TECHNICAL DATA

A REFERENCE FOR The Electrical Power Industry

HUBBELL®

ANDERSON

POWER SYSTEMS, INC.

English-Metric Conversion Table

Inch Frac.	Inch Decimal	Millimeter	Inch Frac.	Inch Decimal	Millimeter	Inch Frac.	Inch Decimal	Millimeter
—	.003937	.1	9/32	.28125	7.1438	21/32	.65625	16.668
—	.007874	.2	19/64	.29685	7.5406	—	.669291	17.
—	.011811	.3	5/16	.3125	7.9375	43/64	.671871	17.0656
1/64	.015625	.3969	—	.314961	8.	11/16	.6875	17.4625
—	.015748	.4	21/64	.328125	8.3344	45/64	.703125	17.8594
—	.019685	.5	11/32	.34375	8.7313	—	.708661	18.
—	.023622	.6	—	.354331	9.	23/32	.718175	18.2563
—	.027559	.7	23/64	.359375	9.1281	47/64	.734375	18.6531
1/32	.03125	.7938	3/8	.375	9.525	—	.748031	19.
—	.031496	.8	25/64	.390625	9.9219	3/4	.750	19.050
—	.03543	.9	—	.393701	10.	49/64	.765625	19.4469
—	.03937	1.	13/32	.40625	10.3188	25/32	.78125	19.8438
3/64	.046875	1.1906	27/64	.421875	10.7156	—	.787402	20.
1/16	.0625	1.5875	—	.433871	11.	51/64	.796875	20.2406
5/64	.078125	1.9844	7/16	.4375	11.1125	13/16	.8125	20.6375
—	.07874	2.	29/64	.453125	11.5094	—	.826772	21.
3/32	.09375	2.3813	15/32	.46875	11.9063	53/64	.828125	21.0344
7/64	.109375	2.7781	—	.472441	12.	27/32	.84375	21.4314
—	.11811	3.	31/64	.484375	12.3031	55/64	.859375	21.8281
1/8	.125	3.175	1/2	.500	12.700	—	.866142	22.
9/64	.140625	3.5719	—	.511811	13.	7/8	.875	22.225
5/32	.15625	3.9688	33/64	.515825	13.0969	57/64	.890625	22.6219
—	.15748	4.	17/32	.53125	13.4938	—	.905512	23.
11/64	.171875	4.3656	35/64	.546875	13.8906	29/32	.90625	23.0188
3/16	.1875	4.7625	—	.5511811	14.	59/64	.921875	23.4156
—	.19685	5.	9/16	.5625	14.2875	15/16	.9375	23.8125
13/64	.203125	5.1594	37/64	.578125	14.6844	—	.944882	24.
7/32	.21875	5.5563	—	.590511	15.	61/64	.953125	24.2094
15/64	.234375	5.9531	19/32	.59375	15.0813	31/32	.96875	24.6063
—	.23622	6.	39/64	.609375	15.4781	—	.984252	25.
1/4	.250	6.350	5/8	.625	15.875	63/64	.984375	25.0031
17/64	.265625	6.7469	—	.629921	16.	1″	1.0000	25.400
—	.275591	7.	41/64	.640625	16.2719			

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Table 1

CONVERSION CHART – DIAMETERS TO CONDUCTORS AND ULTIMATE

The Arrangement of This Table Affords Convenient Selection of Type of Conductors, Diameters and Ultimate

Conductor	(1) COPPER			(2) ALUMINUM			(3) COMPACT ROUND (ALUM.)			(4) ACSR			(5) ACSR/AW			(6) COMPACT ROUND (ACSR)			(7) 6201 ALLOY			(8) 5005 ALLOY			(9) ALUM. COATED STEEL			Conductor
Diameter	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G.	No. of Strands	Rated Ultimate	Diameter
.102	10	Sol.	530	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	Sol.	1590	.102
.114	9	Sol.	661	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	Sol.	2005	.114
.128	8	Sol.	826	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	Sol.	2529	.128
.146	8	7	778	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.146
.158	–	–	–	–	–	–	–	–	–	8	6/1	745	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.158
.162	6	Sol.	1280	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	Sol.	3608	.162
.169	–	–	–	–	–	–	6	7	528	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.169
.174	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30,420	Sol.	777	–	–	–	.174
.182	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	6/1	1170	–	–	–	–	–	–	5	Sol.	4290	.182
.184	6	7	1228	6	7	555	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.184
.197	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30,200	7	1069	–	–	–	–	–	–	.197
.198	–	–	–	–	–	–	–	–	–	6	6/1	1170	27,340	6/1	1187	–	–	–	–	–	–	30,580	7	912	–	–	–	.198
.204	4	Sol.	1970	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	Sol.	5081	.204
.213	–	–	–	–	–	–	4	7	826	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.213
.220	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	48,370	Sol.	1,197	10	3	4532	.220
.221	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	38,090	7	1349	–	–	–	–	–	–	.221
.223	–	–	–	–	–	–	–	–	–	5	6/1	1460	34,480	6/1	1487	–	–	–	–	–	–	–	–	–	–	–	–	.223
.229	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	6/1	1830	–	–	–	–	–	–	–	–	–	.229
.232	4	7	1938	4	7	870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.232
.236	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	7/1	2288	–	–	–	–	–	–	–	–	–	.236
.242	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12	7	6301	.242
.247	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	3	5715	.247
.248	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	48,040	7	1701	–	–	–	–	–	–	.248
.250	–	–	–	–	–	–	–	–	–	4	6/1	1830	43,480	6/1	1857	–	–	–	–	–	–	48,690	7	1,415	–	–	–	.250
.257	–	–	–	–	–	–	–	–	–	4	7/1	2288	44,390	7/1	2373	–	–	–	–	–	–	–	–	–	–	–	–	.257
.258	2	Sol.	3002	–	–	–	–	–	–	–	–	–	–	–	–	3	6/1	2250	–	–	–	–	–	–	–	–	–	.258
.260	–	–	–	3	7	1022	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.260
.268	–	–	–	–	–	–	2	7	1266	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.268
.272	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11	7	7945	.272
.277	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	3	7206	.277
.279	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	60,560	7	2148	–	–	–	–	–	–	.279
.281	–	–	–	–	–	–	–	–	–	–	–	–	54,820	6/1	2324	–	–	–	–	–	–	–	–	–	–	–	–	.281
.289	1	Sol.	3688	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.289
.290	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	6/1	2790	–	–	–	–	–	–	–	–	–	.290
.292	2	7	3045	2	7	1335	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.292
.298	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	7/1	3525	–	–	–	–	–	–	–	–	–	.298
.301	–	–	–	–	–	–	1	7	1537	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.301
.306	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	7	10,020	.306
.311	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7	3	8621	.311
.314	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	76,380	7	2707	–	–	–	–	–	–	.314
.316	–	–	–	–	–	–	–	–	–	2	6/1	2790	69,140	6/1	2877	–	–	–	–	–	–	77,470	7	2,195	–	–	–	.316
.325	0	Sol.	4518	–	–	–	–	–	–	2	7/1	3525	70,590	7/1	3661	–	–	–	–	–	–	–	–	–	–	–	–	.325
.326	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	6/1	3480	–	–	–	–	–	–	–	–	–	.326
.328	1	7	3804	1	7	1625	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.328
.332	1	19	3899	1	19	1685	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.332
.338	–	–	–	–	–	–	0	7	1865	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.338
.340	–	–	–	–	–	–	0	19	2090	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.340
.343	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	7	12,630	.343
.349	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	3	10,280	.349
.352	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	96,320	7	3411	–	–	–	–	–	–	.352

(1) Hard drawn, bare copper cable.
(2) Hard drawn, bare all-aluminum cable.
(3) "Compresto" all-aluminum cable, by Olin Conductors Division.
(4) Standard, aluminum cable steel reinforced.
(5) Standard, aluminum cable steel reinforced (aluminum coated steel core wire(s)).
(6) Aluminum cable steel reinforced, Compresto ACSR by Olin Conductors Division.
(7) High strength all-aluminum cable, "AAAC" by Kaiser Aluminum.
(8) High strength all-aluminum cable, by Reynolds Metals Company.
(9) Alumoweld cable by Copperweld Steel Company.

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Table 1–(Continued)

CONVERSION CHART – DIAMETERS TO CONDUCTORS AND ULTIMATE

The Arrangement of This Table Affords Convenient Selection of Type of Conductors, Diameters and Ultimate

Conductor	(1) COPPER			(2) ALUMINUM			(3) COMPACT ROUND (ALUM.)			(4) ACSR			(5) ACSR/AW			(6) COMPACT ROUND (ACSR)			(7) 6201 ALLOY			(8) 5005 ALLOY			(9) ALUM. COATED STEEL			Conductor
Diameter	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G.	No. of Strands	Rated Ultimate	Diameter
.355	–	–	–	–	–	–	–	–	–	1	6/1	3480	87,180	6/1	3599	–	–	–	–	–	–	–	–	–	–	–	–	.355
.365	00	Sol.	5519	–	–	–	–	–	–	–	–	–	–	–	–	0	6/1	4280	–	–	–	–	–	–	–	–	–	.365
.367	–	–	–	–	–	–	–	–	–	80,000	8/1	5200	86,970	8/1	5311	–	–	–	–	–	–	–	–	–	–	–	–	.367
.368	0	7	4752	0	7	1970	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.368
.373	0	19	4901	0	19	2090	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.373
.381	–	–	–	–	–	–	00	7	2350	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.381
.382	–	–	–	–	–	–	00	19	2586	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.382
.385	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	7	15,930	.385
.392	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	3	12,230	.392
.395	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	121,500	7	4304	–	–	–	–	–	–	.395
.398	–	–	–	–	–	–	–	–	–	0	6/1	4280	109,900	6/1	4426	–	–	–	–	–	–	123,300	7	3,405	–	–	–	.398
.410	000	Sol.	6720	–	–	–	–	–	–	–	–	–	–	–	–	00	6/1	5345	–	–	–	–	–	–	–	–	–	.410
.414	00	7	5926	00	7	2480	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.414
.419	00	19	6152	00	19	2586	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.419
.426	–	–	–	–	–	–	000	7	2845	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.426
.428	–	–	–	–	–	–	000	19	3200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.428
.433	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7	7	19,060	.433
.447	–	–	–	–	–	–	–	–	–	00	6/1	5345	138,700	6/1	5353	–	–	–	–	–	–	155,400	7	4,235	–	–	–	.447
.448	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	156,100	7	5301	–	–	–	–	–	–	.448
.460	0000	Sol.	8143	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.460
.461	–	–	–	–	–	–	–	–	–	101,800	12/7	9860	116,600	12/7	10,320	000	6/1	6675	–	–	–	–	–	–	–	–	–	.461
.464	000	7	7366	000	7	3005	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.464
.470	000	19	7698	000	19	3200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.470
.480	–	–	–	–	–	–	0000	7	3590	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.480
.481	–	–	–	–	–	–	0000	19	3890	110,800	12/7	10,730	127,000	12/7	11,240	–	–	–	–	–	–	–	–	–	–	–	–	.481
.486	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	7	22,730	.486
.502	–	–	–	–	–	–	–	–	–	000	6/1	6675	174,800	6/1	6565	–	–	–	–	–	–	195,700	7	4,965	–	–	–	.502
.503	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	196,800	7	6680	–	–	–	–	–	–	.503
.509	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	19	27,190	.509
.517	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0000	6/1	8420	–	–	–	–	–	–	–	–	–	.517
.522	0000	7	9154	0000	7	3790	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.522
.523	–	–	–	–	–	–	250,000	19	4506	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.523
.528	0000	19	9617	0000	19	3890	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.528
.530	–	–	–	–	–	–	–	–	–	134,600	12/7	12,920	154,200	12/7	13,540	–	–	–	–	–	–	–	–	–	–	–	–	.530
.541	–	–	–	–	–	–	266,800	19	4800	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.541
.546	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	7	27,030	.546
.559	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	266,800	18/1	7100	–	–	–	–	–	–	–	–	–	.559
.563	–	–	–	–	–	–	–	–	–	0000	6/1	8420	220,400	6/1	8005	–	–	–	–	–	–	246,900	7	6,265	–	–	–	.563
.565	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	248,200	7	8427	–	–	–	–	–	–	.565
.572	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	19	34,290	.572
.573	–	–	–	–	–	–	300,000	19	5301	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.573
.574	250,000	19	11,360	250,000	19	4510	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.574
.575	250,000	37	11,560	250,000	37	4860	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.575
.576	–	–	–	–	–	–	–	–	–	159,000	12/7	15,200	182,200	12/7	15,930	–	–	–	–	–	–	–	–	–	–	–	–	.576
.586	–	–	–	266,800	7	4775	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.586
.593	–	–	–	266,800	19	4800	–	–	–	–	–	–	–	–	–	300,000	18/1	7990	–	–	–	–	–	–	–	–	–	.593
.607	–	–	–	–	–	–	336,400	19	5940	176,900	12/7	16,400	202,700	12/7	17,650	–	–	–	–	–	–	–	–	–	–	–	–	.607
.609	–	–	–	–	–	–	–	–	–	266,800	18/1	6840	270,500	18/1	7009	–	–	–	–	–	–	281,400	19	7,365	–	–	–	.609
.618	–	–	–	–	–	–	350,000	19	6185	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.618

(1) Hard drawn, bare copper cable.
(2) Hard drawn, bare all-aluminum cable.
(3) "Compresto" all-aluminum cable, by Olin Conductors Division.
(4) Standard, aluminum cable steel reinforced.
(5) Standard, aluminum cable steel reinforced (aluminum coated steel core wire(s)).
(6) Aluminum cable steel reinforced, Compresto ACSR by Olin Conductors Division.
(7) High strength all-aluminum cable, "AAAC" by Kaiser Aluminum.
(8) High strength all-aluminum cable, by Reynolds Metals Company.
(9) Alumoweld cable by Copperweld Steel Company.

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Table 1–(Continued)

CONVERSION CHART – DIAMETERS TO CONDUCTORS AND ULTIMATE

The Arrangement of This Table Affords Convenient Selection of Type of Conductors, Diameters and Ultimate

Conductor	(1) COPPER			(2) ALUMINUM			(3) COMPACT ROUND (ALUM.)			(4) ACSR			(5) ACSR/AW			(6) COMPACT ROUND (ACSR)			(7) 6201 ALLOY			(8) 5005 ALLOY			(9) ALUM. COATED STEEL			Conductor
Diameter	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G.	No. of Strands	Rated Ultimate	Diameter
.628	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	336,400	18/1	8950	–	–	–	–	–	–	–	–	–	.628
.629	300,000	19	13,510	300,000	37	5830	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.629
.630	300,000	37	13,870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.630
.631	–	–	–	300,000	61	5940	–	–	–	190,800	12/7	17,730	218,600	12/7	19,050	–	–	–	–	–	–	–	–	–	–	–	–	.631
.633	–	–	–	–	–	–	–	–	–	266,800	6/7	9645	275,400	6/7	9680	–	–	–	–	–	–	–	–	–	–	–	–	.633
.636	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	307,100	19	10,420	–	–	–	–	–	–	.636
.642	–	–	–	–	–	–	–	–	–	266,800	26/7	11,250	277,700	26/7	11,420	–	–	–	–	–	–	312,800	19	8,180	8	19	43,240	.642
.646	–	–	–	–	–	–	–	–	–	300,000	18/1	7990	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.646
.663	–	–	–	–	–	–	–	–	–	211,300	12/7	19,640	242,100	12/7	20,610	–	–	–	–	–	–	–	–	–	–	–	–	.663
.666	–	–	–	336,400	19	5940	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.666
.677	–	–	–	–	–	–	–	–	–	336,400	36/1	7630	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.677
.679	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.679
.675	350,000	19	15,590	350,000	19	6180	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.675
.680	–	–	–	–	–	–	–	–	–	300,000	26/7	12,650	312,200	26/7	12,830	–	–	–	–	–	–	–	–	–	–	–	–	.680
.681	350,000	37	16,060	350,000	37	6680	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.681
.684	–	–	–	–	–	–	–	–	–	336,400	18/1	8625	341,000	18/1	8769	–	–	–	–	–	–	355,100	19	9,285	–	–	–	.684
.713	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10	37	52,950	.713
.714	–	–	–	–	–	–	–	–	–	203,200	16/19	27,500	248,500	16/19	29,000	–	–	–	–	–	–	–	–	–	–	–	–	.714
.721	–	–	–	–	–	–	–	–	–	336,400	26/7	14,050	350,100	26/7	14,280	–	–	–	394,600	19	12,830	394,500	19	10,180	7	19	51,730	.721
.724	–	–	–	397,500	19	6880	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.724
.726	400,000	19	17,810	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.726
.728	400,000	37	18,320	400,000	37	7350	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.728
.736	–	–	–	–	–	–	–	–	–	397,500	36/1	8740	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.736
.741	–	–	–	–	–	–	–	–	–	336,400	30/7	17,040	356,000	30/7	17,660	–	–	–	–	–	–	–	–	–	–	–	–	.741
.743	–	–	–	–	–	–	–	–	–	397,500	18/1	10,040	403,000	18/1	10,040	–	–	–	–	–	–	419,600	19	10,820	–	–	–	.743
.772	450,000	37	20,450	450,000	37	8110	–	–	–	397,500	24/7	14,690	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.772
.783	–	–	–	–	–	–	–	–	–	397,500	26/7	16,190	413,700	26/7	16,680	–	–	–	–	–	–	465,400	37	11,840	–	–	–	.783
.784	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	466,300	19	15,160	–	–	–	–	–	–	.784
.793	–	–	–	477,000	19	8090	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.793
.795	–	–	–	477,000	37	8600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.795
.801	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	37	66,770	.801
.806	–	–	–	–	–	–	–	–	–	397,500	30/7	19,980	420,700	30/7	20,710	–	–	–	–	–	–	–	–	–	–	–	–	.806
.806	–	–	–	–	–	–	–	–	–	477,000	36/1	10,320	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.806
.810	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	19	61,700	.810
.811	500,000	19	21,950	500,000	19	8480	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.811
.813	500,000	37	22,510	500,000	37	9010	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.813
.814	–	–	–	–	–	–	–	–	–	477,000	18/1	11,870	483,600	18/1	11,770	–	–	–	–	–	–	503,600	19	12,100	–	–	–	.814
.846	–	–	–	–	–	–	–	–	–	477,000	24/7	17,200	492,500	24/7	17,680	–	–	–	–	–	–	–	–	–	–	–	–	.846
.853	550,000	37	24,760	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.853
.855	550,000	61	25,230	550,000	61	10,490	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.855
.856	–	–	–	556,500	19	9440	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.856
.858	–	–	–	556,500	37	9830	–	–	–	477,000	26/7	19,430	496,400	26/7	20,060	–	–	–	599,600	19	18,200	559,500	19	13,450	–	–	–	.858
.870	–	–	–	–	–	–	–	–	–	556,500	36/1	11,800	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.870
.879	–	–	–	–	–	–	–	–	–	556,500	18/1	13,850	564,200	18/1	13,600	–	–	–	–	–	–	597,200	19	14,120	–	–	–	.879
.883	–	–	–	–	–	–	–	–	–	477,000	30/7	23,300	504,800	30/7	24,670	–	–	–	–	–	–	–	–	–	–	–	–	.883
.891	600,000	37	27,020	600,000	37	10,600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.891
.893	600,000	61	27,530	600,000	61	11,450	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.893
.899	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	37	84,200	.899
.907	–	–	–	–	–	–	–	–	–	605,000	36/1	12,800	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.907
.910	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	19	73,350	.910
.914	–	–	–	–	–	–	–	–	–	556,500	24/7	19,850	574,500	24/7	20,410	–	–	–	–	–	–	–	–	–	–	–	–	.914

(1) Hard drawn, bare copper cable.
(2) Hard drawn, bare all-aluminum cable.
(3) "Compresto" all-aluminum cable, by Olin Conductors Division.
(4) Standard, aluminum cable steel reinforced.
(5) Standard, aluminum cable steel reinforced (aluminum coated steel core wire(s)).
(6) Aluminum cable steel reinforced, Compresto ACSR by Olin Conductors Division.
(7) High strength all-aluminum cable, "AAAC" by Kaiser Aluminum.
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Table 1–(Continued)

CONVERSION CHART – DIAMETERS TO CONDUCTORS AND ULTIMATE

The Arrangement of This Table Affords Convenient Selection of Type of Conductors, Diameters and Ultimate

Conductor	(1) COPPER			(2) ALUMINUM			(3) COMPACT ROUND (ALUM.)			(4) ACSR			(5) ACSR "AW			(6) COMPACT ROUND (ACSR)			(7) 6201 ALLOY			(8) 5005 ALLOY			(9) ALUM. COATED STEEL			Conductor
Diameter	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G.	No. of Strands	Rated Ultimate	Diameter
.918	–	–	–	636,000	37	11,240	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.918
.927	650,000	37	29,130	–	–	–	–	–	–	556,500	26/7	22,400	579,200	26/7	23,170	–	–	–	652,800	19	21,230	652,400	19	15,680	–	–	–	.927
.929	650,000	61	29,770	650,000	61	11,940	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.929
.930	–	–	–	650,000	91	12,630	–	–	–	636,000	36/1	13,450	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.930
.940	–	–	–	–	–	–	–	–	–	636,000	18/1	15,830	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.940
.953	–	–	–	–	–	–	–	–	–	556,500	30/7	27,200	589,000	30/7	28,260	–	–	–	–	–	–	–	–	–	–	–	–	.953
.953	–	–	–	–	–	–	–	–	–	605,000	24/7	21,500	624,600	24/7	22,200	–	–	–	–	–	–	–	–	–	–	–	–	.953
.953	–	–	–	–	–	–	–	–	–	653,900	18/3	14,850	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.953
.953	–	–	–	–	–	–	–	–	–	666,600	36/1	14,100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.953
.964	700,000	61	31,820	700,000	61	12,860	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.964
.966	–	–	–	–	–	–	–	–	–	605,000	26/7	24,100	629,600	26/7	24,930	–	–	–	–	–	–	–	–	–	–	–	–	.966
.974	–	–	–	715,500	37	12,640	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.974
.975	–	–	–	715,500	61	13,150	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.975
.977	–	–	–	–	–	–	–	–	–	636,000	24/7	22,600	656,600	24/7	23,320	–	–	–	–	–	–	–	–	–	–	–	–	.977
.987	–	–	–	–	–	–	–	–	–	715,500	36/1	14,900	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.987
.990	–	–	–	–	–	–	–	–	–	636,000	26/7	25,000	661,900	26/7	26,210	–	–	–	–	–	–	740,800	37	19,110	–	–	–	.990
.994	–	–	–	–	–	–	–	–	–	605,000	30/19	30,000	639,500	30/19	30,600	–	–	–	746,100	37	24,260	–	–	–	–	–	–	.994
.998	750,000	61	34,090	750,000	61	13,510	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.998
1.000	–	–	–	–	–	–	–	–	–	666,600	24/7	23,700	688,200	24/7	24,450	–	–	–	–	–	–	–	–	–	–	–	–	1.000
1.010	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7	37	100,700	1.010
1.019	–	–	–	–	–	–	–	–	–	636,000	30/19	31,500	672,300	30/19	32,190	–	–	–	–	–	–	–	–	–	–	–	–	1.019
1.026	–	–	–	795,000	37	13,770	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.026
1.028	–	–	–	795,000	61	14,330	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.028
1.031	800,000	61	36,360	800,000	61	14,410	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.031
1.036	–	–	–	–	–	–	–	–	–	715,500	54/7	26,300	738,700	54/7	27,070	–	–	–	–	–	–	–	–	–	–	–	–	1.036
1.040	–	–	–	–	–	–	–	–	–	795,000	36/1	16,540	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.040
1.051	–	–	–	–	–	–	–	–	–	715,500	26/7	28,100	744,600	26/7	29,040	–	–	–	–	–	–	–	–	–	–	–	–	1.051
1.063	850,000	61	38,270	–	–	–	–	–	–	795,000	45/7	22,900	808,700	45/7	23,160	–	–	–	–	–	–	–	–	–	–	–	–	1.063
1.077	–	–	–	874,500	37	14,830	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.077
1.078	–	–	–	874,500	61	15,760	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.078
1.081	–	–	–	–	–	–	–	–	–	715,500	30/19	34,600	756,200	30/19	35,870	–	–	–	–	–	–	–	–	–	–	–	–	1.081
1.092	900,000	37	39,510	900,000	37	15,270	–	–	–	795,000	24/7	27,900	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.092
1.093	–	–	–	900,000	91	17,180	–	–	–	795,000	54/7	28,500	820,800	54/7	29,810	–	–	–	–	–	–	–	–	–	–	–	–	1.093
1.094	900,000	61	40,520	900,000	61	15,900	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.094
1.108	–	–	–	–	–	–	–	–	–	795,000	26/7	31,200	827,400	26/7	32,280	–	–	–	–	–	–	927,200	37	23,590	–	–	–	1.108
1.112	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	932,600	37	30,300	–	–	–	–	–	–	1.112
1.124	–	–	–	954,000	37	16,180	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.124
1.126	–	–	–	954,000	61	16,860	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.126
1.131	–	–	–	–	–	–	–	–	–	900,000	45/7	25,400	–	–	–	–	–	–	–	–	–	–	–	–	6	37	120,290	1.131
1.140	–	–	–	–	–	–	–	–	–	795,000	30/19	38,400	840,300	30/19	39,910	–	–	–	–	–	–	–	–	–	–	–	–	1.140
1.140	–	–	–	–	–	–	–	–	–	954,000	36/1	19,520	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.140
1.146	–	–	–	–	–	–	–	–	–	874,500	54/7	31,400	902,900	54/7	32,770	–	–	–	–	–	–	–	–	–	–	–	–	1.140
1.152	1,000,000	61	45,030	1,000,000	61	17,670	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.152
1.162	–	–	–	–	–	–	–	–	–	900,000	54/7	32,300	929,200	54/7	33,250	–	–	–	–	–	–	–	–	–	–	–	–	1.162
1.165	–	–	–	–	–	–	–	–	–	954,000	45/7	26,900	970,500	45/7	27,430	–	–	–	–	–	–	–	–	–	–	–	–	1.165
1.170	–	–	–	1,033,500	37	17,530	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.170
1.172	–	–	–	1,033,500	61	18,260	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.172
1.186	–	–	–	–	–	–	–	–	–	1,033,500	36/1	21,100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.186
1.196	–	–	–	–	–	–	–	–	–	954,000	54/7	34,200	984,900	54/7	35,230	–	–	–	–	–	–	–	–	–	–	–	–	1.196
1.209	–	–	–	1,100,000	91	20,210	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.209

(1) Hard drawn, bare copper cable.
(2) Hard drawn, bare all-aluminum cable.
(3) "Compresto" all-aluminum cable, by Olin Conductors Division.
(4) Standard, aluminum cable steel reinforced.
(5) Standard, aluminum cable steel reinforced (aluminum coated steel core wire(s)).
(6) Aluminum cable steel reinforced, Compresto ACSR by Olin Conductors Division.
(7) High strength all-aluminum cable, "AAAC" by Kaiser Aluminum.
(8) High strength all-aluminum cable, by Reynolds Metals Company.
(9) Alumoweld cable by Copperweld Steel Company.

