

Copperweld pioneered the science of bimetals in 1915 with the invention of the original copper-clad steel (CCS) wire, our trademarked Copperweld®. By metallurgically bonding high-strength steel to conductive, corrosion-resistant copper in a patented continuous solid-cladding process, we have created an extraordinary conductor that provides value and benefits that neither metal can provide alone.

Because the bulk of the current travels along the wire's skin, the copper cladding represents only 10% of the overall wire diameter, yet provides a conductivity of 40% IACS. The steel used at the core of the wire can be of whatever grade is best suited to our clients' particular applications. For applications where higher conductivity is required, Copperweld can achieve up to 70% IACS from CCS wire. The steel used at the core of the wire can be of whatever grade is best suited to our clients' particular applications.

Copperweld® offers numerous value advantages. Steel's low price compared to copper represents upfront cost savings, but high tensile strength also means longer spans with less breakage, so installation is more efficient. Continuous copper cladding without chips or breaks means no chance of oxidation, so our value holds longer over time.

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 **+1.931.433.7177**. 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.

PHYSICAL AND ELECTRICAL PROPERTIES OF COPPERWELD® CCS WIRE
40% IACS CONDUCTIVITY ANNEALED
(METRIC UNITS)

AWG	DIAMETER		CROSS SECTIONAL AREA (mm ²)	WEIGHT (kg/km)	NOMINAL COPPER THICKNESS (mm)	NOMINAL DC RESISTANCE (Ω/km)	MINIMUM BREAK LOADS			
	(inch)	(mm)					LOW CARBON (LC)		HIGH STRENGTH (HS)	
							(kgf)	(N)	(kgf)	(N)
0	0.3249	8.25	53.49	440.5	0.8252	0.806	-	-	-	-
1	0.2893	7.35	42.41	349.2	0.7348	1.016	-	-	-	-
2	0.2576	6.54	33.62	276.9	0.6543	1.282	1002	9830	1414	13863
3	0.2294	5.83	26.67	219.6	0.5827	1.616	750	7354	1121	10994
4	0.2043	5.19	21.15	174.2	0.5189	2.038	595	5833	889	8720
5	0.1819	4.62	16.77	138.1	0.4620	2.571	471	4624	705	6913
6	0.1620	4.11	13.30	109.5	0.4115	3.241	374	3667	559	5483
7	0.1443	3.67	10.55	86.89	0.3665	4.085	297	2910	444	4350
8	0.1285	3.26	8.367	68.90	0.3264	5.152	235	2308	352	3450
9	0.1144	2.91	6.631	54.61	0.2906	6.500	186	1829	279	2734
10	0.1019	2.59	5.261	43.33	0.2588	8.192	148	1451	221	2169
11	0.0907	2.30	4.168	34.33	0.2304	10.34	117	1150	165	1615
12	0.0808	2.05	3.308	27.24	0.2052	13.03	93	912	131	1282
13	0.0720	1.83	2.627	21.63	0.1829	16.41	74	724	104	1018
14	0.0641	1.63	2.082	17.14	0.1628	20.70	59	574	82	807
15	0.0571	1.45	1.652	13.60	0.1450	26.09	46	456	65	640
16	0.0508	1.29	1.308	10.77	0.1290	32.96	37	361	52	507
17	0.0453	1.15	1.040	8.563	0.1151	41.45	29	287	41	403
18	0.0403	1.02	0.823	6.777	0.1024	52.38	23	227	33	319
19	0.0359	0.91	0.653	5.378	0.0912	66.00	18	180	26	253
20	0.0320	0.81	0.519	4.273	0.0813	83.07	15	143	21	201
21	0.0285	0.72	0.412	3.389	0.0724	104.7	12	114	16	159
22	0.0253	0.64	0.324	2.671	0.0643	132.9	9.1	89	13	126
23	0.0226	0.57	0.259	2.131	0.0574	166.5	7.6	75	10.2	100
24	0.0201	0.51	0.205	1.686	0.0511	210.5	6.0	59	8.1	79



