 x .1046*	2 x .1046	2072	97.34	0.0258
No. 8 AWG Copper Equivalent (16510 Circular Mils) .640 Ohms/kft at 68°F.						
D	0.219	2 x .1016	1 x .1016	3160	89.24	0.0243
A	0.199	1 x .1127	2 x .07969	2211	74.28	0.0200
C	0.179	1 x .08081*	2 x .08336	1214	60.67	0.0160

*High strength Copperweld, 40% conductivity.

TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION	TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION	TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION
	Mpsi	x 10^{-6}/°F		Mpsi	x 10^{-6}/°F		Mpsi	x 10^{-6}/°F
E	19.5	8.4	J	20.0	8.3	7A, 8A	21.0	8.1
EK	18.5	8.8	K	21.0	8.0	C	19.0	8.5
F	18.0	9.0	2A, 4A, 6A	19.0	8.5	D	22.0	7.8

Wire Tables – Metric

BARE SOLID COPPERWELD® STRANDS, HIGH STRENGTH AND EXTRA HIGH STRENGTH PHYSICAL AND ELECTRICAL CHARACTERISTICS.						
TYPE OF CONDUCTOR	DIAMETER (mm)	DESIGN OF CONDUCTOR		MINIMUM BREAKING LOAD (kg)	WEIGHT (kg/km)	CROSS SECTION (mm^2)
		NUMBER AND DIAMETER EHS 30% COPPERWELD WIRES	NUMBER AND DIAMETER HARD-DRAWN COPPER WIRES			
350000 Circular Mils Copper Equivalent-177.3 mm^2-.0991 Ohms/km 20°C.						
E	20.15	7 x 4.003	12 x 4.003	14276	2089	239.1
EK	18.670	4 x 3.734	15 x 3.734	10497	1842	208.0
300000 Circular Mils Copper Equivalent-152.1 mm^2-.116 Ohms/km 20°C.						
E	18.529	7 x 3.706	12 x 3.706	12235	1791	204.9
EK	17.285	4 x 3.457	15 x 3.457	9225	1579	178.3
250000 Circular Mils Copper Equivalent-126.7 mm^2-.139 Ohms/km 20°C.						
E	16.916	7 x 3.383	12 x 3.383	10535	1492	170.8
EK	15.773	4 x 3.155	15 x 3.155	7848	1315	148.5
4/0 AWG Copper Equivalent (211600 Circular Mils) 107.2 mm^2-.164 Ohms/km at 20°C.						
E	15.558	7 x 3.112	12 x 3.112	9123	1262	144.5
EK	14.516	4 x 2.903	15 x 2.903	6750	1114	125.8
F	13.967	1 x 4.656	6 x 4.656	5258	1057	119.2
2/0 AWG Copper Equivalent (133100 Circular Mils) 67.43 mm^2-.261 Ohms/km at 20°C.						
K	13.564	4 x 4.521	3 x 4.521	7743	961.0	112.4
J	12.558	3 x 4.186	4 x 4.186	6087	834.1	96.33
F	11.079	1 x 3.693	6 x 3.693	3486	665.3	74.99
1/0 AWG Copper Equivalent (105500 Circular Mils) 53.48 mm^2-.328 Ohms/km at 20°C.						
K	12.078	4 x 4.026	3 x 4.026	6379	761.0	89.11
J	11.179	3 x 3.726	4 x 3.726	4826	660.9	76.33
F	9.860	1 x 3.287	6 x 3.287	2836	526.9	59.39
No. 1 AWG Copper Equivalent (83690 Circular Mils) 42.41 mm^2-.417 Ohms/km at 20°C.						
K	10.759	4 x 3.586	3 x 3.586	5241	604.7	70.72
J	9.959	3 x 3.320	4 x 3.320	3962	524.6	60.59
F	8.786	1 x 2.929	6 x 2.929	2299	418.3	47.15
No. 2 AWG Copper Equivalent (66370 Circular Mils) 33.63 mm^2-.522 Ohms/km at 20°C.						
K	9.578	4 x 3.193	3 x 3.193	4282	479.2	56.04
J	8.870	3 x 2.957	4 x 2.957	3223	416.1	48.06
A	9.300	1 x 4.315	2 x 4.315	2587	382.3	43.88
F	7.818	1 x 2.606	6 x 2.606	1846	331.3	37.34
No. 4 AWG Copper Equivalent (41740 Circular Mils) 21.15 mm^2-.830 Ohms/km at 20°C.						
D	8.840	2 x 4.102	1 x 4.102	3230	335.5	39.65
A	7.373	1 x 3.421	2 x 3.421	1728	240.3	27.58
No. 6 AWG Copper Equivalent (26250 Circular Mils) 13.30 mm^2-1.322 Ohms/km at 20°C.						
D	7.012	2 x 3.254	1 x 3.254	2175	211.1	24.94
A	5.846	1 x 2.713	2 x 2.713	1134	151.2	17.34
C	5.725	1 x 2.657*	2 x 2.657	940	144.9	16.63
No. 8 AWG Copper Equivalent (16510 Circular Mils) 8.366 mm^2-2.100 Ohms/km at 20°C.						
D	5.561	2 x 2.581	1 x 2.581	1433	132.8	15.68
A	0.199	1 x 2.863	2 x 2.024	1003	110.5	12.87
C	0.179	1 x 2.053*	2 x 2.117	551	90.29	10.35