Continued on Page 5

Table 1–(Continued)

CONVERSION CHART – DIAMETERS TO CONDUCTORS AND ULTIMATE

The Arrangement of This Table Affords Convenient Selection of Type of Conductors, Diameters and Ultimate

Conductor	(1) COPPER			(2) ALUMINUM			(3) COMPACT ROUND (ALUM.)			(4) ACSR			(5) ACSR/AW			(6) COMPACT ROUND (ACSR)			(7) 6201 ALLOY			(8) 5005 ALLOY			(9) ALUM. COATED STEEL			Conductor
Diameter	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G. or C.M.	No. of Strands	Rated Ultimate	Cable Size A.W.G.	No. of Strands	Rated Ultimate	Diameter
1.213	–	–	–	–	–	–	–	–	–	1,033,500	45/7	28,900	1,051,000	45/7	29,330	–	–	–	–	–	–	–	–	–	–	–	–	1.213
1.216	–	–	–	1,113,000	61	19,660	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.216
1.246	–	–	–	–	–	–	–	–	–	1,033,500	54/7	37,100	1,067,000	54/7	37,690	–	–	–	–	–	–	–	–	–	–	–	–	1.246
1.258	–	–	–	1,192,500	61	21,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.258
1.259	–	–	–	–	–	–	–	–	–	1,113,000	45/7	30,900	1,132,000	45/7	31,580	–	–	–	–	–	–	–	–	–	–	–	–	1.259
1.263	–	–	–	1,200,000	91	21,630	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.263
1.270	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	37	142,800	1.270
1.288	1,250,000	61	55,670	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.288
1.289	1,250,000	91	56,280	1,250,000	91	22,530	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.289
1.293	–	–	–	–	–	–	–	–	–	1,113,000	54/19	40,200	1,148,000	54/19	40,830	–	–	–	–	–	–	–	–	–	–	–	–	1.293
1.300	–	–	–	1,272,000	61	22,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.300
1.302	–	–	–	–	–	–	–	–	–	1,192,500	45/7	33,200	1,213,000	45/7	33,810	–	–	–	–	–	–	–	–	–	–	–	–	1.302
1.314	–	–	–	1,300,000	91	23,430	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.314
1.333	–	–	–	–	–	–	–	–	–	1,192,500	54/19	43,100	1,230,000	54/19	43,720	–	–	–	–	–	–	–	–	–	–	–	–	1.333
1.340	–	–	–	1,351,500	61	23,400	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.340
1.345	–	–	–	–	–	–	–	–	–	1,272,000	45/7	35,400	1,294,000	45/7	36,060	–	–	–	–	–	–	–	–	–	–	–	–	1.345
1.364	–	–	–	1,400,000	91	24,750	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.364
1.379	–	–	–	1,431,000	61	24,300	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.379
1.382	–	–	–	–	–	–	–	–	–	1,272,000	54/19	44,800	1,312,000	54/19	46,130	–	–	–	–	–	–	–	–	–	–	–	–	1.382
1.385	–	–	–	–	–	–	–	–	–	1,351,500	45/7	37,600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.385
1.386	–	–	–	–	–	–	–	–	–	–	–	–	1,375,000	45/7	38,220	–	–	–	–	–	–	–	–	–	–	–	–	1.386
1.411	1,500,000	61	65,840	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.411
1.412	1,500,000	91	67,540	1,500,000	91	26,500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.412
1.417	–	–	–	1,510,500	61	25,600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.417
1.424	–	–	–	–	–	–	–	–	–	1,351,500	54/19	47,600	1,394,000	54/19	48,990	–	–	–	–	–	–	–	–	–	–	–	–	1.424
1.427	–	–	–	–	–	–	–	–	–	1,431,000	45/7	39,800	1,456,000	45/7	40,570	–	–	–	–	–	–	–	–	–	–	–	–	1.427
1.454	–	–	–	1,590,000	61 91	27,000 28,100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.454
1.459	–	–	–	1,600,000	127	28,840	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.459
1.465	–	–	–	–	–	–	–	–	–	1,431,000	54/19	50,400	1,476,000	54/19	51,900	–	–	–	–	–	–	–	–	–	–	–	–	1.465
1.466	–	–	–	–	–	–	–	–	–	1,510,500	45/7	41,600	1,537,000	45/7	42,810	–	–	–	–	–	–	–	–	–	–	–	–	1.466
1.502	–	–	–	–	–	–	–	–	–	1,590,000	45/7	43,800	1,617,000	45/7	45,000	–	–	–	–	–	–	–	–	–	–	–	–	1.502
1.504	–	–	–	1,700,000	127	30,630	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.504
1.506	–	–	–	–	–	–	–	–	–	1,510,500	54/19	53,200	1,588,000	54/19	54,880	–	–	–	–	–	–	–	–	–	–	–	–	1.506
1.526	1,750,000	91	77,930	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.526
1.526	1,750,000	127	78,800	1,750,000	127	31,530	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.526
1.545	–	–	–	–	–	–	–	–	–	1,590,000	54/19	56,000	1,640,000	54/19	57,680	–	–	–	–	–	–	–	–	–	–	–	–	1.545
1.548	–	–	–	1,800,000	127	32,450	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.548
1.590	–	–	–	1,900,000	127	33,570	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.590
1.602	–	–	–	–	–	–	–	–	–	1,780,000	84/19	53,600	1,816,000	84/19	54,210	–	–	–	–	–	–	–	–	–	–	–	–	1.602
1.630	2,000,000	91	87,790	2,000,000	91	34,600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.630
1.632	2,000,000	127	90,050	2,000,000	127	35,340	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.632
1.737	–	–	–	–	–	–	–	–	–	2,167,000	72/7	50,900	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.737
1.762	–	–	–	–	–	–	–	–	–	2,156,000	84/19	63,400	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.762
1.823	2,500,000	91	109,600	2,500,000	91	42,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.823
1.824	2,500,000	127	111,300	2,500,000	127	43,300	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.824
1.996	–	–	–	3,000,000	127	50,800	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.996
1.998	3,000,000	127	131,700	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.998
1.998	3,000,000	169	134,400	3,000,000	169	53,010	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.998
2.158	3,500,000	127	153,400	3,500,000	127	59,400	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.158

(1) Hard drawn, bare copper cable.
(2) Hard drawn, bare all-aluminum cable.
(3) "Compresto" all-aluminum cable, by Olin Conductors Division.
(4) Standard, aluminum cable steel reinforced.
(5) Standard, aluminum cable steel reinforced (aluminum coated steel core wire(s)).
(6) Aluminum cable steel reinforced, Compresto ACSR by Olin Conductors Division.
(7) High strength all-aluminum cable, "AAAC" by Kaiser Aluminum.
(8) High strength all-aluminum cable, by Reynolds Metals Company.
(9) Alumoweld cable by Copperweld Steel Company.

Table 2

TYPES OF STRANDING*

Construction Requirements of Concentric-Lay-Stranded Copper Conductor

(Ultimate Strength For Class – A, AA & B. See Page 9)

Area of Cross-Section, Cir. Mils	Size, American (Or B. & S.) Wire Gage	CLASS AA			CLASS A			CLASS B			CLASS C			CLASS D		
		No. Of Wires	Diam. Of Wires, Inches	Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	Diam. Of Cable, Inches
*5,000,000	.....	.....	.....	.....	169	.1720	2.580	217	.1518	2.581	271	.1358	2.580	271	.1358	2.580
4,500,000	.....	.....	.....	.....	169	.1632	2.448	217	.1440	2.448	271	.1289	2.448	271	.1289	2.448
4,000,000	.....	.....	.....	.....	169	.1538	2.307	217	.1358	2.309	271	.1215	2.307	271	.1215	2.307
3,500,000	.....	.....	.....	.....	127	.1660	2.158	169	.1439	2.159	217	.1270	2.158	271	.1136	2.158
*3,000,000	.....	.....	.....	.....	127	.1537	1.998	169	.1332	1.998	217	.1176	1.998	271	.1052	1.998
*2,500,000	.....	.....	.....	.....	91	.1657	1.823	127	.1403	1.824	169	.1216	1.824	217	.1073	1.824
*2,000,000	.....	.....	.....	.....	91	.1482	1.630	127	.1255	1.631	169	.1088	1.631	217	.0960	1.631
1,900,000	.....	.....	.....	.....	91	.1445	1.590	127	.1223	1.590	169	.1060	1.590	217	.0936	1.591
1,800,000	.....	.....	.....	.....	91	.1406	1.547	127	.1191	1.548	169	.1032	1.548	217	.0911	1.549
*1,750,000	.....	.....	.....	.....	91	.1387	1.526	127	.1174	1.526	169	.1018	1.526	217	.0898	1.526
1,700,000	.....	.....	.....	.....	91	.1367	1.504	127	.1157	1.504	169	.1003	1.505	217	.0885	1.505
1,600,000	.....	.....	.....	.....	91	.1326	1.459	127	.1122	1.459	169	.0973	1.460	217	.0859	1.460
*1,500,000	.....	.....	.....	.....	61	.1568	1.411	91	.1284	1.412	127	.1087	1.414	169	.0942	1.414
1,400,000	.....	.....	.....	.....	61	.1515	1.364	91	.1240	1.364	127	.1050	1.365	169	.0910	1.365
*1,300,000	.....	.....	.....	.....	61	.1460	1.314	91	.1195	1.315	127	.1012	1.316	169	.0877	1.316
1,250,000	.....	.....	.....	.....	61	.1431	1.288	91	.1172	1.289	127	.0992	1.290	169	.0860	1.290
1,200,000	.....	.....	.....	.....	61	.1403	1.263	91	.1148	1.263	127	.0972	1.264	169	.0843	1.265
1,100,000	.....	.....	.....	.....	61	.1343	1.209	91	.1099	1.209	127	.0931	1.210	169	.0807	1.211
*1,000,000	.....	37	.1644	1.151	61	.1280	1.152	61	.1280	1.152	91	.1048	1.153	127	.0887	1.154
900,000	.....	37	.1560	1.092	61	.1215	1.094	61	.1215	1.094	91	.0994	1.095	127	.0842	1.096
* 800,000	.....	37	.1470	1.029	61	.1145	1.031	61	.1145	1.031	91	.0938	1.032	127	.0794	1.032
* 750,000	.....	37	.1424	.997	61	.1109	.998	61	.1109	.998	91	.0908	.999	127	.0768	1.000
* 700,000	.....	37	.1375	.963	61	.1071	.964	61	.1071	.964	91	.0877	.965	127	.0742	.966
650,000	.....	37	.1325	.928	61	.1032	.929	61	.1032	.929	91	.0845	.930	127	.0715	.930
* 600,000	.....	37	.1273	.891	37	.1273	.891	61	.0992	.893	91	.0812	.893	127	.0687	.894
550,000	.....	37	.1219	.853	37	.1219	.853	61	.0950	.855	91	.0777	.855	127	.0658	.855
* 500,000	.....	19	.1622	.811	37	.1162	.813	37	.1162	.813	61	.0905	.815	91	.0741	.817
450,000	.....	19	.1539	.770	37	.1103	.772	37	.1103	.772	61	.0859	.773	91	.0703	.774
* 400,000	.....	19	.1451	.726	19	.1451	.726	37	.1040	.728	61	.0810	.730	91	.0663	.731
* 350,000	.....	12	.1708	.710	19	.1357	.679	37	.0973	.681	61	.0757	.683	91	.0620	.684
* 300,000	.....	12	.1581	.657	19	.1257	.629	37	.0900	.630	61	.0701	.632	91	.0574	.633
* 250,000	.....	12	.1443	.600	19	.1147	.574	37	.0822	.575	61	.0640	.577	91	.0524	.578
* 211,600	0000	7	.1739	.522	7	.1739	.522	19	.1055	.528	37	.0756	.529	61	.0589	.530
* 167,800	000	7	.1548	.464	7	.1548	.464	19	.0940	.470	37	.0673	.471	61	.0524	.471
* 133,100	00	7	.1379	.414	7	.1379	.414	19	.0837	.418	37	.0600	.419	61	.0467	.419
* 105,600	0	7	.1228	.368	7	.1228	.368	19	.0745	.373	37	.0534	.376	61	.0416	.376
* 83,690	1	3	.1670	.360	7	.1093	.328	19	.0664	.332	37	.0476	.333	61	.0370	.333
* 66,360	2	3	.1487	.320	7	.0974	.292	7	.0974	.292	19	.0591	.295	37	.0424	.296
* 52,620	3	3	.1325	.285	7	.0867	.260	7	.0867	.260	19	.0526	.261	37	.0377	.262
* 41,740	4	3	.1180	.254	7	.0772	.232	7	.0772	.232	19	.0469	.230	37	.0336	.231
* 33,090	5	.....	.....	.....	.....	.....	.....	7	.0688	.206	19	.0417	.209	37	.0299	.210
* 26,240	6	.....	.....	.....	.....	.....	.....	7	.0612	.184	19	.0372	.186	37	.0266	.186
* 20,820	7	.....	.....	.....	.....	.....	.....	7	.0545	.164	19	.0331	.166	37	.0237	.166

Continued on Page 7

Table 2-(Continued)

TYPES OF STRANDING*

Construction Requirements of Concentric-Lay-Stranded Copper Conductor

(Ultimate Strength For Class – A, AA & B. See Page 9)

Area of Cross-Section, Cir. Mils	Size, American (Or B. & S.) Wire Gage	CLASS AA			CLASS A			CLASS B			CLASS C			CLASS D		
		No. Of Wires	Diam. Of Wires, Inches	(a) Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	(a) Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	(a) Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	(a) Diam. Of Cable, Inches	No. Of Wires	Diam. Of Wires, Inches	(a) Diam. Of Cable, Inches
*16,510	8	.....	.....	.....	.....	.....	.....	7	.0486	.146	19	.0295	.147	37	.0211	.148
*1 ,090	9	.....	.....	.....	.....	.....	.....	7	.0432	.130	19	.0262	.131	37	.0188	.132
*10,380	10	.....	.....	.....	.....	.....	.....	7	.0385	.116	19	.0234	.117	37	.0167	.117
* 6,530	12	.....	.....	.....	.....	.....	.....	7	.0305	.092	19	.0185	.093	37	.0133	.093
* 4,110	14	.....	.....	.....	.....	.....	.....	7	.0242	.073	19	.0147	.074	37	.0105	.074
* 2,580	16	.....	.....	.....	.....	.....	.....	7	.0192	.058	19	.0117	.058	.....	.....	.....
* 1,620	18	.....	.....	.....	.....	.....	.....	7	.0152	.046	19	.0092	.046	.....	.....	.....
* 1,020	20	.....	.....	.....	.....	.....	.....	7	.0121	.036	19	.0073	.037	.....	.....	.....

* The sizes of conductors which have been marked with an asterisk provide for one or more schedules of preferred series, and are commonly used in the industry. The sizes not marked are given simply as a matter of reference and it is suggested that their use be discouraged.

** At present the prevailing practice in the industry is to supply 7-wire (class AA) cables for A.W.G. Nos. 000 and 0000 weather-resisting (weatherproof) conductors, unless the application requires a more flexible stranding.

(a) To calculate the nominal diameters of any concentric-lay-stranded conductors made from round wires of uniform diameters, multiply the diameter of an individual wire by that one of the following factors which applies:

NUMBER OF WIRES IN THE CONDUCTOR	FACTOR TO CALCULATE CONDUCTOR DIAMETER
3	2.155
7	3
12	4.155
19	5
37	7
61	9
91	11
127	13
169	15
217	17
271	19

Table 3

SOLID COPPER WIRE

SIZE AWG	NOMINAL DIAMETER INCHES	CROSS SECTIONAL AREA		NOMINAL WEIGHT	HARD DRAWN		MEDIUM HARD DRAWN			ANNEALED	
		CIRCULAR MILS	SQUARE INCHES	LBS./M FT.	MINIMUM BREAKING STRENGTH LBS.	MAX. D-C RESISTANCE @ 20 C OHMS/ M FT.	MINIMUM BREAKING STRENGTH LBS.	MAXIMUM BREAKING STRENGTH LBS.	MAX. D-C RESISTANCE @ 20 C OHMS/ M FT.	MAXIMUM BREAKING STRENGTH LBS.	MAX. D-C RESISTANCE @ 20 C OHMS/ M FT.
10	0.1019	10,380	8.155×10^{-3}	31.43	529.3	1.039	410.4	467.5	1.033	314.0	.9988
9	0.1144	13,090	0.01028	39.62	660.9	.8241	513.9	585.9	.8199	380.3	.7925
8	0.1285	16,510	0.01297	49.98	826.1	.6532	644.0	734.8	.6498	479.8	.6281
7	0.1443	20,820	0.01635	63.03	1030	.5180	806.7	921.2	.5153	605.1	.4981
6	0.1620	26,240	0.02061	79.44	1280	.4110	1010	1154	.4088	762.6	.3952
5	0.1819	33,090	0.02599	100.2	1590	.3260	1265	1446	.3243	961.5	.3134
4	0.2043	41,740	0.03278	126.3	1970	.2584	1584	1814	.2571	1213	.2485
3	0.2294	52,620	0.04133	159.3	2439	.2050	1984	2273	.2039	1529	.1971
2	0.2576	66,360	0.05212	200.9	3002	.1625	2450	2814	.1617	1928	.1563
1	0.2893	83,690	0.06573	253.3	3688	.1289	3024	3484	.1282	2432	.1239
1/0	0.3249	105,600	0.08291	319.5	4518	.1022	3731	4311	.1016	2985	.09825
2/0	0.3648	133,100	0.1045	402.8	5519	.08021	4599	5330	.07980	3763	.07793
3/0	0.4096	167,800	0.1318	507.8	6720	.06362	5666	6588	.06330	4744	.06182
4/0	0.4600	211,600	0.1662	640.5	8143	.05045	6980	8143	.05019	5983	.04901

Table 4

CONSTRUCTION REQUIREMENTS OF ROPE-LAY-STRANDED COPPER CONDUCTORS HAVING CONCENTRIC-STRANDED MEMBERS

Area Of Cross-Section, Cir. Mils	Size A.W.G.	CLASS G				CLASS H			
		Number of Wires	Diam. of Wires, Inches	No. of *Wires in Each Member	Diam. of Cable, Inches	Number of Wires	Diam. of Wires, Inches	No. of *Wires in Each Member	Diam. of Cable, Inches
5,000,000		1159	.0657	19	2.957	1729	.0538	19	2.959
4,500,000		1159	.0623	19	2.804	1729	.0510	19	2.805
4,000,000		1159	.0587	19	2.642	1729	.0481	19	2.646
3,500,000		1159	.0550	19	2.475	1729	.0450	19	2.475
3,000,000		1159	.0509	19	2.291	1729	.0417	19	2.294
2,500,000		703	.0596	19	2.086	1159	.0464	19	2.088
2,000,000		703	.0533	19	1.866	1159	.0415	19	1.868
1,900,000		703	.0520	19	1.820	1159	.0405	19	1.823
1,800,000		703	.0506	19	1.771	1159	.0394	19	1.773
1,750,000		703	.0499	19	1.747	1159	.0389	19	1.751
1,700,000		703	.0496	19	1.722	1159	.0383	19	1.724
1,600,000		703	.0477	19	1.670	1159	.0372	19	1.674
1,500,000		427	.0593	7	1.601	703	.0462	19	1.617
1,400,000		427	.0573	7	1.547	703	.0446	19	1.561
1,300,000		427	.0552	7	1.490	703	.0430	19	1.505
1,250,000		427	.0541	7	1.461	703	.0422	19	1.477
1,200,000		427	.0530	7	1.431	703	.0413	19	1.446
1,100,000		427	.0508	7	1.372	703	.0396	19	1.386
1,000,000		427	.0484	7	1.307	703	.0377	19	1.320
900,000		427	.0459	7	1.239	703	.0358	19	1.253
800,000		427	.0433	7	1.169	703	.0337	19	1.180
750,000		427	.0419	7	1.131	703	.0327	19	1.145
700,000		427	.0405	7	1.094	703	.0316	19	1.106
650,000		427	.0390	7	1.053	703	.0304	19	1.064
600,000		427	.0375	7	1.013	703	.0292	19	1.022
550,000		427	.0359	7	.969	703	.0280	19	.980
500,000		259	.0439	7	.922	427	.0342	7	.923
450,000		259	.0417	7	.876	427	.0325	7	.878
400,000		259	.0393	7	.825	427	.0306	7	.826
350,000		259	.0368	7	.773	427	.0286	7	.772
300,000		259	.0340	7	.714	427	.0265	7	.716
250,000		259	.0311	7	.653	427	.0242	7	.653
211,600	0000	133	.0399	7	.599	259	.0286	7	.601
167,800	000	133	.0355	7	.533	259	.0255	7	.536
133,100	00	133	.0316	7	.474	259	.0227	7	.477
105,600	0	133	.0282	7	.423	259	.0202	7	.442
83,690	1	133	.0251	7	.377	259	.0180	7	.378
66,360	2	49	.0368	7	.331	133	.0223	7	.335
52,620	3	49	.0328	7	.295	133	.0199	7	.299
41,740	4	49	.0292	7	.263	133	.0177	7	.266
33,090	5	49	.0260	7	.234	133	.0158	7	.237
26,240	6	49	.0231	7	.208	133	.0140	7	.210
20,820	7	49	.0206	7	.185	133	.0125	7	.188
16,510	8	49	.0184	7	.166	133	.0111	7	.167
13,090	9	49	.0164	7	.148	133	.0099	7	.149
10,380	10	49	.0146	7	.131	.....	.....	.....	.....
6,530	12	49	.0116	7	.104	.....	.....	.....	.....
4,110	14	49	.0092	7	.083	.....	.....	.....	.....

*This table shows a variety of strand constructions that are useful and generally adequate to meet the needs encountered. It is not intended that the constructions listed in this table be exclusive of other constructions that may appear desirable in certain applications employing the same total numbers of wires. The constructions shown in this table provide for a finished, non-covered, stranded conductor approximately of the area indicated. When specified by the purchaser, usually to provide additional area to compensate for draw-down during subsequent processing, the size of the wires composing the non-covered conductor may be increased as required.

Table 5

PHYSICAL PROPERTIES OF BARE COPPER WIRE AND CABLE*

Overhead Line Conductors — Hard Drawn

CONDUCTOR SIZE		STANDING CLASS	TOTAL NUMBER OF WIRES	WIRE DIAMETER	CABLE DIAMETER	RATED BREAKING STRENGTH	CONDUCTOR WEIGHT		CROSS-SECTIONAL AREA
							PER 1,000 FT.	PER MILE	
MCM	AWG			INCHES	INCHES	POUNDS	POUNDS	POUNDS	SQUARE INCH
16.51	8	Solid	1	.1285	.1285	826	49.97	263.8	.01297
26.25	6	Solid	1	.1620	.1620	1,280	79.46	419.6	.02061
41.74	4	Solid	1	.2043	.2043	1,970	126.4	667.1	.03278
41.74	4	AA	3	.1180	.254	1,879	127.6	673.8	.03278
41.74	4	B & A	7	.0772	.232	1,938	128.9	680.5	.03278
52.63	3	Solid	1	.2294	.2294	2,439	159.3	841.2	.04134
52.63	3	AA	3	.1325	.285	2,359	160.9	849.6	.04134
52.63	3	B & A	7	.0867	.260	2,433	162.5	858.0	.04134
66.37	2	AA	3	.1487	.320	2,913	202.9	1,071	.05213
66.37	2	B & A	7	.0974	.292	3,045	204.9	1,082	.05213
83.69	1	AA	3	.1670	.360	3,620	255.9	1,351	.06573
83.69	1	A	7	.1093	.328	3,804	258.4	1,364	.06573
105.5	1/0	A & AA	7	.1228	.368	4,750	325.7	1,720	.08289
105.5	1/0	B	19	.0745	.373	4,899	325.7	1,720	.08289
133.1	2/0	A & AA	7	.1379	.414	5,927	410.9	2,169	.1045
167.8	3/0	A & AA	7	.1548	.464	7,366	518.1	2,736	.1318
211.6	4/0	A & AA	7	.1739	.522	9,154	653.3	3,450	.1662
216.6	4/0	B	19	.1055	.528	9,617	653.3	3,450	.1662
250	...	AA	12	.1443	.600	11,130	771.9	4,076	.1963
250	...	A	19	.1147	.574	11,360	771.9	4,076	.1963
300	...	AA	12	.1581	.657	13,170	926.3	4,891	.2356
300	...	A	19	.1257	.629	13,510	926.3	4,891	.2356
350	...	AA	12	.1708	.710	15,140	1,081	5,706	.2749
350	...	A	19	.1357	.679	15,590	1,081	5,706	.2749
400	...	A & AA	19	.1451	.726	17,560	1,235	6,521	.3142
450	...	AA	19	.1539	.770	19,750	1,389	7,336	.3534
450	...	B & A	37	.1103	.772	20,450	1,389	7,336	.3534
500	...	AA	19	.1622	.811	21,950	1,544	8,151	.3927
500	...	B & A	37	.1162	.813	22,510	1,544	8,151	.3927
550	...	A & AA	37	.1219	.853	24,760	1,698	8,966	.4320
600	...	A & AA	37	.1273	.891	27,020	1,853	9,781	.4712
650	...	AA	37	.1395	.928	29,110	2,007	10,600	.5105
700	...	AA	37	.1375	.963	31,170	2,161	11,410	.5498
700	...	B & A	61	.1071	.964	31,820	2,161	11,410	.5498
750	...	AA	37	.1424	.997	33,400	2,316	12,230	.5890
750	...	B & A	61	.1109	.998	34,090	2,316	12,230	.5890
800	...	AA	37	.1470	1.029	35,120	2,470	13,040	.6283
800	...	B & A	61	.1145	1.031	36,360	2,470	13,040	.6283
900	...	AA	37	.1560	1.092	39,510	2,779	14,670	.7069
900	...	B & A	61	.1215	1.094	40,520	2,779	14,670	.7069
1,000	...	AA	37	.1644	1.151	43,830	3,088	16,300	.7854
1,000	...	B & A	61	.1280	1.152	45,030	3,088	16,300	.7854

Cable diameters and weights abstracted from ASTM Designation: B8-60.