SPECIFICATIONS:

- ASTM B-227** Hard-Drawn Copper-Clad Steel Wire
- ASTM B-452** Copper-Clad Steel Wire for Electronic Application
- ASTM B-910** Annealed Copper-Clad Steel Wire
- BS 4087** Copper-Clad Steel Wire

PHYSICAL AND ELECTRICAL PROPERTIES OF COPPERWELD® CCS WIRE

40% IACS CONDUCTIVITY HARD DRAWN (METRIC UNITS)

AWG	DIAMETER		CROSS SECTIONAL AREA (mm ²)	WEIGHT (kg/m)	NOMINAL COPPER THICKNESS (mm)	NOMINAL DC RESISTANCE (Ω/km)	MINIMUM BREAKING LOADS					
							LOW CARBON (LC)		HIGH STRENGTH (HS)		EXTRA-HIGH STRENGTH (EHS)	
	(inch)	(mm)					kgf	N	kgf	N	kgf	N
0	0.3249	8.25	53.49	440.5	0.8252	0.806	-	-	-	-	-	-
1	0.2893	7.35	42.41	349.2	0.7348	1.016	-	-	-	-	-	-
2	0.2576	6.54	33.62	276.9	0.6543	1.282	1655	16228	2199	21560	3073	30138
3	0.2294	5.83	26.67	219.6	0.5827	1.616	1387	13605	1837	18017	2512	24636
4	0.2043	5.19	21.15	174.2	0.5189	2.038	1167	11447	1606	15748	2111	20706
5	0.1819	4.62	16.77	138.1	0.4620	2.571	955	9363	1332	13062	1756	17224
6	0.1620	4.11	13.30	109.5	0.4115	3.241	776	7610	1103	10819	1449	14211
7	0.1443	3.67	10.55	86.89	0.3665	4.085	642	6293	912	8948	1187	11639
8	0.1285	3.26	8.367	68.90	0.3264	5.152	521	5105	753	7384	971	9518
9	0.1144	2.91	6.631	54.61	0.2906	6.500	423	4152	620	6081	816	8001
10	0.1019	2.59	5.261	43.33	0.2588	8.192	348	3414	513	5028	577	5659
11	0.0907	2.30	4.168	34.33	0.2304	10.34	288	2828	381	3736	469	4598
12	0.0808	2.05	3.308	27.24	0.2052	13.03	242	2372	267	2623	391	3832
13	0.0720	1.83	2.627	21.63	0.1829	16.41	168	1644	222	2173	310	3043
14	0.0641	1.63	2.082	17.14	0.1628	20.70	138	1351	183	1794	246	2412
15	0.0571	1.45	1.652	13.60	0.1450	26.09	105	1034	145	1424	203	1993
16	0.0508	1.29	1.308	10.77	0.1290	32.96	87	848	114.9	1127	161	1578
17	0.0453	1.15	1.040	8.563	0.1151	41.45	71	695	95.0	932	128	1255
18	0.0403	1.02	0.823	6.777	0.1024	52.38	60	590	75.2	738	97	953
19	0.0359	0.91	0.653	5.378	0.0912	66.00	45	441	59.7	585	80	788
20	0.0320	0.81	0.519	4.273	0.0813	83.07	38	372	49.2	483	59	576
21	0.0285	0.72	0.412	3.389	0.0724	104.7	30	295	31.8	312	54	528
22	0.0253	0.64	0.324	2.671	0.0643	132.9	24	233	25.1	246	45	438
23	0.0226	0.57	0.259	2.131	0.0574	166.5	19	186	20.0	196	36	357
24	0.0201	0.51	0.205	1.686	0.0511	210.5	16	154	15.8	155	29	282
25	0.0179	0.45	0.162	1.337	0.0455	265.5						
26	0.0159	0.40	0.129	1.060	0.0405	334.7						
27	0.0142	0.36	0.102	0.841	0.0361	422.1						
28	0.0126	0.32	0.081	0.667	0.0321	532.3						
29	0.0113	0.29	0.064	0.529	0.0286	671.2						
30	0.0100	0.25	0.051	0.419	0.0255	846.4						
31	0.0089	0.23	0.040	0.333	0.0227	1,067						
32	0.0080	0.20	0.032	0.264	0.0202	1,346						
33	0.0071	0.18	0.025	0.209	0.0180	1,697						
34	0.0063	0.16	0.020	0.166	0.0160	2,140						
35	0.0056	0.14	0.016	0.132	0.0143	2,698						
36	0.0050	0.13	0.013	0.104	0.0127	3,403						
37	0.0045	0.11	0.010	0.083	0.0113	4,290						
38	0.0040	0.10	0.008	0.066	0.0101	5,411						
39	0.0035	0.09	0.006	0.052	0.0090	6,823						