*High strength Copperweld, 40% conductivity.

TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION	TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION	TYPE OF CONDUCTOR	MODULUS OF ELASTICITY	COEFFICIENT OF LINEAR EXPANSION
	GPa	x 10^{-5}/°C		GPa	x 10^{-5}/°C		GPa	x 10^{-5}/°C
E	134.4	1.51	J	137.9	1.49	7A, 8A	144.8	1.46
EK	127.6	1.58	K	144.8	1.44	C	131.0	1.53
F	124.1	1.62	2A, 4A, 6A	131.0	1.53	D	151.7	1.40

Wire Tables – US/Imperial

COPPERWELD® STRANDED AND SOLID BARE CONDUCTORS HIGH STRENGTH AND EXTRA HIGH STRENGTH								
CONDUCTOR SIZE AWG	DIAMETER (inch)	MINIMUM BREAKING LOADS, lbs*			WEIGHT (lbs/kft)	NOMINAL DC RESISTANCE Ω/kft at 68°F		CROSS-SECTION AREA (cmil)
		HIGH STRENGTH		EXTRA HIGH STRENGTH 30% CONDUCTIVITY		40% CONDUCTIVITY	30% CONDUCTIVITY	
		40% CONDUCTIVITY	30% CONDUCTIVITY					
19-Wire Strand								
19 No. 5	0.910	48718	53899	64895	1768.7	0.0418	0.0558	628665
19 No. 6	0.810	40356	44460	53865	1402.9	0.0527	0.0703	498636
19 No. 7	0.721	33379	36628	44494	1113.1	0.0665	0.0886	395627
19 No. 8	0.642	27548	30130	36577	882.7	0.0838	0.1117	313733
19 No. 9	0.572	22675	24727	29686	699.6	0.1057	0.1410	248660
7-Wire Strand								
7 No. 4	0.613	21641	24047	28552	818.8	0.0896	0.1195	292169
7 No. 5	0.546	17949	19858	23909	649.1	0.1131	0.1507	231613
7 No. 6	0.486	14868	16380	19845	514.8	0.1425	0.1901	183708
7 No. 7	0.433	12298	13495	16393	408.5	0.1797	0.2395	145757
7 No. 8	0.385	10149	11101	13476	323.9	0.2266	0.3021	115586
7 No. 9	0.343	8354	9110	10937	256.7	0.2858	0.3811	91612
7 No. 10	0.306	6911	7529	8921	203.7	0.3603	0.4804	72685
7 No. 12	0.242	3786	3799	5670	128.1	0.5730	0.7640	45700
3-Wire Strand								
3 No. 5	0.392	8120	8983	10816	277.6	0.2633	0.3511	99263
3 No. 6	0.349	6726	7410	8978	220.2	0.3319	0.4426	78732
3 No. 7	0.311	5563	6105	7416	174.7	0.4184	0.5578	62467
3 No. 8	0.277	4591	5022	6096	138.5	0.5276	0.7034	49537
3 No. 9	0.247	3779	4121	4948	109.8	0.6657	0.8875	39262
3 No. 10	0.220	3126	3406	4036	87.1	0.8390	1.1186	31151
3 No. 12	0.174	1713	1719	2565	54.8	1.3344	1.7792	19586
Solid Wire								
4	0.2043	3435	3817	4532	115.8	0.6212	0.8283	41738
5	0.1819	2849	3152	3795	91.8	0.7836	1.0448	33088
(.165)	0.1650	2448	2697	3267	75.5	0.9523	1.2698	27225
6	0.1620	2360	2600	3150	72.8	0.9879	1.3173	26244
7	0.1443	1952	2142	2602	57.8	1.2452	1.6602	20822
8	0.1285	1611	1762	2139	45.8	1.5702	2.0936	16512
(.128)	0.1280	1598	1748	2122	45.5	1.5825	2.1100	16384
9	0.1144	1326	1446	1736	36.3	1.9811	2.6415	13087
(.104)	0.1040	1142	1245	1286**	30.0	2.3971	3.1962	10816
10	0.1019	1097	1195	1416	28.8	2.4970	3.3293	10384
12	0.0808	601	603	900	18.1	3.9713	5.2951	6529
(.080)	0.0800	561	585	873	17.8	4.0512	5.4016	6400

*Breaking load of 7-wire and 19-wire Copperweld strands are taken as 90% of the sum of the breaking loads of the individual wires; breaking load of 3-wire Copperweld strand is taken as 95% of the sum of the breaking loads of the individual wires used in the manufacturing of the strand.

** 40% Conductivity
Modulus of Elasticity: Solid Wire, 24 x 10^6 psi. Strand, 23 x 10^6 psi
Coefficient of Linear Expansion: 7.2 x 10^{-6}/°F.
Temperature Coefficient of Resistance: 2.1 x 10^{-3}/°F.