Breaking Strain=0.90 x A x S, where A=total area of cable and S=tensile strength of an individual wire according to ATSM Designation B1-56.

The thermal coefficient of linear expansion is 0.0000094 per degree Fahrenheit.

The final modulus of elasticity is 17,000,000 pounds per square inch.

*Anaconda Publication No. C-51

Table 6

ELECTRICAL PROPERTIES OF BARE COPPER WIRE AND CABLE*

Overhead Line Conductors — Hard Drawn

Conductor Size	Total Number of Wires	Current Ratings	RESISTANCE AT 20°C				Inductive Reactance (XL) 1-ft. Spacing 60-cps	Capacitive Reactance (Xc) 1-ft. Spacing 60-cps
			PER 1,000 FEET		PER MILE			
			D-C	A-C 60-cps	D-C	A-C 60-cps (R)		
AWG or MCM		Amp.	Ohms	Ohms	Ohms	Ohms	Ohms Per Mile	Megohms Per Mile
8	1	68	.6443	.6443	3.402	3.402	.6649	.1552
6	1	91	.4052	.4052	2.140	2.140	.6368	.1482
4	1	130	.2548	.2548	1.346	1.346	.6087	.1414
4	3	....	.2574	.2574	1.359	1.359	.5991	.1345
4	7	141	.2599	.2599	1.372	1.372	.6018	.1376
3	1	....	.2021	.2021	1.067	1.067	.5945	.1380
3	3	....	.2041	.2041	1.078	1.078	.5851	.1315
3	7	....	.2062	.2062	1.088	1.088	.5879	.1342
2	3	....	.1619	.1619	.8547	.8547	.5711	.1281
2	7	186	.1635	.1635	.8632	.8632	.5739	.1308
1	3	....	.1284	.1285	.6778	.6785	.5564	.1246
1	7	220	.1296	.1297	.6845	.6848	.5598	.1274
1/0	7	245	.1028	.1029	.5430	.5433	.5458	.1239
1/0	19	....	.1028	.1029	.5430	.5433	.5387	.1236
2/0	7	283	.08152	.08166	.4304	.4311	.5315	.1204
3/0	7	332	.06466	.06483	.3414	.3423	.5177	.1171
4/0	7	385	.05128	.05149	.2707	.2719	.5034	.1136
4/0	19	....	.05128	.05149	.2707	.2719	.4968	.1132
250	12	....	.04340	.04365	.2292	.2305	.4809	.1094
250	19	430	.04340	.04365	.2292	.2305	.4868	.1107
300	12	....	.03617	.03647	.1910	.1925	.4699	.1067
300	19	480	.03617	.03647	.1910	.1925	.4753	.1080
350	12	....	.03100	.03135	.1637	.1655	.4604	.1044
350	19	524	.03100	.03135	.1637	.1655	.4665	.1057
400	19	576	.02712	.02752	.1432	.1453	.4583	.1038
450	19	....	.02411	.02456	.1273	.1297	.4510	.1020
450	37	619	.02411	.02456	.1273	.1297	.4502	.1019
500	19	....	.02170	.02219	.1146	.1172	.4447	.1005
500	37	663	.02170	.02219	.1146	.1172	.4428	.1004
550	37	701	.01973	.02027	.1042	.1070	.4369	.09900
600	37	745	.01808	.01867	.09548	.09858	.4317	.09768
650	37	783	.01669	.01733	.08813	.09150	.4267	.09650
700	37	....	.01550	.01619	.08184	.08548	.4223	.09540
700	61	813	.01550	.01619	.08184	.08548	.4215	.09537
750	37	....	.01447	.01520	.07638	.08026	.4183	.09439
750	61	860	.01447	.01520	.07638	.08026	.4173	.09435
800	37	....	.01356	.01434	.07161	.07572	.4143	.09330
800	61	883	.01356	.01434	.07161	.07572	.4132	.09336
900	37	....	.01206	.01292	.06365	.06822	.4071	.09166
900	61	938	.01206	.01292	.06365	.06822	.4061	.09161
1,000	37	....	.01085	.01179	.05729	.03011	.4007	.09011
1,000	61	1,025	.01085	.01179	.05729	.03011	.3997	.09008

The resistances are for nominal sizes, and are based on a conductivity of **97.5%** IACS. Resistance is increased **2%** to allow for stranding, except in the case of 3-wire cable where the allowance is **1%**.

Temperature Conversion:

$R_{t_o} = R_{20}\ [1 + 0.00383(T_o - 20)]$ Where R_{t_o} = Resistance at operating temperature, °C.
R_{20} = Resistance at 20°C.
T_o = Operating temperature, °C.

The inductive and capacitive reactance are calculated for an equivalent spacing of one foot. For other spacings the total reactance is the sum of the reactance at one foot spacing plus reactance spacing factor, Table 74, Page 67.

The current ratings are approximate based on the following conditions: Copper conductivity 98.0% I.A.C.S.; aluminum conductivity 61.0% I.A.C.S.; average temperature rise 30°C. above ambient temperature 40°C; frequency 60 cycles; horizontal position; outdoors; and wind velocity 2 feet per second crosswise. Conductors should be spaced at least 18 inches apart; otherwise, use "Relative Current Carrying Capacities Due To Proximity Effect", Table 69, Page 61.

*AnaConda Publication No. C-51.

Table 7

CURRENT RATINGS FOR BARE COPPER CABLES – INDOORS

Not inclosed in separate housing

Conductivity of 97.0%; 40°C. ambient temperature; frequency 60 cycles; horizontal mounting; conductor spacing, 15 inches or more.

Conductor Size AWG or MCM	Stranding	Diameter Inches	CURRENT RATINGS IN AMPERES		
			30° C. Rise	40° C. Rise	50° C. Rise
4	Solid	0.204	95	110	120
2	3	0.320	130	155	170
1/0	7	0.368	180	210	235
2/0	7	0.414	210	240	275
4/0	7	0.522	285	335	375
250	19	0.574	325	380	430
300	19	0.629	360	430	485
400	19	0.726	445	520	590
500	19	0.811	515	600	690
600	37	0.891	595	690	780
750	37	0.997	680	800	905
1000	37	1.151	820	965	1085
1500	61	1.411	1035	1230	1400
2000	61	1.630	1230	1450	1660

Table 8

CURRENT RATINGS FOR BARE COPPER CABLES – OUTDOORS

Conductivity of 97.0%; 40°C. ambient temperature; frequency, 60 cycles; horizontal mounting; conductor spacing, 15 inches or more; wind velocity, 2 feet per second at 90° angle.

Conductor Size AWG or MCM	Stranding	Diameter Inches	CURRENT RATINGS IN AMPERES		
			30° C. Rise	40° C. Rise	50° C. Rise
4	Solid	0.204	130	155	170
2	3	0.320	185	220	245
1/0	7	0.368	245	275	305
2/0	7	0.414	283	315	355
4/0	7	0.522	385	430	480
250	19	0.574	430	480	535
300	19	0.629	480	535	595
400	19	0.726	576	655	725
500	19	0.811	663	750	830
600	37	0.891	745	845	930
750	37	0.997	860	970	1075
1000	37	1.151	1025	1155	1285
1500	61	1.411	1265	1465	1620
2000	61	1.630	1485	1715	1900

Table 9

BARE COPPERWELD STRANDS

High Strength and Extra High Strength

DESIGNATION	NOMINAL DIAMETER	BREAKING LOAD* Lbs.			WEIGHT		RESISTANCE		CROSS-SECTION	
		High Strength		Extra High Strength	Lbs. Per	Lbs. Per	Ohms Per 1,000 Ft. at 68°F.			
	Inch	40% Cond.	30% Cond.	30% Cond.	1,000 Ft.	Mile	40% Cond.	30% Cond.	Cir. Mils	Sq. In.
37-Wire Copperweld Strands										
37 No. 5	1.27	97,830	108,200	130,300	3,466	18,300	.02203	.02936	1,225,000	.9619
37 No. 6	1.13	81,020	89,250	108,100	2,749	14,520	.02778	.03703	971,300	.7629
37 No. 7	1.01	66,970	73,500	89,290	2,180	11,510	.03503	.04669	770,300	.6050
37 No. 8	.899	55,270	60,450	73,400	1,729	9,130	.04417	.05888	610,900	.4798
37 No. 9	.801	45,540	49,650	59,920	1,371	7,240	.05569	.07424	484,400	.3805
37 No. 10	.713	37,640	41,000	48,610	1,087	5,740	.07023	.09362	384,200	.3017
19-, 7- and 3-Wire Copperweld Strands										
7/8 (19 No. 5)	.910	50,240	55,570	66,910	1,770	9,344	.04264	.05685	628,900	.4940
13/16 (19 No. 6)	.810	41,600	45,830	55,530	1,403	7,410	.05377	.07168	498,800	.3917
23/32 (19 No. 7)	.721	34,390	37,740	45,850	1,113	5,877	.06780	.09039	395,500	.3107
21/32 (19 No. 8)	.642	28,380	31,040	37,690	882.7	4,660	.08550	.1140	313,700	.2464
9/16 (19 No. 9)	.572	23,390	25,500	30,610	700.0	3,696	.1078	.1437	248,800	.1954
5/8 (7 No. 4)	.613	22,310	24,780	29,430	818.9	4,324	.09143	.1219	292,200	.2295
9/16 (7 No. 5)	.546	18,510	20,470	24,650	649.4	3,429	.1153	.1537	231,700	.1820
1/2 (7 No. 6)	.486	15,330	16,890	20,460	515.0	2,719	.1454	.1938	183,800	.1443
7/16 (7 No. 7)	.433	12,670	13,910	16,890	408.4	2,157	.1833	.2444	145,700	.1145
3/8 (7 No. 8)	.385	10,460	11,440	13,890	323.9	1,710	.2312	.3081	115,600	.09077
11/32 (7 No. 9)	.343	8,616	9,393	11,280	256.9	1,356	.2915	.3886	91,650	.07198
5/16 (7 No. 10)	.306	7,121	7,758	9,196	203.7	1,076	.3676	.4900	72,680	.05708
3 No. 5	.392	8,373	9,262	11,860	277.8	1,467	.2685	.3579	99,310	.07800
3 No. 6	.349	6,934	7,639	9,754	220.3	1,163	.3385	.4513	78,750	.06185
3 No. 7	.311	5,732	6,291	7,922	174.7	922.4	.4269	.5691	62,450	.04905
3 No. 8	.277	4,730	5,174	6,282	138.5	731.5	.5383	.7176	49,530	.03890
3 No. 9	.247	3,898	4,250	5,129	109.9	580.1	.6788	.9049	39,280	.03085
3 No. 10	.220	3,221	3,509	4,160	87.13	460.0	.8559	1.141	31,150	.02446
3 No. 12	.174	2,236	—	2,565	54.80	289.3	1.361	1.814	19,590	.01539

Modulus of Elasticity: Strand, 23,000,000. Coefficient of Linear Expansion: .000,007,2 per degree Fahrenheit.
Temperature Coefficient of Resistance: .0021 per degree Fahrenheit.

*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.

Table 10

COPPERWELD TYPE M GUY STRANDS

DESIGNATION	NOMINAL DIAMETER OF STRAND Inch	NUMBER AND DIAMETER OF INDIVIDUAL WIRES	RATED STRENGTH Lbs.	WEIGHT Lbs. Per 1,000 Ft.	STANDARD PACKAGE	
					COIL LENGTH Ft.	APPROX. WEIGHT Lbs.
2.2M	.157	3 x .073"	2,200	45	1,000	45
4M	.209	3 x .097"	4,000	79	2-500	80
6M3	.258	3 x .120"	6,000	121	500	65
6M	.237	7 x .079"	6,000	122	500	65
8M	.276	7 x .092"	8,000	166	500	85
10M	.303	7 x .101"	10,000	200	500	100
12.5M	.345	7 x .115"	12,500	259	250†	65
14M	.360	7 x .120"	14,000	283	250†	70
16M	.386	7 x .128"	16,000	324	250†	80
18M	.414	7 x .138"	18,000	374	250†	95
20M	.432	7 x .144"	20,000	407	250†	100

COPPERWELD STEEL CO.

Table 11

BARE STRANDED COPPERWELD-COPPER CONDUCTORS

Sizes 350,000 Cir. Mils to No. 8 AWG Equivalent Conductance

TYPE OF CONDUCTOR	DIAMETER OF CONDUCTOR	DESIGN OF CONDUCTOR		BREAKING LOAD	WEIGHT		CROSS-SECTION
		Copperweld Wires E.H.S. 30% Cond. No.—Diameter	Copper Wires Hard Drawn No.—Diameter		Lbs. Per 1,000 Ft.	Lbs. Per Mile	
	Inch			Lbs.			Sq. In.
350,000 Cir. Mils Copper Equivalent—.03143 Ohms/M Ft. at 68° F.							
E	.788	7—.1576	12—.1576	32,420	1,403	7,409	.3704
EK	.735	4—.1470	15—.1470	23,850	1,238	6,536	.3224
300,000 Cir. Mils Copper Equivalent—.03667 Ohms/M Ft. at 68° F.							
E	.729	7—.1459	12—.1459	27,770	1,203	6,351	.3175
EK	.680	4—.1361	15—.1361	20,960	1,061	5,602	.2763
250,000 Cir. Mils Copper Equivalent—.04400 Ohms/M Ft. at 68° F.							
E	.666	7—.1332	12—.1332	23,920	1,002	5,292	.2646
EK	.621	4—.1242	15—.1242	17,840	884.2	4,669	.2303
4/0 Awg Copper Equivalent—211,600 Cir. Mils—.05199 Ohms/M Ft. at 68° F.							
E	.613	7—.1225	12—.1225	20,730	848.3	4,479	.2239
G	.583	2—.1944	5—.1944	15,640	789.4	4,168	.2077
EK	.571	4—.1143	15—.1143	15,370	748.4	3,951	.1949
F	.550	1—.1833	6—.1833	12,290	710.2	3,750	.1847
2/0 Awg Copper Equivalent—133,100 Cir. Mils—.08265 Ohms/M Ft. at 68° F.							
K	.534	4—.1780	3—.1780	17,600	645.9	3,411	.1742
J	.494	3—.1648	4—.1648	13,430	560.6	2,960	.1493
G	.463	2—.1542	5—.1542	10,510	496.6	2,622	.1307
F	.436	1—.1454	6—.1454	8,094	446.8	2,359	.1162
1/0 Awg Copper Equivalent—105,500 Cir. Mils—.1043 Ohms/M Ft. at 68° F.							
K	.475	4—.1585	3—.1585	14,490	512.0	2,703	.1381
J	.440	3—.1467	4—.1467	10,970	444.3	2,346	.1184
G	.412	2—.1373	5—.1373	8,563	393.6	2,078	.1036
F	.388	1—.1294	6—.1294	6,536	354.1	1,870	.09207
No. 1 Awg Copper Equivalent—83,690 Cir. Mils—.1315 Ohms/M Ft. at 68° F.							
N	.464	5—.1546	2—.1546	15,410	481.3	2,541	.1315
K	.423	4—.1412	3—.1412	11,900	406.2	2,144	.1096
J	.392	3—.1307	4—.1307	9,000	352.5	1,861	.09390
G	.367	2—.1222	5—.1222	6,956	312.2	1,649	.08216
F	.346	1—.1153	6—.1153	5,266	280.9	1,483	.07303
No. 2 Awg Copper Equivalent—66,370 Cir. Mils—.1658 Ohms/M Ft. at 68° F.							
P	.462	6—.1540	1—.1540	16,870	471.1	2,487	.1303
N	.413	5—.1377	2—.1377	12,680	381.7	2,015	.1043
K	.377	4—.1257	3—.1257	9,730	322.1	1,701	.08688
J	.349	3—.1164	4—.1164	7,322	279.5	1,476	.07447
A	.366	1—.1699	2—.1699	5,876	256.8	1,356	.06799
G	.327	2—.1089	5—.1089	5,626	247.6	1,307	.06516
F	.308	1—.1026	6—.1026	4,233	222.8	1,176	.05792
No. 4 Awg Copper Equivalent—41,740 Cir. Mils—.2636 Ohms/M Ft. at 68° F.							
P	.366	6—.1221	1—.1221	11,420	296.3	1,564	.08196
N	.328	5—.1092	2—.1092	8,460	240.0	1,267	.06556
D	.348	2—.1615	1—.1615	7,340	225.5	1,191	.06147
A	.290	1—.1347	2—.1347	3,938	161.5	852.8	.04276
No. 6 Awg Copper Equivalent—26,250 Cir. Mils—.4150 Ohms/M Ft. at 68° F.							
D	.276	2—.1281	1—.1281	4,942	141.8	748.9	.03866
A	.230	1—.1068	2—.1068	2,585	101.6	536.3	.02689
C	.225	1—.1046*	2—.1046	2,143	97.34	514.0	.02577
No. 8 Awg Copper Equivalent—16,510 Cir. Mils—.6598 Ohms/M Ft. at 68° F.							
D	.219	2—.1016	1—.1016	3,256	89.21	471.0	.02431
A	.199	1—.1127	2—.07969	2,233	74.27	392.2	.01995
C	.179	1—.08081*	2—.08336	1,362	60.67	320.3	.01604

*High strength Copperweld, 40% conductivity.

The Modulus of Elasticity and Coefficient of Linear Expansion for the various types of conductors listed above are given on Page 10. Temperature Coefficient of Resistance: .0021 per degree Fahrenheit. Additional sizes and designs are available to meet special conductance and strength requirements.

COPPERWELD STEEL CO.

Table 12 CURRENT RATINGS FOR BARE COPPER TUBULAR BUS – INDOORS

40°C. Ambient Temperature – 98% Conductivity Copper. Frequency 60 cycles – Horizontal mounting.

Nominal Size	Outside Diameter (Inches)	Inside Diameter (Inches)	CURRENT RATINGS IN AMPERES*		
			30° C Rise	40° C Rise	50° C Rise
STANDARD PIPE SIZES					
½	0.840	0.625	425	500	565
¾	1.050	0.822	535	635	720
1	1.315	1.062	695	820	935
1¼	1.660	1.368	920	1,095	1,245
1½	1.900	1.600	1,050	1,260	1,420
2	2.375	2.062	1,330	1,585	1,780
2½	2.875	2.500	1,735	2,030	2,320
3	3.500	3.062	2,210	2,620	2,965
3½	4.000	3.500	2,620	3,160	3,610
4	4.500	4.000	2,925	3,510	4,000
EXTRA HEAVY PIPE SIZES					
½	0.840	0.542	480	575	650
¾	1.050	0.736	600	725	820
1	1.315	0.951	800	965	1,090
1¼	1.660	1.272	1,030	1,240	1,400
1½	1.900	1.494	1,190	1,420	1,620
2	2.375	1.933	1,530	1,820	2,070
2½	2.875	2.315	2,020	2,420	2,760
3	3.500	2.892	2,550	3,010	3,450
3½	4.000	3.358	2,940	3,510	4,000
4	4.500	3.818	3,360	4,000	4,600

Table 13 CURRENT RATINGS FOR BARE COPPER TUBULAR BUS – OUTDOORS

40°C. Ambient Temperature – 98% Conductivity Copper. Frequency 60 cycles – Wind velocity 2 ft. per sec. at 90° angle

Nominal Size	Outside Diameter (Inches)	Inside Diameter (Inches)	CURRENT RATINGS IN AMPERES*		
			30° C Rise	40° C Rise	50° C Rise
STANDARD PIPE SIZES					
½	0.840	0.625	545	615	675
¾	1.050	0.822	675	765	850
1	1.315	1.062	850	975	1,080
1¼	1.660	1.368	1,120	1,275	1,415
1½	1.900	1.600	1,270	1,445	1,600
2	2.375	2.062	1,570	1,780	1,980
2½	2.875	2.500	1,990	2,275	2,525
3	3.500	3.062	2,540	2,870	3,225
3½	4.000	3.500	3,020	3,465	3,860
4	4.500	4.000	3,365	3,810	4,305
EXTRA HEAVY PIPE SIZES					
½	0.840	0.542	615	705	775
¾	1.050	0.736	760	875	970
1	1.315	0.951	1,000	1,140	1,255
1¼	1.660	1.272	1,255	1,445	1,600
1½	1.900	1.494	1,445	1,650	1,830
2	2.375	1.933	1,830	2,080	2,325
2½	2.875	2.315	2,365	2,720	3,020
3	3.500	2.892	2,970	3,365	3,710
3½	4.000	3.358	3,380	3,860	4,255
4	4.500	3.818	3,840	4,350	4,850

*For Proximity effect correction, see Table 69, Page 61.

Table 14

PHYSICAL PROPERTIES OF HIGH CONDUCTIVITY COPPER BUS TUBES – HARD DRAWN

Standard Pipe Sizes

Size of Tube (Inches)	DIAMETER OF TUBE (Inches)		Wall Thickness (Inch)	AREA OF COPPER		Weight Per Foot Pounds	Resistance Per Foot Microhms †	Moment of Inertia I (Inches)	Section Modulus S (Inches)	Radius of Gyration r (Inches)	Elastic Limit Per Tube Pounds	Breaking Strength Per Tube Pounds
	Outside	Inside		Thousand Cir. Mils	Square Inches							
¼	0.540	0.375	0.0825	151.0	0.1186	0.458	70.10	0.003203	0.01186	0.1644	1897.	4743.
⅜	.675	.494	.0905	211.6	.1662	.642	50.02	.007267	.02153	.2091	2659.	6647.
½	.840	.625	.1075	315.0	.2474	.956	33.60	.01695	.04035	.2618	3958.	9895.
¾	1.050	.822	.1140	426.8	.3352	1.30	24.79	.03726	.07096	.3334	5364.	13410.
1	1.315	1.062	.1265	601.4	.4723	1.83	17.60	.08434	.1283	.4226	7557.	18890.
1¼	1.660	1.368	.1460	884.2	.6944	2.68	11.97	.2008	.2420	.5378	11110.	27780.
1½	1.900	1.600	.1500	1,050.0	.8247	3.19	10.08	.3180	.3347	.6210	13190.	32990.
2	2.375	2.062	.1565	1,389.0	1.091	4.21	7.620	.6744	.5679	.7863	17450.	43630.
2½	2.875	2.500	.1875	2,016.0	1.583	6.12	5.250	1.436	.9991	.9525	25330.	63320.
3	3.500	3.062	.2190	2,874.0	2.257	8.72	3.682	3.051	1.743	1.163	36120.	90290.
3½	4.000	3.500	.2500	3,750.0	2.945	11.38	2.822	5.200	2.600	1.329	47120.	117800.
4	4.500	4.000	.2500	4,250.0	3.338	12.90	2.490	7.563	3.361	1.505	53410.	133500.
4½	5.000	4.500	.2500	4,750.0	3.731	14.42	2.228	10.55	4.220	1.682	59690.	149200.
5	5.563	5.063	.2500	5,313.0	4.173	16.12	1.992	14.76	5.305	1.881	66770.	166900.

EXTRA HEAVY PIPE SIZES

Size of Tube (Inches)	DIAMETER OF TUBE (Inches)		Wall Thickness (Inch)	AREA OF COPPER		Weight Per Foot Pounds	Resistance Per Foot Microhms †	Moment of Inertia I (Inches)	Section Modulus S (Inches)	Radius of Gyration r (Inches)	Elastic Limit Per Tube Pounds	Breaking Strength Per Tube Pounds
	Outside	Inside		Thousand Cir. Mils	Square Inches							
¼	0.540	0.294	0.123	205.2	0.1611	0.623	51.58	0.003807	0.01410	0.1537	2578.	6445.
⅜	.675	.421	.127	278.4	.2186	.845	38.02	.008648	.02562	.1989	3498.	8746.
½	.840	.542	.149	411.8	.3235	1.25	25.70	.02020	.04810	.2499	5175.	12940.
¾	1.050	.736	.157	560.8	.4404	1.70	18.87	.04526	.08621	.3206	7047.	17620.
1	1.315	.951	.182	824.8	.6478	2.50	12.83	.1066	.1622	.4057	10370.	25910.
1¼	1.660	1.272	.194	1,138.0	.8935	3.45	9.303	.2442	.2943	.5228	14300.	35740.
1½	1.900	1.494	.203	1,378.0	1.082	4.18	7.680	.3952	.4160	.6043	17320.	43290.
2	2.375	1.933	.221	1,904.0	1.496	5.78	5.558	.8765	.7381	.7656	23930.	59820.
2½	2.875	2.315	.280	2,906.0	2.283	8.82	3.641	1.944	1.352	.9228	36520.	91310.
3	3.500	2.892	.304	3,886.0	3.052	11.79	2.723	3.932	2.247	1.135	48840.	122100.
3½	4.000	3.358	.321	4,724.0	3.710	14.34	2.240	6.325	3.162	1.306	59360.	148400.
4	4.500	3.818	.341	5,673.0	4.455	17.22	1.866	9.698	4.310	1.475	71290.	178200.
4½	5.000	4.250	.375	6,938.0	5.449	21.05	1.525	14.62	5.866	1.641	87180.	217900.
5	5.563	4.813	.375	7,782.0	6.112	23.62	1.360	20.67	7.431	1.839	97790.	244500.

Tube dimensions taken from A.S.T.M. Specification B-42-33:

Tabular values based on a density of 0.322 pound per cubic inch; conductivity of 98.0% I.A.C.S. at 20°C., or 68°F., elastic limit of 16,000 pounds per square inch; tensile strength for pipe of outside diameter up to 4" incl., 40,000 pounds per square inch; outside diameter over 4", 38,000 pounds per square inch. These are minimum values for Anaconda High-Conductivity, Hard-Drawn Copper Bus Tubes.

† 1 Microhm=0.000001 ohm.