For information and technical specifications on fine wire gauges, please contact your Copperweld representative, or our Engineering Support Center.

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PHYSICAL AND ELECTRICAL PROPERTIES OF COPPERWELD® CCS WIRE

**40% CONDUCTIVITY HARD DRAWN
(US/IMPERIAL UNITS)**

AWG	DIAMETER (in)	CROSS SECTIONAL AREA		WEIGHT (lbs/kft)	NOMINAL COPPER THICKNESS (in)	NOMINAL DC RESISTANCE (Ω/kft)	MINIMUM BREAKING LOADS (lbf)		
		(in ²)	(cmil)				LOW CARBON (LC)	HIGH STRENGTH (HS)	EXTRA HIGH STRENGTH (EHS)
0	0.3249	0.082907	105560	296.0	0.03249	0.246	4826	6757	9331
1	0.2893	0.065733	83694	234.7	0.02893	0.310	4273	5804	7781
2	0.2576	0.052117	66358	186.1	0.02576	0.391	3691	4905	6624
3	0.2294	0.041331	52624	147.6	0.02294	0.493	3088	4090	5414
4	0.2043	0.032781	41738	117.0	0.02043	0.621	2640	3435	4548
5	0.1819	0.025987	33088	92.77	0.01819	0.784	2143	2849	3782
6	0.1620	0.020612	26244	73.58	0.01620	0.988	1740	2360	3100
7	0.1443	0.016354	20822	58.38	0.01443	1.245	1460	1952	2539
8	0.1285	0.012969	16512	46.30	0.01285	1.570	1183	1611	2139
9	0.1144	0.010279	13087	36.70	0.01144	1.981	967	1326	1795
10	0.1019	0.008155	10384	29.11	0.01019	2.497	815	1097	1488
11	0.0907	0.006461	8226	23.07	0.00907	3.152	665	887	1011
12	0.0808	0.005128	6529	18.31	0.00808	3.972	444	601	849
13	0.0720	0.004072	5184	14.54	0.00720	5.002	362	497	637
14	0.0641	0.003227	4109	11.52	0.00641	6.311	298	410	535
15	0.0571	0.002561	3260	9.142	0.00571	7.953	228	300	424
16	0.0508	0.002027	2581	7.236	0.00508	10.05	187	247	348
17	0.0453	0.001612	2052	5.754	0.00453	12.64	155	205	294
18	0.0403	0.001276	1624	4.554	0.00403	15.97	130	169	232
19	0.0359	0.001012	1289	3.614	0.00359	20.12	98	133	196
20	0.0320	0.000804	1024	2.871	0.00320	25.32	82	110	147
21	0.0285	0.000638	812	2.277	0.00285	31.92	65	88	125
22	0.0253	0.000503	640	1.795	0.00253	40.51	51	69	108
23	0.0226	0.000401	511	1.432	0.00226	50.77	41	55	86
24	0.0201	0.000317	404	1.133	0.00201	64.18	34	46	73
25	0.0179	0.000252	320	0.898	0.00179	80.93			
26	0.0159	0.000200	254	0.713	0.00159	102.0			
27	0.0142	0.000158	202	0.565	0.00142	128.7			
28	0.0126	0.000126	160	0.448	0.00126	162.3			
29	0.0113	0.000100	127	0.355	0.00113	204.6			
30	0.0100	0.000079	101	0.282	0.00100	258.0			
31	0.0089	0.000063	80	0.223	0.00089	325.3			
32	0.0080	0.000050	63	0.177	0.00080	410.3			
33	0.0071	0.000039	50	0.141	0.00071	517.3			
34	0.0063	0.000031	40	0.111	0.00063	652.3			
35	0.0056	0.000025	32	0.088	0.00056	822.4			
36	0.0050	0.000020	25	0.070	0.00050	1037			
37	0.0045	0.000016	20	0.056	0.00045	1308			
38	0.0040	0.000012	16	0.044	0.00040	1649			
39	0.0035	0.000010	12	0.035	0.00035	2080			