Wire Tables – Metric

COPPERWELD® STRANDED AND SOLID BARE CONDUCTORS HIGH STRENGTH AND EXTRA HIGH STRENGTH								
CONDUCTOR SIZE AWG	DIAMETER (mm)	MINIMUM BREAKING LOADS, kgf*			WEIGHT (kg/km)	NOMINAL DC RESISTANCE Ω/km at 20°C		CROSS-SECTION AREA (mm²)
		HIGH STRENGTH		EXTRA HIGH STRENGTH				
		40% CONDUCTIVITY	30% CONDUCTIVITY	30% CONDUCTIVITY		40% CONDUCTIVITY	30% CONDUCTIVITY	
19-Wire Strand								
19 No. 5	23.10	22098	24448	29436	2632	0.137	0.183	318.5
19 No. 6	20.57	18305	20167	24433	2088	0.173	0.231	252.7
19 No. 7	18.33	15141	16614	20182	1656	0.218	0.291	200.5
19 No. 8	16.32	12496	13667	16591	1314	0.275	0.367	159.0
19 No. 9	14.53	10285	11216	13465	1041	0.347	0.463	126.0
7-Wire Strand								
7 No. 4	15.57	9816	10908	12951	1218	0.294	0.392	148.0
7 No. 5	13.86	8141	9007	10845	966	0.371	0.495	117.4
7 No. 6	12.34	6744	7430	9002	766	0.468	0.624	93.09
7 No. 7	11.00	5578	6121	7436	608	0.589	0.786	73.86
7 No. 8	9.79	4604	5035	6112	482	0.743	0.991	58.57
7 No. 9	8.72	3789	4132	4961	382	0.938	1.250	46.42
7 No. 10	7.76	3135	3415	4046	303	1.182	1.576	36.83
7 No. 12	6.16	1717	1723	2572	191	1.880	2.507	23.16
3-Wire Strand								
3 No. 5	9.96	3683	4075	4906	413	0.864	1.152	50.30
3 No. 6	8.87	3051	3361	4072	328	1.089	1.452	39.89
3 No. 7	7.90	2523	2769	3364	260	1.373	1.830	31.65
3 No. 8	7.03	2083	2278	2765	206	1.731	2.308	25.10
3 No. 9	6.26	1714	1869	2244	163	2.184	2.912	19.89
3 No. 10	5.58	1418	1545	1831	130	2.753	3.670	15.78
3 No. 12	4.42	777	780	1163	82	4.378	5.837	9.92
Solid Wire								
4	5.19	1558	1731	2056	172	2.038	2.717	21.15
5	4.62	1292	1430	1721	137	2.571	3.428	16.77
(.165)	4.19	1110	1223	1482	112	3.124	4.166	13.80
6	4.11	1070	1179	1429	108	3.241	4.322	13.30
7	3.67	885	972	1180	86	4.085	5.447	10.55
8	3.26	731	799	970	68	5.152	6.869	8.367
(.128)	3.25	725	793	963	68	5.192	6.923	8.302
9	2.91	601	656	787	54	6.500	8.666	6.631
(.104)	2.64	518	565	583**	45	7.865	10.486	5.481
10	2.59	498	542	642	43	8.192	10.923	5.261
12	2.05	273	274	408	27	13.029	17.372	3.308
(.080)	2.03	254	265	396	26	13.291	17.722	3.243

*Breaking loads of 7-wire, 19-wire and 37 wire Copperweld strands are taken as 90% of the sum of the breaking loads of the individual wires; breaking load of 3-wire Copperweld strand is taken as 95% of the sum of the breaking loads of the individual wires used in the manufacturing of the strand.

** 40% Conductivity
Modulus of Elasticity: Solid Wire, 1.69 x 10^4 kg/mm²; Strand 1.62 x 10^4 kg/mm²
Coefficient of Linear Expansion: 1.3 x 10^{-5} per degree C.
Temperature Coefficient of Resistance: 3.8 x 10^{-3} ohms per degree C.