Table 15

CURRENT RATINGS AND PHYSICAL PROPERTIES OF TYPE B COPPER TUBE

Nominal Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Area		Weight Lbs./Ft.	Moment of Inertia Inches^4	Section Modulus Inches^3	Radius of Gyration Inches	Breaking Strength Pounds	Yield Strength Pounds	Self* GMD Inches	R20 Microhms /Ft.	R'/R*	Capacity for ** 30°C Temp. Rise	
				Sq. In.	1000 CM.										D C Amps.	60 Cycles Amps.
¼	.540	.410	.065	.097	123.5	.376	.0028	.0103	.169	3,880	2,400	.249	85.2	1.00	205	205
⅜	.675	.545	.065	.125	158.6	.483	.0059	.0174	.217	4,980	3,100	.317	66.3	1.00	255	255
½	.840	.710	.065	.158	201.5	.613	.0120	.0285	.275	6,330	4,000	.399	52.2	1.00	310	310
¾	1.050	.920	.065	.201	256.0	.780	.0245	.0467	.349	8,050	5,000	.504	41.1	1.00	385	385
1	1.315	1.185	.065	.255	325.0	.989	.0500	.076	.442	10,200	6,400	.631	32.4	1.00	475	475
1¼	1.660	1.530	.065	.326	415.0	1.26	.104	.125	.564	13,000	8,100*	.809	25.4	1.00	570	570
1½	1.900	1.770	.065	.375	477.0	1.45	.158	.166	.650	15,000	9,400	.929	22.1	1.00	640	640
2	2.375	2.245	.065	.472	601.0	1.83	.315	.265	.817	18,900	11,800	1.166	17.5	1.00	760	760
2½	2.875	2.739	.068	.600	763.5	2.32	.591	.411	.993	24,000	15,000	1.415	13.8	1.00	920	920
3	3.500	3.334	.083	.891	1,134.0	3.45	1.30	.744	1.208	35,600	22,300	1.723	9.28	1.00	1,285	1,285
3½	4.000	3.810	.095	1.165	1,484.0	4.52	2.22	1.111	1.381	46,600	29,100	1.969	7.08	1.00	1,620	1,620
4	4.500	4.286	.107	1.477	1,888.0	5.72	3.56	1.584	1.554	59,100	36,900	2.215	5.60	1.00	1,920	1,920
5	5.563	5.299	.132	2.25	2,868.0	8.73	8.31	2.99	1.925	90,000	56,300	2.738	3.67	1.00	2,600	2,600
6	6.625	6.309	.158	3.21	4,087.0	12.44	16.79	5.07	2.287	128,000	80,000	3.260	2.57	1.00	3,360	3,360

The above values are indoor capacities. For outdoor capacities, refer to Page 71.

*See Page 71 for basis of calculations and for the relationship between the various terms.

**N.E.M.A. ratings are not available for these types of tubes.

(1) Practically equal to 1.00 for all tube sizes.

Chase Brass and Copper Company.

Table 16

CURRENT RATINGS AND PHYSICAL PROPERTIES OF TYPE K COPPER TUBE

Nominal Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Area		Weight Lbs./Ft.	Moment of Inertia Inches[4]	Section Modulus Inches[3]	Radius of Gyration Inches	Breaking Strength Pounds	Yield Strength Pounds	Self* GMD Inches	R_{20}* Microhms /Ft.	R'/R*	Capacity for ** 30°C Temp. Rise	
				Sq. In.	1000 CM.										D C Amps.	60 Cycles Amps.
3/8	.500	.402	.049	.0694	88.4	.269	.00179	.00714	.100	2,780	1,740	.2343	119.0	1.00	170	170
1/2	.625	.527	.049	.0887	112.9	.344	.00370	.01185	.204	3,550	2,220	.2966	93.1	1.00	210	210
5/8	.750	.652	.049	.108	137.4	.418	.00666	.01776	.248	4,300	2,700	.359	76.6	1.00	245	245
3/4	.875	.745	.065	.165	210.0	.641	.01365	.0312	.287	6,600	4,100	.416	49.9	1.00	325	325
1	1.125	.995	.065	.217	275.0	.839	.0305	.0543	.375	8,650	5,400	.541	38.2	1.00	410	410
1 1/4	1.375	1.245	.065	.268	340.0	1.04	.0575	.0837	.464	10,700	6,700	.666	30.8	1.00	475	475
1 1/2	1.625	1.481	.072	.351	447.0	1.36	.106	.1306	.550	14,100	8,800	.789	23.5	1.00	605	605
2	2.125	1.959	.083	.533	678.0	2.06	.278	.2616	.723	21,300	13,300	1.035	15.5	1.00	835	835
2 1/2	2.625	2.435	.095	.755	961.0	2.92	.605	.461	.895	30,200	18,900	1.281	11.0	1.00	1,080	1,080
3	3.125	2.907	.109	1.03	1,315.0	4.00	1.176	.752	1.067	41,300	25,800	1.527	8.0	1.00	1,370	1,370
3 1/2	3.625	3.385	.120	1.32	1,682.4	5.12	2.03	1.121	1.240	53,000	33,000	1.773	6.25	1.00	1,640	1,640
4	4.125	3.857	.134	1.68	2,139.0	6.51	3.35	1.624	1.412	67,000	42,000	2.018	4.92	1.00	1,965	1,965
5	5.125	4.805	.160	2.50	3,178.0	9.67	7.70	3.004	1.756	100,000	62,400	2.510	3.31	1.00	2,640	2,640
6	6.125	5.741	.192	3.58	4,557.0	13.87	15.76	5.147	2.10	143,000	89,500	2.999	2.31	1.003	3,420	3,420
8	8.125	7.583	.271	6.69	8,514.0	25.90	51.62	12.71	2.79	267,000	167,000	3.973	1.24	1.02	5,300	5,250
10	10.125	9.449	.338	10.4	13,232.0	40.26	124.6	24.61	3.46	416,000	260,000	4.951	.795	1.053	7,280	7,100
12	12.125	11.315	.405	14.9	18,986.0	57.76	256.3	42.28	4.15	596,000	373,000	5.929	.554	1.14	9,500	8,900

The above values are indoor capacities. For outdoor capacities, refer to Page 71.

*See Page 71 for basis of calculations and for the relationship between the various terms.

**N.E.M.A. ratings are not available for these types of tubes.

Chase Brass and Copper Company.

Table 17

CURRENT RATINGS AND PHYSICAL PROPERTIES OF TYPE L COPPER TUBE

Nominal Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Area		Weight Lbs./Ft.	Moment of Inertia Inches⁴	Section Modulus Inches³	Radius of Gyration Inches	Breaking Strength Pounds	Yield Strength Pounds	Self* GMD Inches	R_{20}* Microhms /Ft.	R'/R* (1)	Capacity for ** 30°C Temp. Rise	
				Sq. In.	1000 CM.										D C Amps.	60 Cycles Amps.
⅜	.500	.430	.035	.051	65.1	.198	.0014	.0056	.165	2,050	1,280	.2386	161.7	1.00	145	145
½	.625	.545	.040	.074	93.6	.285	.0032	.0101	.207	2,940	1,840	.2995	112.3	1.00	190	190
⅝	.750	.666	.042	.093	118.9	.362	.0059	.0157	.251	3,740	2,340	.361	88.4	1.00	230	230
¾	.875	.785	.045	.117	149.4	.455	.0101	.0232	.294	4,690	2,930	.423	70.4	1.00	270	270
1	1.125	1.025	.050	.169	215.0	.655	.0244	.0435	.381	6,750	4,220	.546	48.9	1.00	360	360
1¼	1.375	1.265	.055	.228	290.4	.884	.0498	.0724	.467	9,100	5,700	.669	36.2	1.00	455	455
1½	1.625	1.505	.060	.295	375.6	1.14	.0904	.1113	.554	11,800	7,400	.793	28.1	1.00	555	555
2	2.125	1.985	.070	.452	575.4	1.75	.2388	.225	.727	18,100	11,300	1.039	18.3	1.00	770	770
2½	2.625	2.465	.080	.640	814.4	2.48	.5183	.395	.900	25,600	16,000	1.286	12.9	1.00	1,000	1,000
3	3.125	2.945	.090	.858	1,093.0	3.33	.9889	.633	1.073	34,300	21,500	1.533	9.62	1.00	1,250	1,250
3½	3.625	3.425	.100	1.11	1,410.0	4.29	1.721	.950	1.247	44,300	27,700	1.779	7.46	1.00	1,510	1,510
4	4.125	3.905	.110	1.39	1,767.0	5.38	2.798	1.36	1.42	55,500	34,700	2.026	5.95	1.00	1,780	1,780
5	5.125	4.875	.125	1.96	2,500.0	7.61	6.140	2.40	1.77	78,500	49,100	2.521	4.21	1.00	2,340	2,340
6	6.125	5.845	.140	2.63	3,352.0	10.20	11.79	3.85	2.12	105,000	65,800	3.016	3.14	1.00	2,940	2,940
8	8.125	7.725	.200	4.98	6,340.0	19.29	39.12	9.63	2.80	199,000	124,500	3.996	1.66	1.00	4,820	4,820
10	10.125	9.625	.250	7.76	9,875.0	30.04	94.60	18.69	3.49	310,000	194,000	4.980	1.07	1.00	6,670	6,670
12	12.125	11.565	.280	10.42	13,266.0	40.36	182.8	30.16	4.19	417,000	260,000	5.970	.79	1.00	7,930	7,930

The above values are indoor capacities. For outdoor capacities, refer to Page 71.

*See Page 71 for basis of calculations and for the relationship between the various terms.

**N.E.M.A. ratings are not available for these types of tubes.

(1) Practically equal to 1.00 for all tube sizes.

Chase Brass and Copper Company.

Table 18

CURRENT RATINGS AND PHYSICAL PROPERTIES OF TYPE M COPPER TUBE

Nominal Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Area		Weight Lbs./Ft.	Moment of Inertia Inches⁴	Section Modulus Inches³	Radius of Gyration Inches	Breaking Strength Pounds	Yield Strength Pounds	Self GMD Inches	R_{20}* Microhms /Ft.	R'/R* (1)	Capacity for ** 30°C Temp. Rise	
				Sq. In.	1000 CM.										D C Amps.	60 Cycles Amps.
2½	2.625	2.495	.065	.523	666.0	2.03	.428	.3265	.905	20,900	13,100	1.291	15.8	1.00	905	905
3	3.125	2.981	.072	.691	879.0	2.68	.805	.5152	1.080	27,600	17,300	1.539	11.9	1.00	1,120	1,120
3½	3.625	3.459	.083	.924	1,176.0	3.58	1.45	.7995	1.253	36,900	23,100	1.785	8.94	1.00	1,380	1,380
4	4.125	3.935	.095	1.20	1,531.0	4.66	2.44	1.1845	1.425	48,100	30,000	2.031	6.87	1.00	1,690	1,690
5	5.125	4.907	.109	1.72	2,187.0	6.66	5.41	2.109	1.774	68,700	43,000	2.526	4.81	1.00	2,190	2,190
6	6.125	5.881	.122	2.30	2,930.0	8.91	10.37	3.385	2.123	92,000	57,500	3.022	3.59	1.00	2,740	2,740
8	8.125	7.785	.170	4.25	5,410.0	16.46	33.62	8.276	2.813	170,000	106,000	4.006	1.95	1.00	4,220	4,220

The above values are indoor capacities. For outdoor capacities, refer to Page 71.

*See Page 71 for basis of calculations and for the relationship between the various terms.

**N.E.M.A. ratings are not available for these types of tubes.

(1) Practically equal to 1.00 for all tube sizes.

Chase Brass and Copper Company.

Table 19

VERTICAL DEFLECTION OF COPPER TUBULAR CONDUCTORS IN INCHES

Nominal Size	Type	TUBE WEIGHT ONLY SIMPLE BEAM SUPPORT — SPAN IN FEET 10	15	20	COATED W. ICE ½" THICK SIMPLE BEAM SUPPORT — SPAN IN FEET 10	15	20
½"	IPS	.793	4.01	....	1.49	7.544	.....
	Ex. H. IPS	.87	4.43	....	1.45	7.341	.....
¾"	IPS	.491	2.48	....	.855	4.329	.....
	Ex. H. IPS	.53	2.66	....	.831	4.207	.....
1"	IPS	.305	1.56	4.84	.493	2.496	7.888
	Ex. H. IPS	.33	1.68	5.29	.480	2.428	7.680
1¼"	IPS	.188	.95	3.01	.282	1.428	4.512
	Ex. H. IPS	.199	1.01	3.19	.277	1.402	4.432
1½"	IPS	.142	.71	2.25	.208	1.053	3.328
	Ex. H. IPS	.149	.76	2.38	.202	1.023	3.232
2"	IPS	.088	.45	1.41	.126	.638	2.016
	Ex. H. IPS	.093	.47	1.49	.122	.617	1.952
2½"	IPS	.060	.30	.96	.081	.408	1.291
	Ex. H. IPS	.064	.32	1.02	.079	.400	1.265
3"	IPS	.040	.20	.64	.052	.262	.829
	Ex. H. IPS	.042	.22	.68	.051	.259	.820
3½"	IPS	.031	.15	.49	.038	.194	.614
	Ex. H. IPS	.032	.16	.51	.038	.193	.611
4"	IPS	.024	.12	.38	.030	.151	.478
	Ex. H. IPS	.025	.13	.40	.029	.149	.472

Above Deflections Calculated by Beam Formula $D = \frac{5WL^4}{384EI}$

D=Deflection in Inches.
W=Weight in Lbs. Per Inch.
L=Span in Inches.

The deflections tabulated above are for buses simply supported. The deflections for fixed buses are 1/5 the values given.

The deflection varies as the 4th power of the span length. In order to obtain the deflection for any span not shown in the tabulation, multiply the table value for the 10 foot span by 10^{-4} times the 4th power of the new span length in feet.

E=Mod. Elastic $=16\times10^6$ For Cu.

I=Moment of Inertia $=\frac{\pi}{64}(d_1^4-d_2^4)$

d_1=OD of Tube
d_2=ID of Tube

$D_1 = D(l^4\times10^{-4})$

D_1=Deflection in new Span in Inches.
D=Deflection in 10 Ft. Span in Inches.
l=New Span Length in Feet.

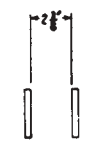
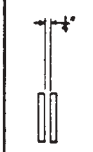
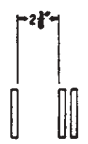
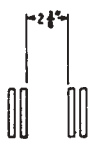
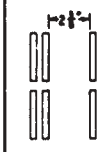
DEFLECTION FACTORS

Factors $l^4 \times 10^{-4}$ For Spans From 5 Ft. to 31 Ft.

Span Feet	Factor l^4X10^{-4}	Span Feet	Factor l^4X10^{-4}	Span Feet	Factor l^4X10^{-4}
5	0.0625	14	3.842	24	33.18
6	0.1296	16	6.554	25	39.06
7	0.2401	17	8.352	26	45.70
8	0.4096	18	10.50	27	53.14
9	0.6561	19	13.03	28	61.47
11	1.464	21	19.45	29	70.73
12	2.074	22	23.43	30	81.00
13	2.856	23	27.98	31	92.35

Table 20

CURRENT CARRYING CAPACITY OF RECTANGULAR COPPER BARS, 60 CYCLES (AMPERES)*

SIZE											
	A	B	C	D	E	F	G	H	J	K	L
⅛" x 1"	247	450	390	494	568	632	672	469	790	931	1,075
⅛" x 2"	447	813	705	894	1,028	1,144	1,215	849	1,430	1,685	1,944
⅛" x 3"	696	1,267	1,100	1,392	1,600	1,782	1,893	1,322	2,227	2,624	3,028
⅛" x 4"	900	1,638	1,420	1,800	2,070	2,304	2,448	1,710	2,880	3,393	3,915
¼" x 1"	366	666	578	732	842	937	995	695	1,171	1,380	1,592
¼" x 1¼"	443	806	700	886	1,019	1,134	1,205	842	1,418	1,670	1,927
¼" x 2"	647	1,178	1,020	1,294	1,488	1,656	1,760	1,229	2,070	2,440	2,814
¼" x 3"	973	1,770	1,540	1,946	2,238	2,490	2,647	1,849	3,114	3,668	4,232
¼" x 4"	1,220	2,220	1,925	2,440	2,800	3,123	3,318	2,318	3,904	4,600	5,307
¼" x 5"	1,460	2,657	2,300	2,920	3,358	3,738	3,971	2,774	4,672	5,504	6,350
¼" x 6"	1,660	3,020	2,620	3,320	3,818	4,250	4,515	3,154	5,312	6,258	7,220
¼" x 8"	2,020	3,676	3,190	4,040	4,646	5,171	5,494	3,838	6,464	7,615	8,787
⅜" x 1"	502	914	792	1,004	1,155	1,285	1,365	954	1,606	1,892	2,184
⅜" x 2"	865	1,574	1,365	1,730	1,990	2,214	2,353	1,643	2,768	3,260	3,763
⅜" x 3"	1,180	2,148	1,860	2,360	2,714	3,020	3,210	2,242	3,776	4,449	5,133
⅜" x 4"	1,440	2,620	2,280	2,880	3,312	3,686	3,917	2,736	4,608	5,429	6,264
⅜" x 5"	1,685	3,067	2,660	3,370	3,875	4,314	4,583	3,201	5,392	6,352	7,330
⅜" x 6"	1,960	3,576	3,100	3,920	4,508	5,018	5,331	3,724	6,272	7,389	8,525
⅜" x 8"	2,420	4,404	3,820	4,840	5,566	6,195	6,582	4,598	7,744	9,123	10,527
½" x 1"	603	1,097	953	1,206	1,387	1,544	1,640	1,146	1,930	2,273	2,623
½" x 2"	990	1,802	1,560	1,980	2,277	2,534	2,693	1,881	3,168	3,732	4,306
½" x 3"	1,325	2,411	2,090	2,650	3,047	3,392	3,604	2,517	4,240	4,995	5,764
½" x 4"	1,630	2,967	2,570	3,260	3,750	4,173	4,434	3,097	5,216	6,145	7,090
½" x 5"	1,935	3,522	3,050	3,870	4,450	4,954	5,263	3,676	6,192	7,295	8,417
½" x 6"	2,220	4,040	3,500	4,440	5,106	5,683	6,038	4,218	7,104	8,370	9,647
½" x 8"	2,760	5,023	4,350	5,220	6,348	7,065	7,507	5,244	8,832	10,405	12,005

*Capacity based on 40°C. Ambient—30°C. Rise and 98% conductivity.
Spacing between bars is ¼" unless otherwise indicated.
For other basis of table, refer to Page 71.
Table used by permission of Chase Brass and Copper Company.

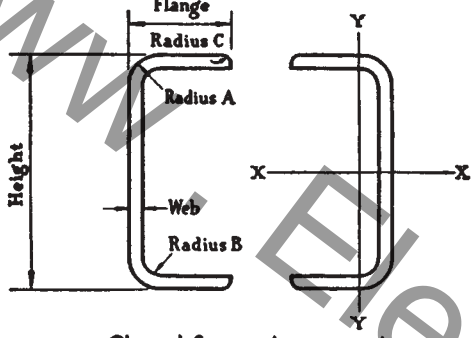
Table 21

PHYSICAL AND ELECTRICAL PROPERTIES OF RECTANGULAR COPPER BARS†

Thickness in.	Width in.	Area		Lbs. per Ft.	Bars on Edge–Flat Side Vertical						Tensile Strength Lbs.	Yield Stgh. Lbs.	D.C. Resistance Microhms /Ft.	Self GMD in.
					Horizontal Axis			Vertical Axis						
		Sq. in.	Circ. Mils		Moment of Inertia $in.^4$	Section Modulus $in.^3$	Radius of Gyration in.	Moment of Inertia $in.^4$	Section Modulus $in.^3$	Radius of Gyration in.				
1/16	1/2	.031	39,800	.121	.00065	.00260	.144	.000010	.000325	.018	1,250	775	264.38	.1258
	3/4	.047	59,700	.182	.00220	.00586	.217	.000015	.000488	.018	1,880	1,175	176.21	.1817
	1	.062	79,600	.242	.00521	.01042	.289	.000020	.000651	.018	2,500	1,550	132.14	.2374
	1 1/2	.094	119,400	.363	.01758	.02344	.433	.000030	.000976	.018	3,750	2,350	88.20	.349
	2	.125	159,200	.485	.04166	.04166	.577	.000041	.00130	.018	5,000	3,125	66.01	.460
	3	.187	238,700	.73	.1406	.09374	.866	.000061	.00195	.018	7,500	4,675	44.04	.683
1/8	1/2	.062	79,600	.242	.00130	.00508	.144	.000081	.00130	.036	2,500	1,550	132.14	.1398
	3/4	.094	119,400	.363	.00439	.01172	.217	.000122	.00195	.036	3,750	2,350	88.20	.1957
	1	.125	159,200	.485	.0104	.02083	.289	.000163	.00260	.036	5,000	3,125	66.01	.2516
	1 1/2	.187	238,700	.73	.0351	.04687	.433	.000244	.00391	.036	7,480	4,675	44.04	.363
	2	.250	318,300	.97	.0832	.08333	.577	.000325	.00521	.036	10,000	6,250	33.04	.475
	2 1/2	.312	397,900	1.21	.1625	.1302	.722	.000407	.00651	.036	12,500	7,800	26.44	.587
	3	.375	477,500	1.45	.2808	.1875	.866	.000488	.00781	.036	15,000	9,375	22.02	.698
	4	.500	636,600	1.94	.6656	.3333	1.155	.000651	.01042	.036	20,000	12,500	16.52	.921
1/4	1/2	.125	159,200	.485	.00260	.01042	.144	.000651	.00521	.072	5,000	3,125	66.01	.1677
	3/4	.187	238,700	.73	.00877	.02344	.217	.000976	.00781	.072	7,500	4,675	44.04	.2236
	1	.250	318,300	.97	.0208	.04167	.289	.001302	.01042	.072	10,000	6,250	33.04	.2797
	1 1/2	.375	477,500	1.45	.0702	.09375	.433	.001953	.01562	.072	15,000	9,375	22.02	.391
	2	.500	636,600	1.94	.1664	.1666	.577	.002604	.02083	.072	20,000	12,500	16.52	.503
	2 1/2	.625	795,800	2.42	.3250	.2604	.722	.003255	.02604	.072	25,000	15,625	13.21	.615
	3	.750	955,000	2.91	.5616	.3750	.866	.003906	.03125	.072	30,000	18,750	11.01	.727
	3 1/2	.875	1,114,000	3.40	.8918	.5104	1.010	.004557	.03645	.072	35,000	21,875	9.43	.838
	4	1.000	1,273,000	3.88	1.331	.6666	1.155	.005208	.04166	.072	40,000	25,000	8.25	.950
	5	1.250	1,592,000	4.85	2.600	1.042	1.443	.00651	.05208	.072	50,000	31,250	6.60	1.173
	6	1.500	1,910,000	5.81	4.493	1.500	1.732	.00781	.0625	.072	60,000	37,500	5.51	1.396
	8	2.000	2,546,000	7.76	10.65	2.667	2.309	.01041	.0833	.072	80,000	50,000	4.13	1.842
3/8	1/2	.187	238,700	.73	.00396	.01562	.144	.002197	.01172	.108	7,500	4,675	44.04	.1956
	3/4	.281	358,100	1.09	.01318	.03516	.217	.003296	.01758	.108	11,250	7,025	29.37	.2515
	1	.375	477,500	1.45	.03125	.0625	.289	.004394	.02344	.108	15,000	9,375	22.02	.308
	1 1/2	.562	716,200	2.18	.1055	.1406	.433	.006592	.03515	.108	22,500	14,050	14.69	.419
	2	.750	955,000	2.91	.2500	.2500	.577	.008789	.04687	.108	30,000	18,750	11.01	.531
	2 1/2	.937	1,194,000	3.63	.4883	.3906	.722	.01099	.05859	.108	37,500	23,425	8.82	.643
	3	1.125	1,432,000	4.36	.8437	.5625	.866	.01318	.07031	.108	45,000	28,125	7.34	.755
	3 1/2	1.312	1,671,000	5.09	1.340	.7656	1.010	.01538	.08203	.108	52,500	32,800	6.29	.867
	4	1.500	1,910,000	5.91	2.00	1.00	1.155	.01758	.09375	.108	60,000	37,500	5.41	.978
	6	2.250	2,865,000	8.72	6.75	2.25	1.732	.02637	.1406	.108	90,000	56,250	3.67	1.425
1/2	3/4	.375	477,500	1.45	.01758	.04687	.217	.00781	.03125	.144	15,000	9,375	22.02	.2794
	1	.50	636,600	1.94	.04167	.08333	.289	.01042	.04167	.144	20,000	12,500	16.52	.335
	1 1/2	.75	955,000	2.91	.1406	.1875	.433	.01562	.0625	.144	30,000	16,750	11.01	.447
	2	1.00	1,273,000	3.88	.3333	.3333	.577	.02083	.0833	.144	40,000	25,000	8.25	.559
	3	1.50	1,910,000	5.81	1.125	.750	.866	.03125	.125	.144	60,000	37,500	5.51	.783
	4	2.00	2,546,000	7.76	2.667	1.333	1.155	.04166	.167	.144	80,000	50,000	4.13	1.006
	6	3.00	3,820,000	11.63	9.000	3.00	1.732	.0625	.25	.144	120,000	75,000	2.75	1.453

*See basis of calculations, page 71.

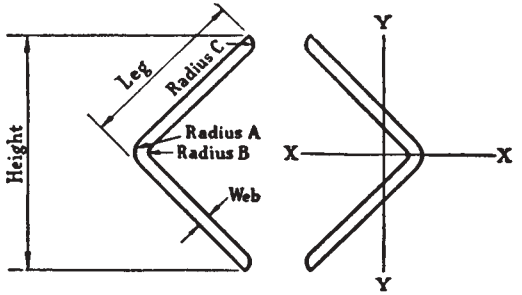
†Chase Brass and Copper Company, for Chase Electrical Copper.