For information and technical specifications on fine wire gauges, please contact your Copperweld representative, or our Engineering Support Center.

COPPERWELD® COPPER-CLAD STEEL 40% IACS HARD DRAWN (US/IMPERIAL)



AWG	DIAMETER (in)	CROSS SECTIONAL AREA		WEIGHT (lbs/kft)	NOMINAL COPPER THICKNESS (in)	NOMINAL DC RESISTANCE (Ω/kft)	MIN BREAKING LOADS (lbf)	
		in ²	cmil				LOW CARBON (LC)	HIGH STRENGTH (HS)
0	0.3249	0.082907	105560	296.0	0.03249	0.246	-	-
1	0.2893	0.065733	83694	234.7	0.02893	0.310	-	-
2	0.2576	0.052117	66358	186.1	0.02576	0.391	2023	2275
3	0.2294	0.041331	52624	147.6	0.02294	0.493	1604	1805
4	0.2043	0.032781	41738	117.0	0.02043	0.621	1272	1431
5	0.1819	0.025987	33088	92.77	0.01819	0.784	1009	1135
6	0.1620	0.020612	26244	73.58	0.01620	0.988	800	900
7	0.1443	0.016354	20822	58.38	0.01443	1.245	635	714
8	0.1285	0.012969	16512	46.30	0.01285	1.570	503	566
9	0.1144	0.010279	13087	36.70	0.01144	1.981	399	449
10	0.1019	0.008155	10384	29.11	0.01019	2.497	316	356
11	0.0907	0.006461	8226	23.07	0.00907	3.152	253	285
12	0.0808	0.005128	6529	18.31	0.00808	3.972	201	226
13	0.0720	0.004072	5184	14.54	0.00720	5.002	160	180
14	0.0641	0.003227	4109	11.52	0.00641	6.311	127	142
15	0.0571	0.002561	3260	9.142	0.00571	7.953	100	113
16	0.0508	0.002027	2581	7.236	0.00508	10.05	79	89
17	0.0453	0.001612	2052	5.754	0.00453	12.64	63	71
18	0.0403	0.001276	1624	4.554	0.00403	15.97	50	56
19	0.0359	0.001012	1289	3.614	0.00359	20.12	40	45
20	0.0320	0.000804	1024	2.871	0.00320	25.32	32	35
21	0.0285	0.000638	812	2.277	0.00285	31.92	25	31
22	0.0253	0.000503	640	1.795	0.00253	40.51	20	25
23	0.0226	0.000401	511	1.432	0.00226	50.77	16	20
24	0.0201	0.000317	404	1.133	0.00201	64.18	12	16
25	0.0179	0.000252	320	0.898	0.00179	80.93	10	12
26	0.0159	0.000200	254	0.713	0.00159	102.0	7.8	9.8
27	0.0142	0.000158	202	0.565	0.00142	128.7	6.2	7.8

40% IACS ANNEALED (US/IMPERIAL)

COPPERWELD® COPPER-CLAD STEEL



COPPERWELD

the power of two

AMERICAS

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