COPPERWELD

Loading Tables

BARE COPPERWELD®-COPPER CONDUCTORS
SIZES 350,000 CIRCULAR MILS TO NO. 8 AWG EQUIVALENT CONDUCTANCE

TYPE OF CONDUCTOR	DIAMETER (inch)	CROSS SECTION AREA (A) (in^2)	MODULES X AREA (EA) (lbf)	VERTICAL, HORIZONTAL, AND RESULTANT* LOADS (LOADING IN POUNDS PER LINEAR FOOT OF CONDUCTOR)								
				LIGHT LOADING DISTRICT			MEDIUM LOADING DISTRICT			HEAVY LOADING DISTRICT		
				VERTICAL CONDUCTOR ONLY	HORIZONTAL WIND 9 lbs/ft^2	RESULTANT*	VERTICAL CONDUCTOR +1/4" ICE	HORIZONTAL WIND 4 lbs/ft^2 +1/4" Ice	RESULTANT*	VERTICAL CONDUCTOR +1/2" Ice	HORIZONTAL WIND 4 lbs/ft^2 +1/2" Ice	RESULTANT*
350000 Circular Mils Copper Equivalent												
E	0.788	0.3706	7223000	1.403	0.5910	1.572	1.726	0.4293	1.979	2.204	0.5900	2.583
EK	0.735	0.3225	5964000	1.238	0.5513	1.405	1.544	0.4117	1.798	2.006	0.5783	2.388
300000 Circular Mils Copper Equivalent												
E	0.729	0.3177	6191000	1.203	0.5468	1.371	1.507	0.4097	1.762	1.967	0.5763	2.350
EK	0.680	0.2764	5112000	1.061	0.5100	1.227	1.350	0.3933	1.606	1.795	0.5600	2.180
250000 Circular Mils Copper Equivalent												
E	0.666	0.2648	5160000	1.002	0.4995	1.170	1.287	0.3887	1.544	1.727	0.5553	2.114
EK	0.621	0.2302	4261000	0.8842	0.4658	1.049	1.155	0.3737	1.414	1.581	0.5403	1.971
4/0 AWG Copper Equivalent (211600 Circular Mils)												
E	0.613	0.2239	4366000	0.8483	0.4598	1.015	1.117	0.3710	1.377	1.540	0.5377	1.931
G	0.583	0.2077	3946000	0.7894	0.4373	0.9524	1.048	0.3610	1.3090	1.463	0.5277	1.855
EK	0.571	0.1950	3606000	0.7484	0.4283	0.9123	1.004	0.3570	1.2650	1.414	0.5237	1.808
F	0.550	0.1847	3325000	0.7102	0.4125	0.8713	0.9589	0.3500	1.2210	1.363	0.5167	1.758
2/0 AWG Copper Equivalent (133100 Circular Mils)												
K	0.534	0.1742	3658000	0.6459	0.4005	0.8100	0.8896	0.3447	1.1540	1.289	0.5113	1.687
J	0.494	0.1493	2986000	0.5606	0.3705	0.7220	0.7919	0.3313	1.0580	1.179	0.4980	1.580
G	0.463	0.1307	2483000	0.4966	0.3473	0.6560	0.7183	0.3210	0.9867	1.095	0.4877	1.499
F	4.360	0.1162	2092000	0.4468	0.3270	0.6037	0.6601	0.3120	0.9301	1.029	0.4787	1.435
1/0 AWG Copper Equivalent (105600 Circular Mils)												
K	0.475	0.1381	2900000	0.5120	0.3563	0.6737	0.7374	0.3250	1.006	1.118	0.4917	1.522
J	0.440	0.1183	2368000	0.4443	0.3300	0.6034	0.6588	0.3133	0.9295	1.029	0.4800	1.435
G	0.412	0.1036	1968000	0.3936	0.3090	0.5504	0.5994	0.3040	0.8721	0.9607	0.4707	1.370