Channel Square Arrangement

Table 22

HIGH CONDUCTIVITY COPPER BUS CHANNELS AND ANGLES HARD DRAWN OR ROLLED



Angle Square Arrangement

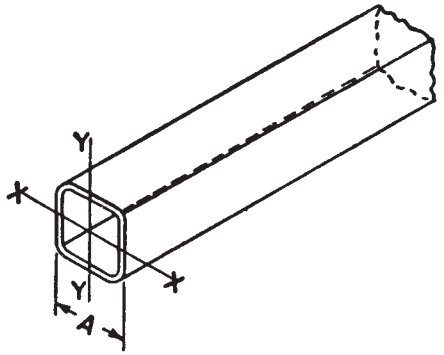
Section No.	Height Inches	Flange or Leg Width Inches	Web Thickness Inch	Corner Radii—In. A	Corner Radii—In. B	Corner Radii—In. C	Area Square Inches	Weight Per Foot Pounds	With Respect to X-X Axis: Moment of Inertia I, Inches⁴	With Respect to X-X Axis: Section Modulus S, Inches³	With Respect to X-X Axis: Radius of Gyration r, Inches	With Respect to Y-Y Axis: Moment of Inertia I, Inches⁴	With Respect to Y-Y Axis: Section Modulus S, Inches³	With Respect to Y-Y Axis: Radius of Gyration r, Inches	Channel Square Bus: Resistance Per Foot *Microhms	Channel Square Bus: Amperes Capacity For 30°C. Rise
SINGLE BUS CHANNEL																
1-A	3	1 5/16	0.165	0.409	0.244	0.0625	0.8258	3.191	1.028	0.6856	1.116	0.1281	0.1380	0.3939	5.033	2,200
2-A	3	1 5/16	.216	.409	.193	.0625	1.064	4.112	1.284	.8558	1.098	.1598	.1754	.3875	3.905	2,500
3-A	3	1 5/16	.284	.409	.125	.0625	1.369	5.291	1.583	1.055	1.075	.1972	.2220	.3795	3.035	2,800
4-A	4	1 3/4	.200	.463	.263	.0625	1.356	5.240	3.059	1.529	1.502	.3788	.3033	.5285	3.065	3,200
5-A	4	1 3/4	.240	.463	.223	.0625	1.612	6.231	3.569	1.785	1.488	.4414	.3574	.5232	2.577	3,500
6-A	4	1 3/4	.338	.463	.125	.0625	2.220	8.576	4.691	2.346	1.454	.5795	.4819	.5110	1.872	4,000
7-A	5	2 3/16	.260	.464	.204	.0625	2.226	8.602	7.888	3.155	1.882	.9675	.6186	.6593	1.867	4,500
8-AT	5	2 3/16	.339	.464	.125	.0625	2.861	11.05	9.839	3.936	1.854	1.204	.7832	.6488	1.453	5,000
9-T	6	2 11/16	.276	.615	.339	.0625	2.872	11.10	14.88	4.960	2.276	1.927	1.001	.8190	1.447	5,600
10-T	6	2 11/16	.384	.615	.231	.0625	3.932	15.19	19.69	6.562	2.238	2.544	1.347	.8043	1.057	6,300
11-T	6	2 11/16	.490	.615	.125	.0625	4.936	19.07	23.90	7.968	2.201	3.086	1.665	.7908	.8419	6,800
12-T	7	3 1/16	.375	.695	.320	.0625	4.569	17.66	31.96	9.130	2.645	4.271	1.889	.9668	.9095	7,300
13-T	7	3 3/16	.325	.645	.320	.0625	3.999	15.45	28.42	8.120	2.666	3.790	1.661	.9735	1.039	7,000
14-T	8	3 11/16	.470	.595	.125	.0625	6.638	25.65	60.76	15.19	3.026	8.233	3.154	1.114	0.6261	8,900
15-T	9	4 1/8	.500	.625	.125	.0625	7.962	30.77	92.81	20.62	3.414	12.41	4.229	1.248	.5219	10,000
SINGLE BUS ANGLE															**ANGLE SQ. BUS**	
16-A	3.536	2½x2½	0.1875	0.25	0.125	0.1875	0.8772	3.389	0.8317	0.4705	0.9737	0.2004	0.2291	0.4780	4.738	2,750
17-A	4.243	3x3	.25	.25	.125	.25	1.401	5.412	1.882	.8874	1.159	.4614	.4285	.5740	2.967	3,650
18-A	4.950	3½x3½	.25	.375	.1875	.25	1.638	6.329	3.066	1.239	1.368	.7326	.6045	.6688	2.537	4,200
19-A	5.657	4x4	.3125	.5	.25	.25	2.335	9.024	5.817	2.057	1.578	1.283	0.9287	0.7411	1.780	5,300
20-A	5.657	4x4	.25	.375	.1875	.25	1.888	7.295	4.665	1.649	1.572	1.122	.8078	.7708	2.201	4,800
21-A	6.364	4½x4½	.25	.375	.1875	.25	2.138	8.261	6.741	2.119	1.776	1.629	1.041	.8729	1.944	5,400
22-A	6.364	4½x4½	.3125	.5	.25	.25	2.648	10.23	8.312	2.612	1.772	1.979	1.270	.8645	1.570	6,000
23-T	7.071	5x5	.3125	.5	.25	.25	2.960	11.44	11.55	3.268	1.976	2.766	1.595	.9666	1.404	6,750

NOTES: Tubular values based on: Density of 0.322 pound per cubic inch,
Conductivity of 98.0% I.A.C.S. at 20°C. or 68°F.
98.0% is minimum value for High Conductivity Hard-Drawn or Rolled Copper Bus Channels and Angles.
Minimum tensile strength, hard-drawn or rolled=32,000 pounds per sq. in.

*1 microhm=0.000 001 ohm. Direct current resistance at 20°C.
Amperes capacity for 60 cycles, 40°C. ambient, bus not enclosed. D.C. capacity about 20-25% greater.
Maximum deviation in outside dimension less than 1%; in thickness, .03 inch.

Table 23

CURRENT RATINGS AND PHYSICAL PROPERTIES OF UNVENTILATED SQUARE COPPER TUBE*



Square Side A, Inches	Wall Thickness T, Inches	Outside Corner Radius R, Inches	Perimeter Inches	Cross Section		Weight Lbs./Ft.	On X-X Axis and Y-Y Axis			Self* GMD Inches	* R_{20} Microhms/Ft.	* R'/R	* R'_{70} Microhms/Ft.	Capacity at 100% Load Factor			
														DC	60 Cycles		
															Temperature Rise		
				Sq. In.	1000 Cm.		Moment of Inertia Inches⁴	Section Modulus Inches³	Radius of Gyration Inches					30°C amps.	30°C amps.	40°C amps.	50°C amps.
1	1/8	1/4	3.57	.397	505	1.54	.048	.024	.348	.529	20.79	1.000	24.79	545	545	640	720
1	3/16	1/4	3.57	.559	712	2.17	.061	.030	.330	.514	14.75	1.008	17.73	645	640	750	850
1	1/4	1/4	3.57	.696	886	2.70	.068	.034	.313	.500	11.86	1.020	14.42	720	710	835	945
1 1/2	1/8	3/8	5.36	.620	789	2.40	.188	.251	.551	.809	13.34	1.004	15.97	800	800	935	1,060
1 1/2	3/16	3/8	5.36	.894	1,138	3.46	.252	.336	.531	.794	9.25	1.014	11.18	960	955	1,120	1,270
1 1/2	1/4	3/8	5.36	1.143	1,455	4.43	.302	.403	.514	.779	7.23	1.034	8.91	1,090	1,070	1,250	1,420
1 1/2	5/16	1/2	5.14	1.30	1,655	5.04	.306	.408	.485	.751	6.35	1.060	8.02	1,160	1,130	1,320	1,490
1 1/2	3/8	1/2	5.14	1.49	1,892	5.76	.328	.437	.470	.738	5.56	1.103	7.31	1,240	1,180	1,380	1,560
2	1/8	3/8	7.36	.87	1,108	3.37	.498	.498	.756	1.103	9.50	1.008	11.42	1,080	1,080	1,260	1,430
2	3/16	3/8	7.36	1.27	1,616	4.92	.688	.688	.736	1.087	6.51	1.020	7.92	1,310	1,300	1,520	1,720
2	1/4	3/8	7.36	1.64	2,092	6.37	.846	.846	.717	1.071	5.03	1.048	6.29	1,490	1,450	1,700	1,930
2	5/16	1/2	7.14	1.93	2,451	7.46	.92	.92	.691	1.043	4.29	1.08	5.53	1,610	1,550	1,820	2,060
2	3/8	1/2	7.14	2.24	2,847	8.67	1.02	1.02	.674	1.028	3.69	1.13	4.97	1,740	1,640	1,920	2,170
2 1/2	1/8	3/8	9.36	1.12	1,426	4.34	1.03	.83	.961	1.397	7.42	1.01	8.94	1,360	1,350	1,590	1,790
2 1/2	3/16	3/8	9.36	1.64	2,091	6.36	1.43	1.14	.932	1.380	5.06	1.03	6.21	1,650	1,620	1,900	2,160
2 1/2	1/4	3/8	9.36	2.14	2,729	8.31	1.82	1.46	.922	1.363	3.88	1.056	4.89	1,880	1,830	2,140	2,430
2 1/2	5/16	1/2	9.14	2.55	3,247	9.88	2.11	1.69	.909	1.336	3.26	1.10	4.28	2,050	1,950	2,290	2,600
2 1/2	3/8	1/2	9.14	2.99	3,802	11.57	2.30	1.84	.878	1.320	2.78	1.16	3.85	2,220	2,060	2,420	2,740
2 1/2	1/2	3/4	8.71	3.57	4,547	13.84	2.42	1.94	.823	1.265	2.33	1.305	3.64	2,420	2,120	2,490	2,820
3	1/8	3/8	11.36	1.37	1,744	5.31	1.86	1.24	1.17	1.690	6.07	1.015	7.35	1,640	1,620	1,900	2,160
3	3/16	3/8	11.36	2.02	2,568	7.82	2.61	1.74	1.14	1.672	4.12	1.037	5.09	1,990	1,950	2,280	2,600
3	1/4	3/8	11.36	2.64	3,365	10.24	3.35	2.23	1.13	1.655	3.14	1.07	4.00	2,270	2,200	2,580	2,920
3	5/16	1/2	11.14	3.18	4,043	12.31	3.92	2.61	1.11	1.628	2.62	1.11	3.46	2,500	2,360	2,760	3,140
3	3/8	1/2	11.14	3.74	4,757	14.48	4.37	2.91	1.08	1.612	2.22	1.185	3.14	2,700	2,480	2,920	3,300
3	1/2	3/4	10.71	4.57	5,820	17.72	4.83	3.22	1.03	1.557	1.82	1.353	2.94	3,000	2,560	3,010	3,410
4	1/8	1/2	15.14	1.84	2,348	7.15	4.54	2.27	1.57	2.265	4.51	1.025	5.51	2,150	2,120	2,500	2,820
4	3/16	1/2	15.14	2.73	3,473	10.57	6.54	3.27	1.55	2.247	3.05	1.051	3.82	2,620	2,550	2,990	3,380
4	1/4	1/2	15.14	3.59	4,570	13.91	8.37	4.19	1.53	2.230	2.32	1.09	3.02	3,000	2,870	3,360	3,800
4	5/16	1/2	15.14	4.43	5,634	17.15	10.05	5.03	1.51	2.213	1.88	1.15	2.58	3,320	3,100	3,640	4,100
4	3/8	1/2	15.14	5.24	6,667	20.29	11.6	5.80	1.49	2.195	1.59	1.22	2.32	3,620	3,270	3,840	4,350
4	1/2	3/4	14.7	6.57	8,366	25.47	13.6	6.78	1.44	2.142	1.26	1.445	2.17	4,070	3,380	3,970	4,490

Continued on Page 25.

Table 23–(Continued)

CURRENT RATINGS AND PHYSICAL PROPERTIES OF UNVENTILATED SQUARE COPPER TUBE*

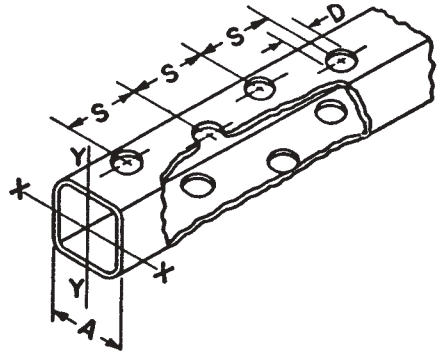
Square Side A, Inches	Wall Thickness T, Inches	Outside Corner Radius R, Inches	Perimeter Inches	Cross Section		Weight Lbs./Ft.	On X-X Axis and Y-Y Axis			Self* GMD Inches	* R_{20} Microhms/Ft.	* R'/R	* R'_{70} Microhms/Ft.	Capacity at 100% Load Factor			
														DC	60 Cycles		
															Temperature Rise		
				Sq. In.	1000 Cm.		Moment of Inertia Inches⁴	Section Modulus Inches³	Radius of Gyration Inches					30°C amps.	30°C amps.	40°C amps.	50°C amps.
5	1/8	3/4	18.7	2.29	2,916	8.88	8.84	3.54	1.96	2.828	3.63	1.035	4.48	2,620	2,580	3,020	3,420
5	3/16	3/4	18.7	3.40	4,326	13.17	12.8	5.14	1.94	2.811	2.45	1.065	3.11	3,200	3,150	3,620	4,100
5	1/4	3/4	18.7	4.48	5,707	17.37	16.6	6.63	1.92	2.794	1.85	1.105	2.44	3,670	3,500	4,100	4,620
5	5/16	3/4	18.7	5.54	7,055	21.48	20.1	8.02	1.90	2.777	1.50	1.165	2.08	4,080	3,790	4,430	5,010
5	3/8	3/4	18.7	6.58	8,372	25.48	23.3	9.33	1.88	2.760	1.264	1.242	1.87	4,450	4,000	4,660	5,290
5	1/2	3/4	18.7	8.57	10,913	33.22	29.1	11.65	1.84	2.726	.970	1.48	1.71	5,075	4,180	4,870	5,540
6	1/8	3/4	22.7	2.79	3,552	10.81	15.7	5.24	2.37	3.42	2.979	1.043	3.70	3,150	3,080	3,620	4,100
6	3/16	3/4	22.7	4.15	5,281	16.08	23.0	7.65	2.35	3.40	2.004	1.08	2.58	3,840	3,700	4,320	4,900
6	1/4	3/4	22.7	5.48	6,980	21.25	29.8	9.93	2.33	3.38	1.516	1.13	2.04	4,410	4,150	4,860	5,510
6	5/16	3/4	22.7	6.79	8,647	26.32	36.3	12.09	2.31	3.36	1.224	1.19	1.74	4,910	4,500	5,290	5,975
6	3/8	3/4	22.7	8.08	10,281	31.30	42.4	14.13	2.29	3.35	1.029	1.27	1.56	5,370	4,750	5,575	6,300
6	1/2	3/4	22.7	10.57	13,459	40.97	53.6	17.86	2.25	3.31	.786	1.51	1.415	6,140	5,000	5,850	6,620
7	3/16	3/4	26.7	4.90	6,236	18.98	37.3	10.67	2.76	3.98	1.697	1.097	2.196	4,510	4,310	5,050	5,710
7	1/4	3/4	26.7	6.48	8,253	25.12	48.7	13.90	2.74	3.97	1.282	1.15	1.758	5,160	4,810	5,640	6,390
7	5/16	3/4	26.7	8.04	10,238	31.17	59.5	16.99	2.72	3.95	1.034	1.212	1.494	5,750	5,220	6,110	6,940
7	3/8	3/4	26.7	9.58	12,191	37.11	69.8	19.94	2.70	3.93	.868	1.30	1.345	6,280	5,500	6,450	7,300
7	1/2	3/4	26.7	12.57	16,006	48.73	88.9	25.40	2.66	3.89	.661	1.545	1.217	7,200	5,800	6,770	7,690
8	3/16	3/4	30.7	5.65	7,191	21.89	56.7	14.19	3.17	4.57	1.472	1.11	1.94	5,150	4,880	5,710	6,450
8	1/4	3/4	30.7	7.48	9,526	29.00	74.2	18.54	3.15	4.55	1.111	1.165	1.544	5,920	5,500	6,420	7,250
8	5/16	3/4	30.7	9.29	11,830	36.01	90.9	22.73	3.13	4.53	.895	1.23	1.312	6,600	5,950	6,960	7,860
8	3/8	3/4	30.7	11.08	14,101	42.93	107.0	26.74	3.11	4.51	.750	1.32	1.180	7,200	6,270	7,350	8,300
8	1/2	3/4	30.7	14.57	18,552	56.46	137.1	34.27	3.07	4.48	.567	1.575	1.065	8,280	6,600	7,740	8,740
9	3/16	1	34.3	6.32	8,044	24.48	80.4	17.86	3.57	5.13	1.308	1.122	1.750	5,740	5,410	6,350	7,160
9	1/4	1	34.3	8.37	10,662	32.45	105.2	23.39	3.55	5.12	.987	1.18	1.389	6,600	6,080	7,110	8,030
9	5/16	1	34.3	10.41	13,250	40.33	129.3	28.73	3.52	5.10	.794	1.25	1.184	7,360	6,580	7,710	8,700
9	3/8	1	34.3	12.41	15,806	48.10	152.4	33.87	3.50	5.08	.666	1.34	1.064	8,040	6,950	8,140	9,190
9	1/2	1	34.3	16.36	20,825	63.38	196.2	43.59	3.46	5.04	.505	1.58	.951	9,240	7,350	8,600	9,700
10	3/16	1	38.3	7.07	8,999	27.39	111.7	22.33	3.97	5.72	1.169	1.13	1.575	6,380	6,000	7,050	7,950
10	1/4	1	38.3	9.37	11,935	36.32	146.5	29.31	3.95	5.70	.881	1.195	1.256	7,350	6,710	7,900	8,900
10	5/16	1	38.3	11.66	14,842	45.17	180.3	36.06	3.93	5.68	.709	1.265	1.069	8,200	7,290	8,550	9,650
10	3/8	1	38.3	13.91	17,716	53.92	213	42.60	3.91	5.66	.594	1.35	.956	8,950	7,700	9,025	10,200
10	1/2	1	38.3	18.36	23,372	71.13	275	55.02	3.87	5.63	.450	1.607	.863	10,250	8,100	9,500	10,700
11	3/16	1	42.3	7.82	9,954	30.3	150	27.31	4.38	6.30	1.057	1.14	1.436	7,000	6,560	7,700	8,700
11	1/4	1	42.3	10.37	13,209	40.2	197	35.89	4.36	6.28	.796	1.21	1.148	8,080	7,350	8,625	9,750
11	5/16	1	42.3	12.91	16,434	50.0	243	44.23	4.34	6.27	.640	1.28	.977	9,000	7,950	9,350	10,600
11	3/8	1	42.3	15.41	19,626	59.7	288	52.32	4.32	6.25	.536	1.367	.873	9,840	8,420	9,900	11,200
11	1/2	1	42.3	20.36	25,918	78.9	373	67.78	4.28	6.21	.406	1.615	.782	11,300	8,900	10,500	11,800

*See basis of calculations, Page 71.

Chase Brass and Copper Company.

Table 24

CURRENT RATINGS AND PHYSICAL PROPERTIES OF VENTILATED SQUARE COPPER TUBE*



Square Side A, Inches	Wall Thickness T Inches	Outside Corner Radius R, Inches	Perimeter Inches	AV. CROSS-SECTION Sq. In.	AV. CROSS-SECTION 1000 Cm.	Weight Lbs./Ft.	VENTILATION Holes Per Foot	VENTILATION Diameter D, Inches	VENTILATION Spacing S, Inches	ON X-X AXIS Moment of Inertia Inches⁴	ON X-X AXIS Section Modulus Inches³	ON X-X AXIS Radius of Gyration Inches	ON Y-Y AXIS Moment of Inertia Inches⁴	ON Y-Y AXIS Section Modulus Inches³	ON Y-Y AXIS Radius of Gyration Inches	* Self GMD Inches	* R_{20} Microhms/Ft.	* R'_{70} Microhms/Ft.	Capacity at 100% Load Factor DC	Capacity at 100% Load Factor 60 Cycles Temperature Rise 30°C. Amps.	30°C. Amps.	40°C. Amps.	50°C. Amps.
2	1/8	3/8	7.36	.82	1,044	3.18	8	7/8	3	.453	.453	.743	.491	.491	.773	1.103	10.068	12.10	1,320	1,310	1,540	1,750
2	3/16	3/8	7.36	1.19	1,519	4.62	8	7/8	3	.624	.624	.723	.678	.678	.754	1.087	6.930	8.43	1,590	1,570	1,850	2,100
2	1/4	3/8	7.36	1.54	1,965	5.98	8	7/8	3	.766	.766	.704	.833	.833	.735	1.071	5.394	6.74	1,800	1,760	2,060	2,340
2	5/16	1/2	7.14	1.80	2,292	6.98	8	7/8	3	.825	.825	.677	.909	.909	.710	1.043	4.587	5.91	1,950	1,880	2,200	2,500
2	3/8	1/2	7.14	2.09	2,656	8.09	8	7/8	3	.969	.909	.660	1.004	1.004	.694	1.028	3.958	5.33	2,100	1,980	2,325	2,640
2 1/2	1/8	3/8	9.36	1.05	1,332	4.05	8	1 1/16	3	.930	.744	.943	1.015	.812	.985	1.397	7.946	9.56	1,640	1,630	1,930	2,170
2 1/2	3/16	3/8	9.36	1.53	1,949	5.93	8	1 1/16	3	1.306	1.045	.923	1.405	1.124	.958	1.380	5.429	6.66	1,990	1,960	2,300	2,600
2 1/2	1/4	3/8	9.36	2.00	2,540	7.73	8	1 1/16	3	1.627	1.302	.903	1.783	1.426	.945	1.363	4.166	5.25	2,260	2,200	2,580	2,940
2 1/2	5/16	1/2	9.14	2.37	3,011	9.17	8	1 1/16	3	1.876	1.501	8.91	2.074	1.659	.936	1.336	3.514	4.61	2,460	2,350	2,760	3,140
2 1/2	3/8	1/2	9.14	2.76	3,519	10.71	8	1 1/16	3	2.032	1.625	.857	2.256	1.805	.903	1.320	3.007	4.16	2,670	2,480	2,900	3,300
2 1/2	1/2	3/4	8.71	3.28	4,171	12.70	8	1 1/16	3	2.102	1.682	.801	2.397	1.918	.855	1.265	2.537	3.95	2,900	2,540	2,980	3,380
3	1/8	3/8	11.36	1.29	1,646	5.01	6	1 1/4	4	1.667	1.111	1.135	1.824	1.216	1.188	1.690	6.428	7.78	1,970	1,950	2,300	2,600
3	3/16	3/8	11.36	1.90	2,422	7.37	6	1 1/4	4	2.369	1.579	1.116	2.556	1.704	1.159	1.672	4.370	5.40	2,400	2,350	2,760	3,120
3	1/4	3/8	11.36	2.49	3,170	9.65	6	1 1/4	4	2.987	1.991	1.095	3.270	2.180	1.146	1.655	3.338	4.26	2,740	2,640	3,100	3,520
3	5/16	1/2	11.14	2.98	3,798	11.56	6	1 1/4	4	3.483	2.322	1.080	3.839	2.559	1.134	1.628	2.786	3.69	3,000	2,840	3,340	3,780
3	3/8	1/2	11.14	3.51	4,464	13.59	6	1 1/4	4	3.864	2.576	1.050	4.272	2.848	1.104	1.612	2.371	3.35	3,240	2,980	3,500	3,960
3	1/2	3/4	10.71	4.26	5,429	16.53	6	1 1/4	4	4.217	2.811	.994	4.765	3.177	1.057	1.557	1.949	3.14	3,580	3,080	3,600	4,090
4	1/8	1/2	15.14	1.73	2,206	6.72	6	1 1/2	4	4.042	2.021	1.527	4.437	2.218	1.600	2.265	4.796	5.86	2,580	2,550	2,980	3,380
4	3/16	1/2	15.14	2.56	3,262	9.93	6	1 1/2	4	5.817	2.908	1.507	6.390	3.195	1.579	2.247	3.244	4.06	3,140	3,060	3,580	4,050
4	1/4	1/2	15.14	3.37	4,288	13.05	6	1 1/2	4	7.442	3.721	1.486	8.178	4.089	1.558	2.230	2.468	3.21	3,600	3,440	4,030	4,560
4	5/16	1/2	15.14	4.15	5,283	16.08	6	1 1/2	4	8.923	4.461	1.466	9.810	4.905	1.538	2.213	2.003	2.75	3,980	3,720	4,350	4,925
4	3/8	1/2	15.14	4.91	6,245	19.01	6	1 1/2	4	10.27	5.137	1.447	11.302	5.651	1.518	2.195	1.695	2.46	4,340	3,930	4,600	5,200
4	1/2	3/4	14.7	6.13	7,804	23.75	6	1 1/2	4	11.90	5.948	1.393	13.286	6.643	1.472	2.142	1.356	2.34	4,830	4,030	4,720	5,350
5	1/8	3/4	18.7	2.16	2,750	8.37	6	1 5/8	4	7.94	3.18	1.917	8.685	3.474	2.005	2.828	3.848	4.75	3,160	3,100	3,620	4,100
5	3/16	3/4	18.7	3.20	4,078	12.42	6	1 5/8	4	11.5	4.61	1.896	12.609	5.044	1.984	2.811	2.595	3.30	3,840	3,720	4,350	4,930
5	1/4	3/4	18.7	4.22	5,377	16.37	6	1 5/8	4	14.9	5.94	1.875	16.261	6.504	1.962	2.794	1.968	2.59	4,410	4,200	4,900	5,550
5	5/16	3/4	18.7	5.22	6,642	20.22	6	1 5/8	4	17.9	7.18	1.855	19.675	7.870	1.942	2.777	1.593	2.21	4,900	4,550	5,300	6,010
5	3/8	3/4	18.7	6.19	7,876	23.98	6	1 5/8	4	20.8	8.34	1.835	22.851	9.140	1.922	2.760	1.344	1.99	5,340	4,800	5,600	6,350
5	1/2	3/4	18.7	8.05	10,252	31.21	6	1 5/8	4	26.0	10.40	1.797	28.527	11.411	1.882	2.726	1.032	1.82	6,100	5,000	5,850	6,640

Continued on Page 27.

Chase Brass and Copper Company.

Table 24–(Continued)

CURRENT RATINGS AND PHYSICAL PROPERTIES OF VENTILATED SQUARE COPPER TUBE*

Square Side A, Inches	Wall Thickness T Inches	Outside Corner Radius R, Inches	Perimeter Inches	AV. CROSS-SECTION		Weight Lbs./Ft.	VENTILATION			ON X-X AXIS			ON Y-Y AXIS			* Self GMD Inches	* R_{10} Microhms/Ft.	* R'_{70} Microhms/Ft.	Capacity at 100% Load Factor			
				Sq. In.	1000 Cm.		Holes Per Foot	Diameter D, Inches	Spacing S, Inches	Moment of Inertia Inches[4]	Section Modulus Inches[3]	Radius of Gyration Inches	Moment of Inertia Inches[4]	Section Modulus Inches[3]	Radius of Gyration Inches				DC	60 Cycles Temperature Rise		
																			30°C. Amps.	30°C. Amps.	40°C. Amps.	50°C. Amps.
6	1/8	3/4	22.7	2.64	3.361	10.23	6	1 3/4	4	14.4	4.81	2.337	15.464	5.155	2.420	3.42	3.148	3.91	3,800	3,720	4,360	4,950
6	3/16	3/4	22.7	3.92	4,995	15.20	6	1 3/4	4	21.0	7.01	2.315	22.579	7.526	2.399	3.40	2.119	2.73	4,640	4,460	5,220	5,925
6	1/4	3/4	22.7	5.18	6,597	20.08	6	1 3/4	4	27.3	9.09	2.295	29.292	9.764	2.378	3.38	1.604	2.16	5,330	5,020	5,890	6,650
6	5/16	3/4	22.7	6.42	8,168	24.87	6	1 3/4	4	33.2	11.06	2.274	35.642	11.881	2.357	3.36	1.296	1.83	5,940	5,450	6,390	7,250
6	3/8	3/4	22.7	7.62	9,707	29.55	6	1 3/4	4	38.8	12.92	2.254	41.633	13.878	2.337	3.35	1.090	1.65	6,460	5,750	6,750	7,620
6	1/2	3/4	22.7	9.97	12,694	38.64	6	1 3/4	4	49.0	16.31	2.215	52.577	17.525	2.296	3.31	.834	1.50	7,390	6,000	7,050	8,000
7	3/16	3/4	26.7	4.64	5,906	17.98	6	1 7/8	4	34.3	9.80	2.719	36.692	10.483	2.812	3.98	1.792	2.344	5,410	5,170	6,050	6,870
7	1/4	3/4	26.7	6.14	7,814	23.79	6	1 7/8	4	44.7	12.77	2.699	47.796	13.656	2.791	3.97	1.354	1.857	6,250	5,800	6,800	7,700
7	5/16	3/4	26.7	7.61	9,689	29.50	6	1 7/8	4	54.6	15.59	2.678	58.386	16.682	2.770	3.95	1.092	1.578	6,950	6,300	7,380	8,380
7	3/8	3/4	26.7	9.06	11,532	35.11	6	1 7/8	4	64.0	18.28	2.658	68.472	19.563	2.750	3.93	.918	1.423	7,570	6,650	7,760	8,800
7	1/2	3/4	26.7	11.88	15,127	46.05	6	1 7/8	4	81.4	23.27	2.618	87.163	24.904	2.709	3.89	.700	1.290	8,675	6,975	8,160	9,250
8	3/16	3/4	30.7	5.35	6,816	20.75	6	2	4	52.2	13.05	3.123	55.705	13.926	3.266	4.57	1.553	2.056	6,200	5,890	6,900	7,800
8	1/4	3/4	30.7	7.09	9,026	27.48	6	2	4	68.2	17.05	3.102	72.783	18.196	3.204	4.55	1.172	1.629	7,150	6,610	7,750	8,750
8	5/16	3/4	30.7	8.80	11,204	34.11	6	2	4	83.5	20.89	3.081	89.172	22.293	3.183	4.53	.945	1.386	7,950	7,170	8,400	9,500
8	3/8	3/4	30.7	10.49	13,351	40.64	6	2	4	98.3	24.57	3.061	104.887	26.222	3.163	4.51	.793	1.249	8,675	7,550	8,850	10,000
8	1/2	3/4	30.7	13.79	17,552	53.43	6	2	4	125.8	31.45	3.021	134.311	33.578	3.121	4.48	.603	1.132	9,950	7,950	9,300	10,500
9	3/16	1	34.3	5.99	7,620	23.20	6	2 1/8	4	73.8	16.4	3.513	78.995	17.554	3.633	5.13	1.389	1.858	6,890	6,500	7,640	8,600
9	1/4	1	34.3	7.93	10,098	30.74	6	2 1/8	4	96.7	21.5	3.422	103.438	22.986	3.611	5.12	1.048	1.475	7,930	7,300	8,560	9,650
9	5/16	1	34.3	9.85	12,545	38.19	6	2 1/8	4	118.7	26.4	3.471	127.004	28.223	3.590	5.10	.843	1.256	8,850	7,900	9,260	10,500
9	3/8	1	34.3	11.75	14,959	45.54	6	2 1/8	4	140	31.1	3.451	149.717	33.270	3.570	5.08	.707	1.130	9,650	8,350	9,750	11,000
9	1/2	1	34.3	15.47	19,696	59.96	6	2 1/8	4	180	40.0	3.410	192.541	42.787	3.528	5.04	.537	1.011	11,100	8,800	10,300	11,700
10	3/16	1	38.3	6.70	8,524	25.95	6	2 1/4	4	103	20.5	3.915	109.678	21.936	4.047	5.72	1.241	1.672	7,650	7,200	8,450	9,550
10	1/4	1	38.3	8.88	11,303	34.41	6	2 1/4	4	135	26.9	3.894	143.878	28.776	4.026	5.70	.936	1.334	8,800	8,050	9,450	10,700
10	5/16	1	38.3	11.04	14.051	42.77	6	2 1/4	4	166	33.1	3.873	176.983	35.397	4.005	5.68	.753	1.136	9,800	8,750	10,250	11,600
10	3/8	1	38.3	13.17	16,766	51.04	6	2 1/4	4	195	39.1	3.853	209.015	41.803	3.984	5.66	.631	1.015	10,700	9,250	10,900	12,200
10	1/2	1	38.3	17.36	22,106	67.29	6	2 1/4	4	252	50.5	3.812	269.812	53.962	3.942	5.63	.479	.917	12,300	9,700	11,400	12,900
11	3/16	1	42.3	7.40	9,426	28.69	6	2 3/8	4	138	25.1	4.318	147.404	26.801	4.462	6.30	1.123	1.526	8,400	7,850	9,300	10,400
11	1/4	1	42.3	9.82	12,503	38.06	6	2 3/8	4	181	33.0	4.296	193.652	35.209	4.445	6.28	.846	1.221	9,650	8,800	10,350	11,700
11	5/16	1	42.3	12.22	15.553	47.34	6	2 3/8	4	223	40.6	4.276	238.570	43.376	4.419	6.27	.680	1.038	10,800	9,550	11,250	12,700
11	3/8	1	42.3	14.58	18,568	56.52	6	2 3/8	4	264	48.0	4.255	282.166	51.303	4.399	6.25	.570	.930	11,800	10,050	11,900	13,400
11	1/2	1	42.3	19.25	24,507	74.61	6	2 3/8	4	342	62.1	4.214	365.334	66.424	4.357	6.21	.432	.832	13,500	10,600	12,500	14,200

NOTE: Skin effect ratio, R'/R is same as for unventilated square tubes, Pages 24 and 25.

*See basis of calculations, Page 71.

Table 25

*CURRENT RATINGS FOR BARE CABLES AND WIRES, OUTDOORS, FOR COPPER, A.C.S.R., AND ALL-ALUMINUM CONDUCTORS

The arrangement of this table affords convenient selection of A.C.S.R. and all-aluminum conductors which are equivalents of copper conductors in 60-cycle current ratings.

COPPER		A.C.S.R.		ALL-ALUMINUM	
Size	Current Ratings, Amperes	Size & (Stranding)	Current Ratings, Amperes	Size	Current Ratings, Amperes
				#8 Sol.	53
#8 Sol.	68			#6 Sol.	69
#8 Str.	74	#6	82	#6 Str.	75
#6 Sol.	91			#4 Sol.	92
#6 Str.	99	#4	112	#4 Str.	100
#4 Sol.	130			#2 Sol.	131
#4 Str.	141	#2	147	#2 Str.	137
				#1 Str.	156
		#1	170		
#2 Sol.	185			1/0 Str.	180
#2 Str.	186	1/0	194		
#1 Str.	220	2/0	220	2/0 Str.	220
1/0 Sol.	240				
1/0 Str.	245	3/0	252	3/0 Str.	260
2/0 Sol.	280				
2/0 Str.	283	4/0	282	4/0 Str.	280
3/0 Str.	332	266.8MCM (6x7)	316	250MCM	330
		266.8MCM (26x7)	360	266.8MCM	350
4/0 Sol.	380			300MCM	375
4/0 Str.	385	300MCM (26x7)	396	336.4MCM	400
		300MCM (30x7)	408		
		336.4MCM (18x1)			
		336.4MCM (26x7)	418	350MCM	413
		336.4MCM (30x7)	418		
250 MCM	430	397.5MCM (18x1)	450	397.5MCM	450
		397.5MCM (26x7)	462	400MCM	456
300 MCM	480	397.5MCM (30x7)	469	450MCM	487
				477MCM	500
350 MCM	524	477MCM (26x7)	523	500MCM	523
		477MCM (30x7)	523		
		500MCM (30x7)	548	550MCM	552
				556.5MCM	552
		556.5MCM (26x7)	575	600MCM	570
400 MCM	576	556.5MCM (30x7)	575		
		605MCM (54x7)	600	636MCM	605
450 MCM	619	605MCM (26x7)	613	650MCM	615
		605MCM (30x19)	613		
		636MCM (36x1)			
		636MCM (54x7)	625		

COPPER		A.C.S.R.		ALL-ALUMINUM	
Size	Current Ratings, Amperes	Size & (Stranding)	Current Ratings, Amperes	Size	Current Ratings, Amperes
		636MCM (26x7)	637		
		636MCM (30x19)	637		
		666.6MCM (54x7)	642	700MCM	640
				715.5MCM	650
500 MCM	663	715.5MCM (54x7)	670	750MCM	660
		715.5MCM (26x7)	679		
		715.5MCM (30x19)	679	795MCM	690
550 MCM	701	795MCM (36x1)	690	800MCM	695
		795MCM (54x7)	720		
		795MCM (26x7)	720		
		795MCM (30x19)	727	874.5MCM	725
				900MCM	740
600 MCM	745	874.5MCM (54x7)	756	954MCM	755
650 MCM	783	900MCM (54x7)	770	1,000MCM	790
				1,033.5MCM	
				1,100MCM	
700 MCM	813	954MCM (54x7)	803	1,113MCM	813
750 MCM	860	1,033.5MCM (54x7)	845	1,192.5MCM	865
				1,200MCM	
800 MCM	883	1,113MCM (54x19)	888	1,250MCM	903
				1,272MCM	
				1,300MCM	
850 MCM	916			1,351MCM	916
				1,400MCM	
900 MCM	938	1,192.5MCM (54x19)	930	1,431MCM	
950 MCM	976	1,272MCM (54x19)	965	1,500MCM	1,000
		1,351.5MCM (54x19)	1,010	1,510.5MCM	
1,000 MCM	1,025	1,431MCM (54x19)	1,054	1,590MCM	1,035
				1,600MCM	
				1,700MCM	
		1,510.5MCM (54x19)	1,095	1,750MCM	1,080
				1,800MCM	
				1,900MCM	
1,250 MCM	1,148	1,590MCM (54x19)	1,125	2,000MCM	1,175
1,500 MCM	1,265			2,500MCM	1,270
1,750 MCM	1,372			3,000 MCM	1,382
2,000 MCM	1,485				
2,500 MCM	1,612			3,500MCM	
3,000 MCM	1,756				

*These current ratings are approximate based on the following conditions: Copper conductivity 98.0% I.A.C.S.; aluminum conductivity 61.0% I.A.C.S.; average temperature rise 30°C. above ambient temperature 40°C.; frequency 60 cycles; horizontal position; outdoors; and wind velocity 2 feet per second crosswise. Conductors should be spaced at least 18 inches apart; otherwise, use "Relative Current Carrying Capacities Due To Proximity Effect", Table 69, Page 61.

Table 26

ALUMINUM CONDUCTOR, EC-119 – PHYSICAL CHARACTERISTICS

Classes AA and A

Cable code word	Conductor size		Copper equivalent	Stranding		Conductor dia., inches	Ultimate strength, pounds	Weight, pounds ①	
	Circular mils or AWG	Square inches	Cir mils or AWG	Class	Number and dia. of wires, inches			Per 1,000 feet	Per mile
Peachbell	6	0.0206	8	A	7 x 0.0612	0.184	555	24.6	130
Rose	4	0.0328	6	A	7 x 0.0772	0.232	875	39.2	207
Iris	2	0.0521	4	AA, A	7 x 0.0974	0.292	1,335	62.3	329
Pansy	1	0.0657	3	AA, A	7 x 0.1093	0.328	1,625	78.5	414
Poppy	1/0	0.0829	2	AA, A	7 x 0.1228	0.368	1,970	99.1	523
Aster	2/0	0.1045	1	AA, A	7 x 0.1379	0.414	2,480	124.9	659
Phlox	3/0	0.1318	1/0	AA, A	7 x 0.1548	0.464	3,005	157.5	832
Oxlip	4/0	0.1662	2/0	AA, A	7 x 0.1739	0.522	3,790	198.6	1,049
Sneezewort	250000	0.1964	157200	....	7 x 0.1890	0.567	4,480	234.7	1,239
Valerian	250000	0.1964	157200	A	19 x 0.1147	0.574	4,510	234.7	1,239
Daisy	266800	0.2095	3/0	....	7 x 0.1953	0.586	4,775	250.4	1,322
Laurel	266800	0.2095	3/0	A	19 x 0.1185	0.593	4,800	250.4	1,322
Peony	300000	0.2356	188700	A	19 x 0.1257	0.629	5,300	281.6	1,487
Tulip	336400	0.2642	4/0	A	19 x 0.1331	0.666	5,940	315.8	1,667
Daffodil	350000	0.2749	220000	A	19 x 0.1357	0.679	6,180	328.6	1,735
Canna	397500	0.3122	250000	AA, A	19 x 0.1447	0.724	6,880	372.5	1,967
Goldentuft	450000	0.3534	283000	AA	19 x 0.1539	0.770	7,630	422.4	2,230
Cosmos	477000	0.3746	300000	AA	19 x 0.1584	0.793	8,090	447.8	2,364
Syringa	477000	0.3746	300000	A	37 x 0.1135	0.795	8,600	447.8	2,364
Zinnia	500000	0.3927	314000	AA	19 x 0.1622	0.811	8,480	469.4	2,478
Hyacinth	500000	0.3927	314000	A, A	37 x 0.1162	0.813	9,010	469.4	2,478
Dahlia	556500	0.4371	350000	....	19 x 0.1711	0.856	9,440	522.4	2,758
Mistletoe	556500	0.4371	350000	AA, A	37 x 0.1226	0.858	9,830	522.4	2,758
Meadowsweet	600000	0.4712	377000	AA, A	37 x 0.1273	0.891	10,600	563.2	2,974
Orchid	636000	0.4995	400000	AA, A	37 x 0.1311	0.918	11,240	597.0	3,152
Heuchera	650000	0.5105	409000	AA	37 x 0.1325	0.928	11,490	610.2	3,222
Verbena	700000	0.5498	440000	AA	37 x 0.1375	0.963	12,370	657.1	3,469
Flag	700000	0.5498	440000	A	61 x 0.1071	0.964	12,860	657.1	3,469
Violet	715500	0.5620	450000	AA	37 x 0.1391	0.974	12,640	671.6	3,546
Nasturtium	715500	0.5620	450000	A	61 x 0.1083	0.975	13,150	671.6	3,546
Petunia	750000	0.5890	472000	AA	37 x 0.1424	0.997	12,990	704.0	3,717
Cattail	750000	0.5890	472000	A	61 x 0.1109	0.998	13,510	704.0	3,717
Arbutus	795000	0.6244	500000	AA	37 x 0.1466	1.026	13,770	746.3	3,940
Lilac	795000	0.6244	500000	A	61 x 0.1142	1.028	14,330	746.3	3,940
Cockscomb	900000	0.7069	566000	AA	37 x 0.1560	1.092	15,270	844.9	4,461
Snapdragon	900000	0.7069	566000	A	61 x 0.1215	1.094	15,900	844.9	4,461
Magnolia	954000	0.7493	600000	AA	37 x 0.1606	1.124	16,180	895.5	4,728
Goldenrod	954000	0.7493	600000	A	61 x 0.1251	1.126	16,860	895.5	4,728
Hawkweed	1000000	0.7854	629000	AA	37 x 0.1644	1.151	16,960	938.7	4,956
Camellia	1000000	0.7854	629000	A	61 x 0.1280	1.152	17,670	938.7	4,956
Bluebell	1033500	0.8117	650000	AA	37 x 0.1672	1.170	17,530	970.1	5,122
Larkspur	1033500	0.8117	650000	A	61 x 0.1302	1.172	18,200	970.1	5,122
Marigold	1113000	0.8741	700000	AA, A	61 x 0.1351	1.216	19,660	1,045.	5,518
Hawthorn	1192500	0.9366	750000	AA, A	61 x 0.1398	1.258	21,000	1,119.	5,908
Narcissus	1272000	0.999	800000	AA, A	61 x 0.1444	1.300	22,000	1,193.	6,299
Columbine	1351500	1.062	850000	AA, A	61 x 0.1489	1.340	23,400	1,269.	6,700
Carnation	1431000	1.124	900000	AA, A	61 x 0.1532	1.379	24,300	1,343.	7,091
Gladiolus	1510500	1.186	950000	AA, A	61 x 0.1574	1.417	25,600	1,418.	7,487
Coreopsis	1590000	1.249	1000000	AA	61 x 0.1615	1.454	27,000	1,493.	7,883
Jessamine	1750000	1.374	1101000	AA	61 x 0.1694	1.525	29,700	1,643.	8,675
Cowslip	2000000	1.570	1260000	A	91 x 0.1482	1.630	34,600	1,876.	9,905
Sagebrush	2250000	1.766	1415000	A	91 x 0.1572	1.729	38,100	2,133.	11,262
Lupine	2500000	1.962	1570000	A	91 x 0.1657	1.823	42,400	2,368.	12,503
Bitterroot	2750000	2.158	1730000	A	91 x 0.1738	1.912	46,600	2,607.	13,765
Trillium	3000000	2.350	1890000	A	127 x 0.1537	1.996	50,800	2,837.	14,979
Bluebonnet	3500000	2.749	2200000	A	127 x 0.1660	2.158	59,400	3,350.	17,688

ROME CABLE DIVISION OF ALCOA

Class AA stranding is usually specified for bare conductors used on overhead lines. Class A stranding is usually specified for conductors to be covered with weather-resistant (weatherproof) materials and for bare conductors where greater flexibility than afforded by Class AA is required.

Table 27

ALUMINUM CONDUCTOR, EC-H19, EC H26, EC-H24 – PHYSICAL CHARACTERISTICS

Classes B and C

Conductor size		Copper equivalent	Stranding		Conductor dia., inches	Ultimate strength, pounds EC-H19	Minimum ultimate strength, pounds EC-H26	Minimum ultimate strength, pounds EC-H24	Weight (1) per 1,000 ft, lb
Circular mils or AWG	Square inches	Cir mils or AWG	Class	Number and dia. of wires, inches					
6	0.0206	8	B	7 x 0.0612	0.184	555	335	295	24.6
4	0.0328	6	B	7 x 0.0772	0.232	870	530	465	39.2
2	0.0521	4	B	7 x 0.0974	0.292	1,335	840	740	62.3
2	0.0521	4	C	19 x 0.0591	0.296	1,360	800	705	62.3
1	0.0657	3	B	19 x 0.0664	0.332	1,685	1,000	890	78.5
1/0	0.0829	2	B	19 x 0.0745	0.373	2,090	1,270	1,120	99.1
2/0	0.1045	1	B	19 x 0.0837	0.419	2,586	1,600	1,410	124.9
2/0	0.1045	1	C	37 x 0.0600	0.420	2,725	1,600	1,410	124.9
3/0	0.1318	1/0	B	19 x 0.0940	0.470	3,200	2,015	1,780	157.5
3/0	0.1318	1/0	C	37 x 0.0673	0.471	3,380	2,015	1,780	157.5
4/0	0.1662	2/0	B	19 x 0.1055	0.528	3,890	2,540	2,240	198.6
4/0	0.1662	2/0	C	37 x 0.0756	0.529	4,190	2,540	2,240	198.6
250000	0.1964	157300	B	37 x 0.0822	0.575	4,860	3,000	2,650	234.7
250000	0.1964	157300	C	61 x 0.0640	0.576	5,040	3,000	2,650	234.7
300000	0.2356	188800	B	37 x 0.0900	0.629	5,830	3,600	3,180	281.6
300000	0.2356	188800	C	61 x 0.0701	0.631	5,940	3,600	3,180	281.6
350000	0.2749	220200	B	37 x 0.0973	0.681	6,680	4,200	3,710	328.6
350000	0.2749	220200	C	61 x 0.0757	0.681	6,930	4,200	3,710	328.6
400000	0.3142	251500	B	37 x 0.1040	0.728	7,350	4,800	4,240	375.5
400000	0.3142	251500	C	61 x 0.0810	0.729	7,780	4,800	4,240	375.5
450000	0.3534	283000	B	37 x 0.1103	0.772	8,110	5,400	4,770	422.4
450000	0.3534	283000	C	61 x 0.0859	0.773	8,750	5,400	4,770	422.4
500000	0.3927	314500	B	37 x 0.1162	0.813	9,010	6,000	5,300	469.4
500000	0.3927	314500	C	61 x 0.0905	0.815	9,540	6,000	5,300	469.4
550000	0.4320	346000	B	61 x 0.0950	0.855	10,490	6,610	5,830	516.3
550000	0.4320	346000	C	91 x 0.0777	0.855	10,880	6,600	5,830	516.3
600000	0.4712	377000	B	61 x 0.0992	0.893	11,450	7,210	6,360	563.2
600000	0.4712	377000	C	91 x 0.0812	0.893	11,660	7,200	6,360	563.2
650000	0.5105	409000	B	61 x 0.1032	0.929	11,940	7,810	6,890	610.2
650000	0.5105	409000	C	91 x 0.0845	0.930	12,630	7,800	6,890	610.2
700000	0.5498	440000	B	61 x 0.1071	0.964	12,860	8,410	7,420	657.1
700000	0.5498	440000	C	91 x 0.0877	0.964	13,600	8,400	7,420	657.1
750000	0.5890	472000	B	61 x 0.1109	0.998	13,510	9,010	7,950	704.0
750000	0.5890	472000	C	91 x 0.0908	0.999	14,310	9,000	7,950	704.0
800000	0.6283	503000	B	61 x 0.1145	1.031	14,410	9,610	8,480	751.0
800000	0.6283	503000	C	91 x 0.0938	1.032	15,270	9,600	8,480	751.0
900000	0.7069	566000	B	61 x 0.1215	1.094	15,900	10,810	9,540	844.8
900000	0.7069	566000	C	91 x 0.0994	1.093	17,180	10,800	9,540	844.8
1000000	0.7854	629000	B	61 x 0.1280	1.152	17,670	12,020	10,600	938.7
1000000	0.7854	629000	C	91 x 0.1048	1.153	18,380	12,000	10,600	938.7
1100000	0.8639	692000	B	91 x 0.1099	1.209	20,210	13,220	11,660	1,033.
1100000	0.8639	692000	C	127 x 0.0931	1.210	21,000	13,200	11,660	1,033.
1200000	0.9425	755000	B	91 x 0.1148	1.263	21,630	14,420	12,720	1,126.
1200000	0.9425	755000	C	127 x 0.0972	1.264	22,900	14,400	12,720	1,126.
1250000	0.9818	786000	B	91 x 0.1172	1.289	22,530	15,020	13,250	1,173.
1250000	0.9818	786000	C	127 x 0.0992	1.290	23,900	15,000	13,250	1,173.
1300000	1.021	818000	B	91 x 0.1195	1.315	23,430	15,620	13,780	1,220.
1300000	1.021	818000	C	127 x 0.1012	1.316	23,900	15,600	13,780	1,220.
1400000	1.100	880000	B	91 x 0.1240	1.364	24,750	16,830	14,850	1,314
1400000	1.100	880000	C	127 x 0.1050	1.365	25,700	16,800	14,850	1,314.
1500000	1.178	943000	B	91 x 0.1284	1.412	26,500	18,020	15,900	1,408.

ROME CABLE DIVISION OF ALCOA

Continued on Page 31

Class B stranding is usually specified for conductors to be insulated with various materials such as rubber, paper, varnished cloth, etc. Class C stranding is specified for conductors where greater flexibility than provided by Class B is required.

Table 27–(Continued)

ALUMINUM CONDUCTOR, EC-H-19, EC-H26, EC-H24 – PHYSICAL CHARACTERISTICS (Concluded)

Classes B and C

Conductor size		Copper equivalent	Stranding		Conductor dia., inches	Ultimate strength, pounds EC-H19	Minimum ultimate strength, pounds EC-H26	Minimum ultimate strength, pounds EC-H24	Weight per 1,000 ft, lb
Circular mils or AWG	Square inches	Cir mils or AWG	Class	Number and dia. of wires, inches					
1500000	1.178	943000	C	127 x 0.1087	1.413	27,600	18,000	15,900	1,408.
1600000	1.257	1006000	B	127 x 0.1122	1.459	28,840	19,230	16,970	1,502.
1600000	1.257	1006000	C	169 x 0.0973	1.460	30,500	19,200	16,970	1,502.
1700000	1.335	1069000	B	127 x 0.1157	1.504	30,630	20,400	18,020	1,596.
1700000	1.335	1069000	C	169 x 0.1003	1.505	31,200	20,400	18,020	1,596.
1750000	1.374	1101000	B	127 x 0.1174	1.526	31,530	21,000	18,550	1,643.
1750000	1.374	1101000	C	169 x 0.1018	1.527	32,100	21,000	18,550	1,643.
1800000	1.414	1132000	B	127 x 0.1191	1.548	32,450	21,600	19,090	1,690.
1800000	1.414	1132000	C	169 x 0.1032	1.548	33,100	21,600	19,090	1,690.
1900000	1.492	1195000	B	127 x 0.1223	1.590	33,570	22,800	20,100	1,784.
1900000	1.492	1195000	C	169 x 0.1060	1.590	34,900	22,800	20,100	1,784.
2000000	1.571	1258000	B	127 x 0.1255	1.632	35,340	24,000	21,200	1,877.
2000000	1.571	1258000	C	169 x 0.1088	1.632	36,800	24,000	21,200	1,877.
2500000	1.964	1570000	B	127 x 0.1403	1.824	43,300	30,000	26,500	2,370.
2500000	1.964	1570000	C	169 x 0.1216	1.824	44,200	30,000	26,500	2,370.
3000000	2.356	1890000	B	169 x 0.1332	1.998	53,010	36,000	31,800	2,844.
3500000	2.749	2200000	B	169 x 0.1439	2.158	60,610	40,500	37,100	3,350.