F	0.388	0.09206	1657000	0.3541	0.2910	0.5083	0.5524	0.2960	0.8267	0.9062	0.4627	1.318
No. 1 AWG Copper Equivalent (83690 Circular Mils)												
N	0.464	0.1315	2893000	0.4813	0.3480	0.6439	0.7033	0.3213	0.9732	1.081	0.4880	1.486
K	0.423	0.1096	2302000	0.4062	0.3173	0.5654	0.6154	0.3077	0.8880	0.9801	0.4743	1.389
J	0.392	0.0939	1878000	0.3525	0.2940	0.5090	0.5521	0.2973	0.8271	0.9071	0.4640	1.319
G	0.367	0.0822	1561000	0.3122	0.2753	0.4662	0.5040	0.2890	0.7810	0.8513	0.4557	1.266
F	0.346	0.07309	1315000	0.2809	0.2595	0.4324	0.4662	0.2820	0.7448	0.8069	0.4487	1.223
No. 2 AWG Copper Equivalent (66370 Circular Mils)												
P	0.462	0.1303	2997000	0.4711	0.3465	0.6348	0.6925	0.3207	0.9631	1.069	0.4873	1.475
N	0.413	0.1043	2295000	0.3817	0.3098	0.5416	0.5878	0.3043	0.8619	0.9494	0.4710	1.360
K	0.377	0.08687	1824000	0.3221	0.2828	0.4786	0.5170	0.2923	0.7940	0.8674	0.4590	1.281
J	0.349	0.07449	1489000	0.2795	0.2618	0.4329	0.4657	0.2830	0.7450	0.8074	0.4497	1.224
A	0.366	0.06801	1292000	0.2568	0.2745	0.4259	0.4483	0.2887	0.7332	0.7953	0.4553	1.216
G	0.327	0.06516	1238000	0.2476	0.2453	0.3985	0.4270	0.2757	0.7082	0.7618	0.4423	1.181
F	0.308	0.05787	1043000	0.2228	0.2310	0.3709	0.3963	0.2693	0.6791	0.7252	0.4360	1.146
No. 4 AWG Copper Equivalent (41740 Circular Mils)												
P	0.366	0.08196	1885000	0.2963	0.2745	0.4539	0.4878	0.2887	0.7668	0.8348	0.4553	1.251
N	0.328	0.06556	1442000	0.2400	0.2460	0.3937	0.4197	0.2760	0.7023	0.7548	0.4427	1.175
D	0.348	0.06145	1352000	0.2255	0.2610	0.3949	0.4114	0.2827	0.6992	0.7528	0.4493	1.177
A	0.290	0.04275	812400	0.1615	0.2175	0.3209	0.3294	0.2633	0.6217	0.6527	0.4300	1.082
No. 6 AWG Copper Equivalent (26250 Circular Mils)												
D	0.276	0.03866	850500	0.1418	0.2070	0.3009	0.3053	0.2587	0.6002	0.6243	0.4253	1.055
A	0.230	0.02688	510900	0.1016	0.1725	0.2502	0.2508	0.2433	0.5495	0.5555	0.4100	0.9904
C	0.225	0.02578	489600	0.09734	0.1688	0.2448	0.2450	0.2417	0.5441	0.5481	0.4083	0.9835
No. 8 AWG Copper Equivalent (16510 Circular Mils)												
D	0.219	0.02432	534800	0.08921	0.1643	0.2369	0.2350	0.2397	0.5357	0.5363	0.4063	0.9728
A	0.199	0.01995	419000	0.07427	0.1493	0.2167	0.2139	0.2330	0.5163	0.5089	0.3997	0.9471
C	0.179	0.01604	304800	0.06067	0.1343	0.1973	0.1940	0.2263	0.4981	0.4829	0.3930	0.9226

*Based on Rule 251, National Electrical Safety Code, 1990 Edition.

Loading Tables

BARE COPPERWELD® CONDUCTORS FOR OVERHEAD LINE CONSTRUCTION
HIGH STRENGTH AND EXTRA HIGH STRENGTH

CONDUCTOR SIZE AWG	DIAMETER (inch)	CROSS SECTION AREA (A) (in^2)	MODULES X AREA (EA) (lbf)	VERTICAL, HORIZONTAL, AND RESULTANT* LOADS (LOADING IN POUNDS PER LINEAR FOOT OF CONDUCTOR)								
				LIGHT LOADING DISTRICT			MEDIUM LOADING DISTRICT			HEAVY LOADING DISTRICT		
				VERTICAL CONDUCTOR ONLY	HORIZONTAL WIND 9 lbs/ft^2	RESULTANT*	VERTICAL CONDUCTOR + 1/4" ICE	HORIZONTAL WIND 4 LBS PER SQ FT 1/4" ICE	RESULTANT*	VERTICAL CONDUCTOR + 1/2" Ice	HORIZONTAL WIND 4 Lbs/Ft^2 1/2" Ice	RESULTANT*
19-Wire Strand												
19 No. 5	0.910	0.4940	11360000	1.770	0.6825	1.947	2.130	0.4700	2.382	2.647	0.6367	3.002
19 No. 6	0.810	0.3917	9009000	1.403	0.6075	1.579	1.733	0.4367	1.987	2.218	0.6033	2.578
19 No. 7	0.722	0.3107	7146000	1.113	0.5408	1.287	1.415	0.4070	1.672	1.872	0.5737	2.238
19 No. 8	0.643	0.2464	5667000	0.8827	0.4815	1.055	1.160	0.3807	1.421	1.593	0.5473	1.964
19 No. 9	0.572	0.1954	4494000	0.7000	0.4290	0.8710	0.9555	0.3573	1.220	1.367	0.5240	1.744
7-Wire Strand												
7 No. 4	0.613	0.2295	5278000	0.8189	0.4598	0.9891	1.087	0.3710	1.349	1.511	0.5377	1.884
7 No. 5	0.546	0.1820	4186000	0.6494	0.4095	0.8177	0.8969	0.3487	1.162	1.300	0.5153	1.678
7 No. 6	0.486	0.1443	3319000	0.5150	0.3645	0.6809	0.7438	0.3287	1.013	1.128	0.4953	1.512
7 No. 7	0.433	0.1145	2633000	0.4084	0.3248	0.5718	0.6207	0.3110	0.8943	0.9885	0.4777	1.378
7 No. 8	0.386	0.09077	2088000	0.3239	0.2888	0.4839	0.5213	0.2950	0.7990	0.8742	0.4617	1.269
7 No. 9	0.343	0.07198	1656000	0.2569	0.2573	0.4136	0.4413	0.2810	0.7231	0.7811	0.4477	1.180
7 No. 10	0.306	0.05708	1313000	0.2037	0.2295	0.3569	0.3766	0.2687	0.6626	0.7048	0.4353	1.108