ROME CABLE DIVISION OF ALCOA

Table 28

HIGH STRENGTH ALL-ALUMINUM CONDUCTOR AND EQUIVALENT A.C.S.R.

AAAC-BARE (ALL-ALUMINUM ALLOY 6201)							ACSR FOR EASY REFERENCE						
CODE WORD	E.C. EQUIV. SIZE	AREA		DIAMETER, INCHES		STRENGTH LBS.	CODE WORD	E.C. EQUIV. SIZE	AREA		DIAMETER, INCHES		STRENGTH LBS.
		CM	SQ. IN.	STRANDING	CONDUCTOR				CM	SQ. IN.	STRANDING	CONDUCTOR	
Akron	6	30,200	0.0237	7 x 0.0657	0.197	1,069	Turkey	6	26,240	0.0206	6/1 0.0661	0.198	1,170
Athens	5	38,090	0.0299	7 x 0.0738	0.221	1,349	Thrush	5	33,090	0.0260	6/1 0.0743	0.223	1,460
Alton	4	48,040	0.0377	7 x 0.0828	0.248	1,701	Swan	4	41,740	0.0328	6/1 0.0834	0.250	1,830
Austin	3	60,560	0.0476	7 x 0.0930	0.279	2,148	Swallow	3	52,620	0.0413	6/1 0.0937	0.281	2,250
Ames	2	76,380	0.0600	7 x 0.1045	0.3135	2,707	Sparrow	2	66,360	0.0521	6/1 0.1052	0.316	2,790
Astoria	1	96,320	0.0756	7 x 0.1173	0.352	3,411	Robin	1	83,690	0.0657	6/1 0.1182	0.355	3,480
Azusa	1/0	121,500	0.0954	7 x 0.1317	0.395	4,304	Raven	1/0	105,600	0.0829	6/1 0.1327	0.398	4,280
Anaheim	2/0	156,100	0.1226	7 x 0.1493	0.448	5,301	Quail	2/0	133,100	0.1045	6/1 0.1490	0.447	5,345
Amherst	3/0	198,800	0.1545	7 x 0.1677	0.503	6,680	Pigeon	3/0	167,800	0.1318	6/1 0.1672	0.502	6,675
Alliance	4/0	248,200	0.1949	7 x 0.1883	0.565	8,427	Penquin	4/0	211,600	0.1622	6/1 0.1878	0.563	8,420
Butte		307,100	0.2412	19 x 0.1271	0.636	10,420	Partridge		266,800	0.2436	26/7 0.1013/0.0788	0.642	11,250
Canton		394,600	0.3099	19 x 0.1441	0.721	12,830	Linnet		336,400	0.3072	26/7 0.1138/0.0885	0.721	14,050
Cairo		466,300	0.3662	19 x 0.1567	0.784	15,160	Ibis		397,500	0.3630	26/7 0.1236/0.0961	0.783	16,190
Darien		599,600	0.4395	19 x 0.1716	0.858	18,200	Hawk		477,000	0.4356	26/7 0.1355/0.1054	0.858	19,430
Elgin		652,800	0.5127	19 x 0.1854	0.927	21,230	Dove		556,500	0.5083	26/7 0.1463/0.1138	0.927	22,400
Flint		746,100	0.5860	37 x 0.1420	0.994	24,260	Grosbeak		636,000	0.5809	26/7 0.1564/0.1216	0.990	25,000
Greeley		932,600	0.7325	37 x 0.1588	1.112	30,300	Drake		795,000	0.7261	26/7 0.1749/0.1360	1.108	31,200

KAISER ALUMINUM & CHEMICAL SALES, INC.

Table 29

SOLID ALUMINUM CONDUCTOR WIRE

CONDUCTOR SIZE			Ultimate Strength Pounds	Diameter, Inches	D.C. Resistance At 20°C. Ohms Per 1000 Ft. (61%)
A.W.G.	Circular Mils	Square Inches			
14	4,107	0.003225	87.09	0.06408	4.140
12	6,530	0.005129	133.3	0.08081	2.604
10	10,380	0.008155	199.7	0.1019	1.638
9	13,090	0.01028	246.7	0.1144	1.299
8	16,510	0.01297	304.7	0.1285	1.030
7	20,820	0.01635	384.3	0.1443	0.8166
6	26,250	0.02062	474.2	0.1620	0.6477
5	33,100	0.02600	597.9	0.1819	0.5137
4	41,740	0.03278	754.0	0.2043	0.4073
3	52,630	0.04134	930.1	0.2294	0.3230
2	66,370	0.05213	1,173.0	0.2576	0.2562

Table 30

ALL-ALUMINUM COMPRESTO CONDUCTORS

TABLE 1.—ALL-ALUMINUM COMPRESTO CONDUCTORS

AWG or MCM Size and Stranding	Nominal Bare COMPRESTO Diameter-In.	Breaking Strength EC - H 19 (Pounds)	Pounds Per 1000 Ft.	D - C Resistance at 20° C. ohms/1000 ft. IACS	
				61% Conductivity	62% Conductivity
6-7W	0.169	528	24.6	0.6606	0.6502
4-7w	0.213	826	39.2	0.4155	0.4088
2-7w	0.268	1266	62.3	0.2613	0.2571
1-7w	0.301	1537	78.5	0.2073	0.2039
1/0-7w	0.338	1865	99.1	0.1643	0.1616
1/0-19w	0.340	2090	99.1	0.1643	0.1616
2/0-7w	0.381	2350	124.9	0.1303	0.1282
2/0-19w	0.382	2586	124.9	0.1303	0.1282
3/0-7w	0.426	2845	157.5	0.1033	0.1017
3/0-19w	0.428	3200	157.5	0.1033	0.1017
4/0-7w	0.480	3590	198.6	0.08195	0.08063
4/0-19w	0.481	3890	198.6	0.08195	0.08063
250.0-19w	0.523	4506	234.7	0.06940	0.06825
266.8-19w	0.541	4800	250.4	0.06500	0.06395
300.0-19w	0.573	5301	281.6	0.05784	0.05687
336.4-19w	0.607	5940	315.8	0.05155	0.05072
350.0-19w	0.618	6185	328.6	0.04957	0.04875

OLIN CONDUCTORS METALS DIVISION

Table 31

BARE ELECTRICAL CONDUCTOR

5005 Aluminum Alloy

Physical Properties

CODE WORD	SIZE MCM	NUMBER AND DIAMETER OF STRANDS	SIZE AND STRANDING OF ACSR WITH EQUAL DIAMETER AWG OR MCM	CROSS SECTION SQ. INCHES	OUTSIDE DIAMETER INCHES	WEIGHT PER 1000 FT. (LBS.)	ULTIMATE STRENGTH (LBS.)
Jupe	30,420	1 x .1744	*6 AWG	.0239	.174	28.0	777
Juve	48,370	1 x .2199	*4 AWG	.0380	.220	44.5	1,197
Kazoo	30,580	7 x .0661	6-6/1	.0240	.198	28.7	912
Kaki	48,690	7 x .0834	4-6/1	.0382	.250	45.7	1,415
Kench	77,470	7 x .1052	2-6/1	.0608	.316	72.7	2,195
Kibe	123,300	7 x .1327	1/0-6/1	.0968	.398	115.7	3,405
Kayak	155,400	7 x .1490	2/0-6/1	.1221	.447	145.9	4,235
Kopeck	195,700	7 x .1672	3/0-6/1	.1537	.502	183.7	4,965
Kittle	246,900	7 x .1878	4/0-6/1	.1939	.563	231.8	6,265
Ratch	281,400	19 x .1217	266.8-18/1	.2211	.609	264.0	7,365
Ramie	312,800	19 x .1283	266.8-26/7	.2456	.642	294.0	8,180
Radar	355,100	19 x .1367	336.4-18/1	.2789	.684	333.0	9,285
Radian	394,500	19 x .1441	336.4-26/7	.3099	.721	370.0	10,180
Rede	419,600	19 x .1486	397.5-18/1	.3295	.743	394.0	10,820
Ragout	465,400	19 x .1565	397.5-26/7	.3655	.783	437.0	11,840
Rex	503,600	19 x .1628	477.0-18/1	.3954	.814	473.0	12,100
Remex	559,500	19 x .1716	477.0-26/7	.4394	.858	525.0	13,450
Ruble	587,200	19 x .1758	556.5-18/1	.4614	.879	551.0	14,120
Rune	652,400	19 x .1853	556.5-26/7	.5124	.927	612.0	15,680
Spar	740,800	37 x .1415	636.0-26/7	.5818	.991	694.0	19,110
Solar	927,200	37 x .1583	795.0-26/7	.7282	1.108	870.0	23,590

*Designed to have equal D.C. resistance of indicated size of E.C. grade aluminum conductor.

Table 32

CHARACTERISTICS OF ALUMINUM CABLE STEEL REINFORCED

Zinc Coated Steel Core

Circular Mils Or A.W.G. Aluminum	ALUMINUM			STEEL		Outside Diameter, Inches	• Copper Equivalent Circular Mils-Or A.W.G.	Ultimate Strength Pounds	Weight Pounds Per Mile	Geo. Metric Mean Radius At 60 Cycles, Feet	† Approx. Current Carrying Capacity, Amps	RESISTANCE OHMS PER CONDUCTOR PER MILE								Xa INDUCTIVE REACTANCE OHMS PER CONDUCTOR PER MILE AT 1 FT. SPACING ALL CURRENTS			Xa' SHUNT CAPACITIVE REACTANCE MEGOHMS PER CONDUCTOR PER MILE AT 1 FT. SPACING		
												25°C. (77°F.) SMALL CURRENTS				50°C. (122°F.) CURRENT APPROX. 75% CAPACITY ‡									
	Strands	Layer	Strand Dia., Inches	Strands	Strands Dia., Inches							d-c	25 Cycles	50 Cycles	60 Cycles	d-c	25 Cycles	50 Cycles	60 Cycles	25-Cycles	50-Cycles	60-Cycles	25 Cycles	50 Cycles	60 Cycles
1,590,000	54	3	0.1716	19	0.1030	1.545	1,000,000	56,000	10,777	0.0520	1,380	0.0587	0.0588	0.0590	0.0591	0.0646	0.0656	0.0675	0.0684	0.1495	0.299	0.359	0.1953	0.0977	0.0814
1,431,000	54	3	0.1628	19	0.0977	1.465	900,000	50,400	9,699	0.0493	1,300	0.0652	0.0653	0.0655	0.0656	0.0718	0.0729	0.0749	0.0760	0.1522	0.304	0.365	0.1991	0.0996	0.0830
1,272,000	54	3	0.1535	19	0.0921	1.382	800,000	44,800	8,621	0.0465	1,200	0.0734	0.0735	0.0737	0.0738	0.0808	0.0819	0.0840	0.0851	0.1551	0.310	0.372	0.203	0.1016	0.0847
1,113,000	54	3	0.1436	19	0.0862	1.293	700,000	40,200	7,544	0.0435	1,110	0.0839	0.0840	0.0842	0.0844	0.0924	0.0935	0.0957	0.0969	0.1585	0.317	0.380	0.208	0.1040	0.0867
1,033,500	54	3	0.1384	7	0.1384	1.246	650,000	37,100	7,019	0.0420	1,060	0.0903	0.0905	0.0907	0.0909	0.0994	0.1005	0.1025	0.1035	0.1603	0.321	0.385	0.211	0.1053	0.0878
954,000	54	3	0.1329	7	0.1329	1.196	600,000	34,200	6,479	0.0403	1,010	0.0979	0.0980	0.0981	0.0982	0.1078	0.1088	0.1118	0.1128	0.1624	0.325	0.390	0.214	0.1068	0.0890
900,000	54	3	0.1291	7	0.1291	1.162	566,000	32,300	6,112	0.0391	970	0.104	0.104	0.104	0.104	0.1145	0.1155	0.1175	0.1185	0.1639	0.328	0.393	0.216	0.1078	0.0898
874,500	54	3	0.1273	7	0.1273	1.146	550,000	31,400	5,940	0.0386	950	0.107	0.107	0.107	0.108	0.1178	0.1188	0.1218	0.1228	0.1646	0.329	0.395	0.217	0.1083	0.0903
795,000	54	3	0.1214	7	0.1214	1.093	500,000	28,500	5,399	0.0368	900	0.117	0.118	0.118	0.119	0.1288	0.1303	0.1358	0.1378	0.1670	0.334	0.401	0.220	0.1100	0.0917
795,000	36	3	.....	1	.....	1.040	500,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
795,000	26	2	0.1749	7	0.1360	1.108	500,000	31,200	5,770	0.0375	900	0.117	0.117	0.117	0.117	0.1288	0.1288	0.1288	0.1288	0.1660	0.332	0.399	0.219	0.1095	0.0912
795,000	30	2	0.1628	19	0.0977	1.140	500,000	38,400	6,517	0.0393	910	0.117	0.117	0.117	0.117	0.1288	0.1288	0.1288	0.1288	0.1637	0.327	0.393	0.217	0.1085	0.0904
715,500	54	3	0.1151	7	0.1151	1.036	450,000	26,300	4,859	0.0349	830	0.131	0.131	0.131	0.132	0.1442	0.1452	0.1472	0.1482	0.1697	0.339	0.407	0.224	0.1119	0.0932
715,500	26	2	0.1659	7	0.1290	1.051	450,000	28,100	5,193	0.0355	840	0.131	0.131	0.131	0.131	0.1442	0.1442	0.1442	0.1442	0.1687	0.337	0.405	0.223	0.1114	0.0928
715,500	30	2	0.1544	19	0.0926	1.081	450,000	34,600	5,865	0.0372	840	0.131	0.131	0.131	0.131	0.1442	0.1442	0.1442	0.1442	0.1664	0.333	0.399	0.221	0.1104	0.0920
666,600	24	2	0.1667	7	0.1111	1.000	419,000	23,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
636,000	36	3	.....	1	.....	0.930	400,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
636,000	24	2	0.1628	7	0.1085	0.977	400,000	22,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
636,000	26	2	0.1564	7	0.1216	0.990	400,000	25,000	4,616	0.0335	780	0.147	0.147	0.147	0.147	0.1618	0.1618	0.1618	0.1618	0.1718	0.344	0.412	0.227	0.1135	0.0946
636,000	30	2	0.1456	19	0.0874	1.019	400,000	31,500	5,213	0.0351	780	0.147	0.147	0.147	0.147	0.1618	0.1618	0.1618	0.1618	0.1693	0.339	0.406	0.225	0.1125	0.0937
605,000	24	2	0.1588	7	0.1059	0.953	380,500	21,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
605,000	26	2	0.1525	7	0.1186	0.966	380,500	24,100	4,391	0.0327	760	0.154	0.154	0.154	0.154	0.1700	0.1720	0.1720	0.1720	0.1730	0.346	0.415	0.229	0.1144	0.0953
605,000	30	2	0.1420	19	0.0852	0.994	380,500	30,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
556,500	26	2	0.1463	7	0.1138	0.927	350,000	22,400	4,039	0.0313	730	0.168	0.168	0.168	0.168	0.1849	0.1859	0.1859	0.1859	0.1751	0.350	0.420	0.232	0.1159	0.0965
556,500	24	2	0.1523	7	0.1015	0.914	350,000	19,850	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
556,500	30	2	0.1362	7	0.1362	0.953	350,000	27,200	4,588	0.0328	730	0.168	0.168	0.168	0.168	0.1849	0.1859	0.1859	0.1859	0.1728	0.346	0.415	0.230	0.1149	0.0957
477,000	18	2	0.1628	1	0.1628	0.814	300,000	12,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
477,000	24	2	0.1410	7	0.0940	0.846	300,000	17,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
477,000	26	2	0.1355	7	0.1054	0.858	300,000	19,430	3,462	0.0290	670	0.196	0.196	0.196	0.196	0.216	.....	.....	.....	0.1790	0.358	0.430	0.237	0.1186	0.0988
477,000	30	2	0.1261	7	0.1261	0.883	300,000	23,300	3,933	0.0304	670	0.196	0.196	0.196	0.196	0.216	.....	.....	.....	0.1766	0.353	0.424	0.235	0.1176	0.0980

WESTINGHOUSE ELECTRIC CORPORATION AND ALUMINUM COMPANY OF AMERICA.

STANDARD WEIGHT COATING

REYNOLDS METAL DIVISION

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32-(Continued)

CHARACTERISTICS OF ALUMINUM CABLE STEEL REINFORCED

Zinc Coated Steel Core

Circular Mils Or A.W.G. Aluminum	ALUMINUM Strands	ALUMINUM Layers	ALUMINUM Strand Dia., Inches	STEEL Strands	STEEL Strands Dia., Inches	Outside Diameter, Inches	* Copper Equivalent Circular Mils-Or A.W.G.	Ultimate Strength Pounds	Weight Pounds Per Mile	Geo. Metric Mean Radius At 60 Cycles, Feet	† Approx. Current Carrying Capacity, Amps	r_a RESISTANCE OHMS PER CONDUCTOR PER MILE 25°C. (77°F.) SMALL CURRENTS d-c	25 Cycles	50 Cycles	60 Cycles	50°C. (122°F.) CURRENT APPROX. 75% CAPACITY ‡ d-c	25 Cycles	50 Cycles	60 Cycles	X_a INDUCTIVE REACTANCE OHMS PER CONDUCTOR PER MILE AT 1 FT. SPACING ALL CURRENTS 25-Cycles	50-Cycles	60-Cycles	X_a' SHUNT CAPACITIVE REACTANCE MEGOHMS PER CONDUCTOR PER MILE AT 1 FT. SPACING 25 Cycles	50 Cycles	60 Cycles
397,500	18	2	0.1486	1	0.1486	0.743	250,000	10,400																	
397,500	26	2	0.1236	7	0.0961	0.783	250,000	16,190	2,885	0.0265	590	0.235				0.259				0.1836	0.367	0.441	0.244	0.1219	0.1015
397,500	30	2	0.1151	7	0.1151	0.806	250,000	19,980	3,277	0.0278	600	0.235	Same As d-c			0.259	Same As d-c			0.1812	0.362	0.435	0.242	0.1208	0.1006
336,400	18	2	0.1367	1	0.1367	0.684	4/0	8,950																	
336,400	26	2	0.1138	7	0.0885	0.721	4/0	14,050	2,442	0.0244	530	0.278				0.306				0.1872	0.376	0.451	0.250	0.1248	0.1039
336,400	30	2	0.1059	7	0.1059	0.741	4/0	17,040	2,774	0.0255	530	0.278				0.306				0.1855	0.371	0.445	0.248	0.1238	0.1032
300,000	26	2	0.1074	7	0.0835	0.680	188,700	12,650	2,178	0.0230	490	0.311				0.342				0.1908	0.382	0.458	0.254	0.1269	0.1057
266,800	26	2	0.1013	7	0.0788	0.642	3/0	11,250	1,936	0.0217	460	0.350				0.385				0.1936	0.387	0.465	0.258	0.1289	0.1074
266,800	18	2	0.1217	1	0.1217	0.609	3/0	7,100																	
										For Current Approx. 75% Capacity ‡									SINGLE LAYER CONDUCTORS SMALL CURRENTS 25 Cycles	50 Cycles	60 Cycles	SINGLE LAYER CONDUCTORS CURRENT APPROX. 75% CAPACITY ‡ 25 Cycles	50 Cycles	60 Cycles			
266,800	6	1	0.2109	7	0.0703	0.633	3/0	9,645	1,802	0.00684	460	0.351	0.351	0.351	0.352	0.386	0.430	0.510	0.552	0.194	0.388	0.466	0.252	0.504	0.605	0.259	0.1294	0.1079
4/0	6	1	0.1878	1	0.1878	0.563	2/0	8,420	1,542	0.00814	340	0.441	0.442	0.444	0.445	0.485	0.514	0.567	0.592	0.218	0.437	0.524	0.242	0.484	0.581	0.267	0.1336	0.1113
3/0	6	1	0.1672	1	0.1672	0.502	1/0	6,675	1,223	0.00600	300	0.556	0.557	0.559	0.560	0.612	0.642	0.697	0.723	0.225	0.450	0.540	0.259	0.517	0.621	0.275	0.1377	0.1147
2/0	6	1	0.1490	1	0.1490	0.447	1	5,345	970	0.00510	270	0.702	0.702	0.704	0.706	0.773	0.806	0.866	0.895	0.231	0.462	0.554	0.267	0.534	0.641	0.284	0.1418	0.1182
1/0	6	1	0.1327	1	0.1327	0.398	2	4,280	769	0.00446	230	0.885	0.885	0.887	0.888	0.974	1.01	1.08	1.12	0.237	0.473	0.568	0.273	0.547	0.656	0.292	0.1460	0.1216
1	6	1	0.1182	1	0.1182	0.355	3	3,480	610	0.00418	200	1.12	1.12	1.12	1.12	1.23	1.27	1.34	1.38	0.242	0.483	0.580	0.277	0.554	0.665	0.300	0.1500	0.1250
2	6	1	0.1052	1	0.1052	0.316	4	2,790	484	0.00418	180	1.41	1.41	1.41	1.41	1.55	1.59	1.66	1.69	0.247	0.493	0.592	0.277	0.554	0.665	0.308	0.1542	0.1285
2	7	1	0.0974	1	0.1299	0.325	4	3,525	566	0.00504	180	1.41	1.41	1.41	1.41	1.55	1.59	1.62	1.65	0.247	0.493	0.592	0.267	0.535	0.642	0.306	0.1532	0.1276
3	6	1	0.0937	1	0.0937	0.281	5	2,250	384	0.00430	160	1.78	1.78	1.78	1.78	1.95	1.98	2.04	2.07	0.252	0.503	0.604	0.275	0.551	0.661	0.317	0.1583	0.1320
4	6	1	0.0834	1	0.0834	0.250	6	1,830	304	0.00437	140	2.24	2.24	2.24	2.24	2.47	2.50	2.54	2.57	0.257	0.514	0.611	0.274	0.549	0.659	0.325	0.1627	0.1355
4	7	1	0.0772	1	0.1029	0.257	6	2,288	356	0.00452	140	2.24	2.24	2.24	2.24	2.47	2.50	2.53	2.55	0.257	0.515	0.618	0.273	0.545	0.655	0.323	0.1615	0.1346
5	6	1	0.0743	1	0.0743	0.223	7	1,460	241	0.00416	120	2.82	2.82	2.82	2.82	3.10	3.12	3.16	3.18	0.262	0.525	0.630	0.279	0.557	0.665	0.333	0.1666	0.1388
6	6	1	0.0661	1	0.0661	0.198	8	1,170	191	0.00394	100	3.56	3.56	3.56	3.56	3.92	3.94	3.97	3.98	0.268	0.536	0.643	0.281	0.561	0.673	0.342	0.1708	0.1423

*Based on Copper 97 percent, Aluminum 61 percent conductivity.

†For conductor at 75°C., air at 25°C., wind 1.4 miles per hour (2 ft./sec.) frequency=60 cycles.

‡"Current Approx. 75% Capacity" is 75% of the "Approx. Current Carrying Capacity in Amps." and is approximately the current which will produce 50°C. conductor temp. (25°C. rise) with 25°C. air temp., wind 1.4 miles per hour.

**Standard Weight Coating

WESTINGHOUSE ELECTRIC CORPORATION AND ALUMINUM COMPANY OF AMERICA.