3-Wire Strand												
3 No. 5	0.392	0.0780	1794000	0.2778	0.2940	0.4545	0.4774	0.2973	0.762	0.832	0.4640	1.233
3 No. 6	0.349	0.0619	1423000	0.2203	0.2618	0.3921	0.4065	0.2830	0.695	0.748	0.4497	1.153
3 No. 7	0.311	0.0491	1128000	0.1747	0.2333	0.3414	0.3491	0.2703	0.6415	0.6790	0.4370	1.087
3 No. 8	0.277	0.03890	894700	0.1385	0.2078	0.2997	0.3023	0.2590	0.5981	0.6216	0.4257	1.033
3 No. 9	0.247	0.03085	709500	0.1099	0.1853	0.2654	0.2644	0.2490	0.5632	0.5744	0.4157	0.9890
3 No. 10	0.220	0.02446	562600	0.08713	0.1650	0.2366	0.2332	0.2400	0.5347	0.5348	0.4067	0.9519
3 No. 12	0.174	0.01539	354000	0.05480	0.1305	0.1915	0.1866	0.2247	0.4921	0.4739	0.3913	0.8946
Solid Wire												
4	0.204	0.03278	786700	0.1158	0.1532	0.2421	0.2570	0.2348	0.5481	0.5537	0.4014	0.9639
5	0.182	0.02600	624000	0.09186	0.1364	0.2145	0.2261	0.2273	0.5206	0.5158	0.3940	0.9291
(.165)	0.165	0.02138	513100	0.07555	0.1237	0.1950	0.2046	0.2217	0.5016	0.4890	0.3883	0.9045
6	0.162	0.02062	494900	0.07285	0.1215	0.1917	0.2009	0.2207	0.4984	0.4845	0.3873	0.9003
7	0.144	0.01635	392400	0.05777	0.1082	0.1727	0.1804	0.2148	0.4805	0.4584	0.3814	0.8763
8	0.129	0.01297	311300	0.04581	0.09638	0.1567	0.1635	0.2095	0.4657	0.4366	0.3762	0.8563
(.128)	0.128	0.01287	308900	0.04547	0.09600	0.1562	0.1630	0.2093	0.4653	0.4359	0.3760	0.8557
9	0.114	0.01028	246700	0.03633	0.08580	0.1432	0.1496	0.2048	0.4536	0.4183	0.3715	0.8395
(.104)	0.104	0.008495	203900	0.03001	0.07800	0.1336	0.1401	0.2013	0.4452	0.4056	0.3680	0.8276
10	0.102	0.008155	195700	0.02881	0.07643	0.1317	0.1382	0.2006	0.4436	0.4031	0.3673	0.8253
12	0.081	0.005129	123100	0.01812	0.06061	0.1133	0.1210	0.1936	0.4283	0.3793	0.3603	0.8031
(.080)	0.080	0.005027	120600	0.01776	0.06000	0.1126	0.1204	0.1933	0.4276	0.3784	0.3600	0.8023

Modulus of Elasticity: Solid Wire, 24 Mpsi; Strand 23 Mpsi
Coefficient of Linear Expansion: 7.2 x 10^{-6}/°F

*Based on Rule 251, National Electrical Safety Code, 1990 Edition.

Other physical and electrical properties for the above conductors are listed in the Wire Tables on page 4.

COPPERWELD

Guy Strands

COPPERWELD® TYPE M® GUY STRANDS						
					STANDARD PACKAGE	
DESIGNATION	NOMINAL DIAMETER OF STRAND (inch)	NUMBER AND DIAMETER OF INDIVIDUAL WIRES	RATED STRENGTH (lbs)	WEIGHT (lbs/1000 ft)	COIL LENGTH (ft)	APPROXIMATE WEIGHT (lbs)
2.2M	.164	3 x .076″	2200	49	1000	45
4M	.209	3 x .097″	4000	79	2-500	80
6M3	.258	3 x .120″	6000	121	500	65
6M	.237	7 x .076″	6000	122	500	65
8M	.276	7 x .092″	8000	166	500	85
10M	.303	7 x .101″	10000	200	500	100
12.5M	.345	7 x .115″	12500	259	250†	65
14M	.360	7 x .120″	14000	283	250†	70
16M	.386	7 x .128″	16000	324	250†	80
18M	.414	7 x .138″	18000	374	250†	95
20M	.438	7 x .146″	20000	418	250†	100

† Put up in 500-foot coils when specified.

Reels of 2500, 5000 and 10000 feet are also available.

Specifications

Applicable ASTM specifications are as follows:

Specification No.	Title
B-227	Hard-Drawn Copper-Clad Steel Wire.
B-228	Concentric-Lay-Stranded Copper-Clad Steel Conductors.
B-229	Concentric-Lay-Stranded Copper and Copper-Clad Steel Composite Conductors.
B-452	Copper-Clad Steel Wire for Electronic Application.
A-460	Copper-Clad Steel Wire Strand. (For use as guy and messenger strand)

All ASTM specifications are re-approved every 5 years.
Please reference the current specification.

Copies of these specifications should be ordered from the

American Society for Testing and Materials
100 Barr Harbor Drive
P.O. Box C700
West Conshohocken, PA 19428–2959

COPPERWELD
the power of two

AMERICAS
Copperweld Bimetallics LLC — Nashville, Tennessee — +1.615.377.4200

EUROPE/NORTH AFRICA
Dynext SRL — Milan, Italy — +39.333.749.6906

SOUTHERN AFRICA
ARB Electrical Wholesalers — Durban, South Africa — +27.82.827.0110

NORTHEAST ASIA/PACIFIC
Fushi Copperweld Inc. — Beijing, China — +86.411.8778.7555

SOUTHEAST ASIA
Copperweld Bimetallics LLC — Bangkok, Thailand — +1.931.652.2440

MIDDLE EAST
Mishnan Holdings — Dammam, Saudi Arabia — +966.13.826.6626