Table 33

CHARACTERISTICS FOR ALL-ALUMINUM AND A.C.S.R. CABLE WITH PREFORMED, STRAIGHT AND TAPERED ARMOR RODS

Cable Code	Cable Size A.W.G. or C.M.	Stranding		Dia. of Bare Cable	Current Ratings Amperes	Cross Section Square Inch		Percent Weight		Percent Area		Ultimate Strength			Dia. over Armor Rods		
		Alum.	St.			Alum.	Total	Alum.	St.	Alum.	St.	* Alum.	* St.	Total Cable	Preformed	Straight	Taper
Peachbell	6	7	0	.184	75	.0206	.0206	100	–	100	–	–	–	528	.426	–	–
Turkey	6	6	1	.198	82	.0206	.0240	67.7	32.3	85.7	14.3	590	580	1,170	.440	.434	–
Rose	4	7	0	.232	100	.0328	.0328	100	–	100	–	–	–	826	.474	–	–
Swan	4	6	1	.250	112	.0328	.0383	67.7	32.3	85.7	14.3	900	930	1,830	.542	.548	–
Swanate	4	7	1	.257	–	.0328	.0411	57.8	42.2	79.8	20.2	918	1,370	2,288	.549	.555	–
Iris	2	7	0	.292	137	.0521	.0521	100	–	100	–	–	–	1,266	.584	.532	–
Sparrow	2	6	1	.316	147	.0521	.0608	67.7	32.3	85.7	14.3	1,355	1,435	2,790	.588	.586	–
Sparate	2	7	1	.325	–	.0521	.0653	57.8	42.2	79.8	20.2	1,410	2,115	3,525	.597	.595	–
Pansy	1	7	0	.328	156	.0657	.0657	100	–	100	–	–	–	1,537	.620	–	–
Robin	1	6	1	.355	170	.0657	.0767	67.7	32.3	85.7	14.3	1,670	1,810	3,480	.647	.653	–
Poppy	1/0	7	0	.368	180	.0829	.0829	100	–	100	–	–	–	1,865	.660	.688	–
Raven	1/0	6	1	.398	194	.0829	.0967	67.7	32.3	85.7	14.3	2,072	2,208	4,280	.732	.746	–
Aster	2/0	7	0	.414	220	.1045	.1045	100	–	100	–	–	–	2,350	.706	.770	–
Quail	2/0	6	1	.447	220	.1045	.1212	67.7	32.3	86.2	13.8	2,560	2,785	5,345	.781	.745	.835
Phlox	3/0	7	0	.464	260	.1318	.1318	100	–	100	–	–	–	2,845	.798	.744	.864
Pigeon	3/0	6	1	.502	252	.1318	.1537	67.7	32.3	85.7	14.3	3,160	3,515	6,675	.836	.834	.938
Oxlip	4/0	7	0	.522	280	.1662	.1662	100	–	100	–	–	–	3,590	.856	.870	.970
Penguin	4/0	6	1	.563	282	.1662	.1939	67.7	32.3	85.7	14.3	3,988	4,432	8,420	.927	.939	1.051
Daisy	266,800	7	0	.586	350	.2095	.2095	100	–	100	–	–	–	4,525	.950	.976	1.095
Laurel	266,800	19	0	.593	–	.2095	.2095	100	–	100	–	–	–	4,800	.957	–	1.095
	266,800	37	0	.594	–	.2095	.2095	100	–	100	–	–	–	5,185	.958	–	–
Owl	266,800	6	7	.633	316	.2095	.2367	73.0	27.0	88.5	11.5	5,025	4,620	9,645	.997	–	1.179
Waxwing	266,800	18	1	.609	–	.2095	.2211	86.4	13.6	94.7	5.3	4,980	1,860	6,840	.973	.999	1.125
Partridge	266,800	26	7	.642	360	.2095	.2436	68.5	31.5	86.0	14.0	5,450	5,800	11,250	1.006	–	1.188
Peony	300,000	19	0	.629	375	.2356	.2356	100	–	100	–	–	–	5,301	.993	–	1.153
Ostrich	300,000	26	7	.680	396	.2356	.2739	68.5	31.5	86.0	14.0	6,050	6,600	12,650	1.088	–	1.258
Piper	300,000	30	7	.700	408	.2356	.2906	60.5	39.5	81.1	18.9	6,360	9,070	15,430	1.108	–	–
Tulip	336,400	19	0	.666	400	.2642	.2642	100	–	100	–	–	–	5,940	1.030	1.038	1.228
Merlin	336,400	18	1	.684	–	.2642	.2789	86.4	13.6	94.7	5.3	6,275	2,350	8,625	1.092	1.056	1.262
Linnet	336,400	26	7	.721	418	.2642	.3073	68.6	31.4	86.0	14.0	6,740	7,310	14,050	1.129	–	1.349
Oriole	336,400	30	7	.741	418	.2642	.3259	60.5	39.5	81.1	18.9	6,860	10,180	17,040	1.149	–	1.369
Canna	397,500	19	0	.724	450	.3122	.3122	100	–	100	–	–	–	6,880	1.132	1.056	1.352
Chickadee	397,500	18	1	.743	450	.3122	.3295	86.4	13.6	94.7	5.3	7,265	2,775	10,040	1.151	1.075	1.371
Brant	397,500	24	7	.772	–	.3122	.3525	73.3	26.7	88.6	11.4	7,840	6,850	14,690	1.180	–	–
Ibis	397,500	26	7	.783	462	.3122	.3630	68.6	31.4	86.0	14.0	7,820	8,370	16,190	1.283	–	1.447
Lark	397,500	30	7	.806	469	.3122	.3850	60.5	39.5	81.1	18.9	7,950	12,030	19,980	1.306	–	1.490
Cosmos	477,000	19	0	.793	500	.3746	.3746	100	–	100	–	–	–	8,090	1.293	1.165	1.479
Syringa	477,000	37	0	.795	–	.3746	.3746	100	–	100	–	–	–	8,600	1.295	–	1.479
Pelican	477,000	18	1	.814	–	.3746	.3954	86.4	13.6	94.7	5.3	8,850	3,320	11,870	1.314	1.186	1.518
Flicker	477,000	24	7	.846	–	.3746	.4231	73.2	26.8	88.5	11.5	9,200	8,000	17,200	1.346	–	1.570
Hawk	477,000	26	7	.858	523	.3746	.4356	68.6	31.4	86.0	14.0	9,365	10,065	19,430	1.358	–	1.602
Hen	477,000	30	7	.883	523	.3746	.4620	60.5	39.5	81.1	18.9	9,350	13,935	23,300	1.383	–	1.649
Zinnia	500,000	19	0	.812	523	.3927	.3927	100	–	100	–	–	–	8,482	1.312	–	–
Dahlia	556,500	19	0	.856	552	.4371	.4371	100	–	100	–	–	–	9,440	1.356	–	1.600
Mistletoe	556,500	37	0	.858	–	.4371	.4371	100	–	100	–	–	–	9,830	1.358	–	1.600
Osprey	556,500	18	1	.879	–	.4371	.4614	86.4	13.6	94.7	5.3	9,950	3,900	13,850	1.379	–	1.623
Parakeet	556,500	24	7	.914	–	.4371	.4938	73.2	26.8	88.5	11.5	10,500	9,350	19,850	1.414	–	1.702
Dove	556,500	26	7	.927	575	.4371	.5083	68.6	31.4	86.0	14.0	10,700	11,700	22,400	1.427	–	1.715
Eagle	556,500	30	7	.953	575	.4371	.5391	60.5	39.5	81.1	18.9	10,900	16,300	27,200	1.453	–	1.763
Peacock	605,000	24	7	.953	–	.4752	.5358	73.2	26.8	88.5	11.5	11,400	10,100	21,500	1.453	–	1.763
Squab	605,000	26	7	.966	613	.4752	.5526	68.6	31.4	86.0	14.0	11,400	12,700	24,100	1.466	–	1.798
Teal	605,000	30	19	.994	613	.4752	.5835	60.9	39.1	81.5	18.5	11,600	18,400	30,000	1.614	–	1.850
Orchid	636,000	37	0	.918	605	.4995	.4995	100	–	100	–	–	–	11,240	1.418	–	1.706
Rook	636,000	24	7	.977	–	.4995	.5642	73.2	26.8	88.5	11.5	11,900	10,700	22,600	1.597	–	1.809
Grosbeak	636,000	26	7	.990	637	.4995	.5808	68.6	31.4	86.0	14.0	12,000	13,000	25,000	1.610	–	1.846
Egret	636,000	30	19	1.019	637	.4995	.6134	60.9	39.1	81.5	18.5	12,200	19,300	31,500	1.639	–	1.901
Aug	636,000	36	1	.930	–	.4995	.5134	92.7	7.3	97.3	2.7	11,230	2,220	13,450	1.430	–	1.718
Goose	636,000	54	7	.977	625	.4995	.5643	73.3	26.7	88.5	11.5	13,000	10,600	23,600	1.597	–	–
Kingbird	636,000	18	1	.940	–	.4995	.5072	86.4	13.6	98.5	1.5	11,398	4,432	15,830	1.440	–	–
	653,900	18	3	.953	–	.5136	.5321	90.8	9.2	96.5	3.5	11,715	3,135	14,850	1.453	–	–
Flamingo	666,000	24	7	1.000	–	.5235	.5914	73.2	26.8	94.7	5.3	12,500	11,200	23,700	1.620	–	1.856
Gull	666,000	54	7	1.000	642	.5235	.5914	73.3	26.7	88.5	11.5	13,300	11,200	24,500	1.620	–	–
Violet	715,500	37	0	.974	650	.5620	.5620	100	–	100	–	–	–	12,640	1.474	–	1.807
Nasturtium	715,500	61	0	.975	–	.5620	.5620	100	–	100	–	–	–	13,150	1.475	–	1.807
Stilt	715,500	24	7	1.036	–	.5620	.6348	73.3	26.7	88.5	11.5	13,500	12,000	25,500	1.656	–	–
Starling	715,500	26	7	1.051	679	.5620	.6535	68.7	31.3	86.0	14.0	13,500	14,600	28,100	1.671	–	1.959
Redwing	715,500	30	19	1.081	679	.5620	.6901	61.0	39.0	81.5	18.5	13,500	21,100	34,600	1.701	–	2.013
Crow	715,500	54	7	1.036	670	.5620	.6348	73.3	26.7	88.5	11.5	14,300	12,000	26,300	1.656	–	1.918

*Aluminum and steel ultimate strength are within 1% of values calculated in accordance with A.S.T.M. Standard Specification B-232-60T.

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Table 33–(Continued)

CHARACTERISTICS FOR ALL-ALUMINUM AND A.C.S.R. CABLE WITH PREFORMED, STRAIGHT AND TAPERED ARMOR RODS

Cable Code	Cable Size A.W.G. or C.M.	Stranding		Dia. of Bare Cable	Current Ratings Amperes	Cross Section Square Inch		Percent Weight		Percent Area		Ultimate Strength			Dia. over Armor Rods		
		Alum.	St.			Alum.	Total	Alum.	St.	Alum.	St.	* Alum.	* St.	Total Cable	Preformed	Straight	Taper
Petunia	750,000	37	0	.997	660	.5890	.5890	100	–	100	–	–	–	12,440	1.617	–	–
Cattail	750,000	61	0	.998	–	.5890	.5890	100	–	100	–	–	–	13,510	1.618	–	–
Arbutus	795,000	37	0	1.026	690	.6244	.6244	100	–	100	–	–	–	13,770	1.646	–	1.910
Lilac	795,000	61	0	1.028	–	.6244	.6244	100	–	100	–	–	–	14,330	1.648	–	1.910
Tern	795,000	45	7	1.063	–	.6244	.6676	83.7	16.3	93.5	6.5	15,570	7,330	22,900	1.683	–	1.971
Drake	795,000	26	7	1.108	720	.6244	.7261	68.8	31.2	86.0	14.0	15,000	16,200	31,200	1.728	–	2.040
Mallard	795,000	30	19	1.140	727	.6244	.7668	61.0	39.0	81.5	18.5	15,000	23,400	38,400	1.760	–	2.128
Coot	795,000	36	1	1.040	690	.6244	.6417	92.7	7.3	97.3	2.7	13,770	2,780	16,550	1.660	–	1.922
Condor	795,000	54	7	1.093	720	.6244	.7053	73.4	26.6	88.5	11.5	15,600	12,900	28,500	1.713	–	2.025
Anemone	874,500	37	0	1.077	725	.6868	.6868	100	–	100	–	–	–	14,830	1.697	–	2.010
Crocus	874,500	61	0	1.078	–	.6868	.6868	100	–	100	–	–	–	15,760	1.698	–	2.010
Crane	874,500	54	7	1.146	756	.6868	.7759	73.3	26.7	88.5	11.5	17,200	14,200	31,400	1.766	–	2.134
Canary	900,000	54	7	1.162	770	.7069	.7985	73.3	26.7	88.5	11.5	17,700	14,600	32,300	1.782	–	2.150
Ruddy	900,000	45	7	1.131	–	.7066	1.196	83.7	16.3	59.1	40.9	17,340	8,060	25,400	1.751	–	2.153
Magnolia	954,000	37	0	1.124	755	.7493	.7493	100	–	100	–	–	–	16,180	1.744	–	2.058
Goldenrod	954,000	61	0	1.126	–	.7493	.7493	100	–	100	–	–	–	16,860	1.746	–	2.058
Catbird	954,000	36	1	1.140	–	.7493	.7701	92.7	7.3	97.3	2.7	16,190	3,330	19,520	1.760	–	–
Rail	954,000	45	7	1.165	–	.7493	.8011	83.7	16.3	93.5	6.5	18,340	8,560	26,900	1.785	–	–
Cardinal	954,000	54	7	1.196	803	.7493	.8464	73.3	26.7	88.5	11.5	18,700	15,500	34,200	1.816	–	1.984
Blue Bell	1,033,500	37	0	1.170	–	.8117	.8117	100	–	100	–	–	–	17,530	1.790	–	1.960
Larkspur	1,033,500	61	0	1.172	–	.8117	.8117	100	–	100	–	–	–	18,260	1.792	–	1.960
Tanager	1,033,500	36	1	1.140	–	.8117	.8342	92.7	7.3	97.3	2.7	17,500	3,600	21,100	1.760	–	–
Ortlan	1,033,500	45	7	1.165	–	.8117	.8678	83.7	16.3	93.5	6.5	19,625	9,275	28,900	1.785	–	2.023
Curlew	1,033,500	54	7	1.246	845	.8117	.9169	73.3	26.7	88.5	11.5	20,300	16,800	37,100	1.976	–	2.078
Marigold	1,113,000	61	0	1.216	813	.8741	.8741	100	–	100	–	–	–	19,660	1.946	–	2.026
Bluejay	1,113,000	45	7	1.259	–	.8741	.9346	83.7	16.3	93.5	6.5	20,900	10,000	30,900	1.989	–	2.091
Finch	1,113,000	54	19	1.293	888	.8741	.9849	73.8	26.2	88.7	11.5	21,400	18,800	40,200	2.023	–	2.149
Bunting	1,192,500	45	7	1.302	–	.9366	1.001	83.7	16.3	93.5	6.5	22,520	10,680	33,200	2.032	–	2.158
Grackle	1,192,500	54	19	1.333	–	.9366	1.0553	73.8	26.2	88.5	11.5	22,900	20,200	43,100	2.068	–	2.220
Narcissus	1,272,000	61	0	1.300	–	.9990	.9990	100	–	100	–	–	–	22,000	2.030	–	2.156
Bittern	1,272,000	45	7	1.345	–	.9990	1.068	83.7	16.3	93.5	6.5	24,000	11,400	35,400	2.075	–	2.227
Pheasant	1,272,000	54	19	1.382	965	.9990	1.1256	73.8	26.2	88.7	11.3	23,900	20,900	44,800	2.112	–	2.290
Dipper	1,351,500	45	7	1.385	–	1.0620	1.135	83.7	16.3	93.5	6.5	25,575	12,025	37,600	–	–	2.152
Martin	1,351,500	54	19	1.424	–	1.0620	1.196	73.7	26.7	88.7	11.3	25,440	22,160	47,600	–	–	2.190
Carnation	1,431,000	61	0	1.379	–	1.1240	1.1240	100	–	100	–	–	–	24,300	2.109	–	2.287
Bobolink	1,431,000	45	7	1.427	–	1.1240	1.202	83.7	16.3	93.5	6.5	26,960	12,840	39,800	2.229	–	2.115
Plover	1,431,000	54	19	1.465	–	1.1240	1.266	73.7	26.3	88.8	11.2	26,890	23,510	50,400	–	–	2.253
Nuthatch	1,510,500	45	7	1.466	–	1.1860	1.268	83.7	16.3	93.5	6.5	28,415	13,115	41,600	–	–	2.276
Parrot	1,510,500	54	19	1.506	–	1.1860	1.336	73.7	26.3	88.8	11.2	28,400	24,800	53,200	–	–	2.316
Coreopsis	1,590,000	61	0	1.454	1,035	1.2490	1.2490	100	–	100	–	–	–	27,000	2.184	–	2.242
Dogwood	1,590,000	91	0	1.454	–	1.2490	1.2490	100	–	100	–	–	–	28,100	–	–	2.242
Lapwing	1,590,000	45	7	1.502	–	1.2490	1.335	83.7	16.3	93.6	6.4	30,013	13,787	43,800	2.374	–	2.312
Falcon	1,590,000	54	19	1.545	–	1.2490	1.407	73.7	26.3	88.8	11.2	29,885	26,115	56,000	2.417	–	2.377
Chukar	1,780,000	84	19	1.602	–	1.398	1.512	81.3	18.7	92.5	7.5	34,220	19,380	53,600	–	–	2.472
Bluebird	2,156,000	84	19	1.762	–	1.693	1.828	81.2	18.8	92.6	7.4	40,665	22,735	63,400	–	–	2.462
Kiwi	2,167,000	72	7	1.737	–	1.702	1.776	89.2	10.8	95.8	4.2	40,850	12,150	53,000	–	–	2.437
Grouse ①	80,000	8	1	.367	–	.0628	.0847	50.4	49.6	74.1	15.9	1,660	3,540	5,200	.659	–	–
Petrel ①	101,800	12	7	.461	–	.0800	.1266	37.8	62.2	63.1	36.9	2,145	7,715	9,860	.795	–	.861
Minorca ①	110,800	12	7	.481	–	.0870	.1378	37.8	62.2	63.1	36.9	2,355	8,375	10,730	.815	–	.893
Leghorn ①	134,600	12	7	.530	–	.1057	.1674	37.8	62.2	63.1	36.9	2,735	10,185	12,920	.864	–	.990
Guinea ①	159,000	12	7	.576	–	.1249	.1977	37.8	62.2	63.1	36.9	3,190	12,010	15,200	.940	–	1.078
Dotterel ①	176,900	12	7	.607	–	.1389	.2200	37.8	62.2	63.1	36.9	3,425	12,975	16,440	.971	–	1.123
Dorking ①	190,800	12'	7	.631	–	.1499	.2373	37.8	62.2	63.1	36.9	3,745	13,985	17,730	.995	–	1.177
Cochin ①	211,300	12	7	.664	–	.1660	.2628	37.8	62.2	63.1	36.9	4,150	15,490	19,640	1.028	–	1.241
Brahma ①	203,200	16	19	.714	–	.1596	.3020	28.3	71.7	52.8	47.2	3,990	23,510	27,500	1.122	–	1.324

① These conductors have a high ratio of mechanical strength to current-carrying capacity. They are used largely for overhead ground wires and for special construction such as river crossing spans. Generally speaking they are of interest for any application where mechanical requirements are of primary importance.

* Aluminum and steel ultimate strength are within 1% of values calculated in accordance with A.S.T.M. Standard Specification B-232-60T.

Table 34
ACSR – PHYSICAL CHARACTERISTICS

ACSR				Stranding, number and diameter of strands, inches		Diameter, inches		Ultimate strength, pounds		
Code word	Cross section							Zinc coated core		
	Aluminum		Total					Standard weight coating	Class B coating	Class C coating
	Cir mils or AWG	Square inches	Square inches	Aluminum	Steel	Complete conductor	Steel core			
Turkey	**6**	**0.0206**	**0.0240**	**6 x 0.0661**	**1 x 0.0661**	**0.198**	**0.0661**	**1,170**	**1,150**	**1,170**
Swan	**4**	**0.0328**	**0.0383**	**6 x 0.0834**	**1 x 0.0834**	**0.250**	**0.0834**	**1,830**	**1,800**	**1,830**
Swanate	**4**	**0.0328**	**0.0411**	**7 x 0.0772**	**1 x 0.1029**	**0.257**	**0.1029**	**2,290**	**2,205**	**2,245**
Sparrow	**2**	**0.0521**	**0.0608**	**6 x 0.1052**	**1 x 0.1052**	**0.316**	**0.1052**	**2,790**	**2,705**	**2,745**
Sparate	**2**	**0.0521**	**0.0653**	**7 x 0.0974**	**1 x 0.1299**	**0.325**	**0.1299**	**3,525**	**3,255**	**3,385**
Robin	1	0.0657	0.0767	6 x 0.1182	1 x 0.1182	0.355	0.1182	3,480	3,370	3,430
Raven	**1/0**	**0.0829**	**0.0967**	**6 x 0.1327**	**1 x 0.1327**	**0.398**	**0.1327**	**4,280**	**4,000**	**4,140**
Quail	**2/0**	**0.1045**	**0.1219**	**6 x 0.1490**	**1 x 0.1490**	**0.447**	**0.1490**	**5,345**	**4,820**	**4,910**
Pigeon	**3/0**	**0.1318**	**0.1538**	**6 x 0.1672**	**1 x 0.1672**	**0.502**	**0.1672**	**6,675**	**6,020**	**6,135**
Penguin	**4/0**	**0.1662**	**0.1939**	**6 x 0.1878**	**1 x 0.1878**	**0.563**	**0.1878**	**8,420**	**7,590**	**7,730**
Waxwing	**266800**	**0.2095**	**0.2211**	**18 x 0.1217**	**1 x 0.1217**	**0.609**	**0.1217**	**6,840**	**6,600**	**6,720**
Owl	266800	0.2095	0.2367	6 x 0.2109	7 x 0.0703	0.633	0.2109	9,645	9,410	9,645
Partridge	**266800**	**0.2095**	**0.2436**	**26 x 0.1013**	**7 x 0.0788**	**0.642**	**0.2364**	**11,250**	**11,070**	**11,250**
Ostrich	300000	0.2356	0.2740	26 x 0.1074	7 x 0.0835	0.680	0.2505	12,650	12,460	12,650
Merlin	**336400**	**0.2642**	**0.2789**	**18 x 0.1367**	**1 x 0.1367**	**0.684**	**0.1367**	**8,625**	**8,330**	**8,475**
Linnet	**336400**	**0.2642**	**0.3072**	**26 x 0.1137**	**7 x 0.0884**	**0.721**	**0.2652**	**14,050**	**13,830**	**14,050**
Oriole	**336400**	**0.2642**	**0.3259**	**30 x 0.1059**	**7 x 0.1059**	**0.741**	**0.3177**	**17,040**	**16,430**	**16,740**
Chickadee	**397500**	**0.3122**	**0.3295**	**18 x 0.1486**	**1 x 0.1486**	**0.743**	**0.1486**	**10,040**	**9,520**	**9,605**
Brant	**397500**	**0.3122**	**0.3525**	**24 x 0.1287**	**7 x 0.0858**	**0.772**	**0.2574**	**14,690**	**14,480**	**14,690**
Ibis	**397500**	**0.3122**	**0.3630**	**26 x 0.1236**	**7 x 0.0961**	**0.783**	**0.2883**	**16,190**	**15,680**	**15,930**
Lark	397500	0.3122	0.3850	30 x 0.1151	7 x 0.1151	0.806	0.3453	19,980	19,240	19,600
Pelican	**477000**	**0.3746**	**0.3954**	**18 x 0.1628**	**1 x 0.1628**	**0.814**	**0,1628**	**11,870**	**11,250**	**11,350**
Flicker	**477000**	**0.3746**	**0.4231**	**24 x 0.1410**	**7 x 0.0940**	**0.846**	**0.2820**	**17,200**	**16,700**	**16,940**
Hawk	**477000**	**0.3746**	**0.4356**	**26 x 0.1354**	**7 x 0.1053**	**0.858**	**0.3162**	**19,430**	**18,820**	**19,130**
Hen	**477000**	**0.3746**	**0.4620**	**30 x 0.1261**	**7 x 0.1261**	**0.883**	**0.3783**	**23,300**	**21,600**	**22,500**
Osprey	**556500**	**0.4371**	**0.4614**	**18 x 0.1758**	**1 x 0.1758**	**0.879**	**0.1758**	**13,850**	**13,120**	**13,240**
Parakeet	**556500**	**0.4371**	**0.4938**	**24 x 0.1523**	**7 x 0.1015**	**0.914**	**0.3045**	**19,850**	**19,280**	**19,560**
Dove	**556500**	**0.4371**	**0.5083**	**26 x 0.1463**	**7 x 0.1138**	**0.927**	**0.3414**	**22,400**	**21,700**	**22,100**
Eagle	556500	0.4371	0.5391	30 x 0.1362	7 x 0.1362	0.953	0.4086	27,200	25,200	26,200
Peacock	605000	0.4752	0.5368	24 x 0.1588	7 x 0.1059	0.953	0.318	21,500	20,950	21,250
Squab	605000	0.4752	0.5526	26 x 0.1525	7 x 0.1186	0.966	0.356	24,100	23,400	23,800
Teal	605000	0.4752	0.5835	30 x 0.1420	19 x 0.0852	0.994	0.426	30,000	29,500	30,000
Swift	636000	0.4995	0.5134	36 x 0.1329	1 x 0.1329	0.930	0.1329	13,450	13,180	13,320
Kingbird	**636000**	**0.4995**	**0.5272**	**18 x 0.1880**	**1 x 0.1880**	**0.940**	**0.1880**	**15,830**	**15,000**	**15,140**
Rook	**636000**	**0.4995**	**0.5643**	**24 x 0.1628**	**7 x 0.1085**	**0.977**	**0.326**	**22,600**	**22,000**	**22,400**
Grosbeak	**636000**	**0.4995**	**0.5809**	**26 x 0.1564**	**7 x 0.1216**	**0.990**	**0.365**	**25,000**	**23,400**	**24,200**
Egret	636000	0.4995	0.6134	30 x 0.1456	19 x 0.0874	1.019	0.437	31,500	31,000	31,500
.....	653900	0.5136	0.5321	18 x 0.1906	3 x 0.0885	0.953	0.1906	14,850	14,750	14,850
Flamingo	666600	0.5235	0.5914	24 x 0.1667	7 x 0.1111	1.000	0.333	23,700	23,100	23,400
Gannet	666600	0.5235	.6087	26 x 0.1601	7 x 0.1245	1.014	0.373	26,200	24,500	25,350
Stilt	715500	0.5620	0.6348	24 x 0.1727	7 x 0.1151	1.036	0.345	25,500	24,800	25,100
Starling	715500	0.5620	0.6535	26 x 0.1659	7 x 0.1290	1.051	0.387	28,100	26,300	27,200
Redwing	715500	0.5620	0.6901	30 x 0.1544	19 x 0.0926	1.081	0.463	34,600	33,300	34,000
Coot	795000	0.6244	0.6417	36 x 0.1486	1 x 0.1486	1.040	0.1486	16,540	16,020	16,110
Tern	**795000**	**0.6244**	**0.6676**	**45 x 0.1329**	**7 x 0.0886**	**1.063**	**0.266**	**22,900**	**22,700**	**22,900**
Cuckoo	**795000**	**0.6244**	**0.7053**	**24 x 0.1820**	**7 x 0.1213**	**1.092**	**0.364**	**27,900**	**26,300**	**27,100**
Condor	795000	0.6244	0.7053	54 x 0.1213	7 x 0.1213	1.093	0.364	28,500	26,900	27,700
Drake	**795000**	**0.6244**	**0.7261**	**26 x 0.1749**	**7 x 0.1360**	**1.108**	**0.408**	**31,200**	**29,200**	**30,200**
Mallard	795000	0.6244	0.7668	30 x 0.1628	19 x 0.0977	1.140	0.489	38,400	37,000	37,700
Ruddy	900000	0.7069	0.7555	45 x 0.1414	7 x 0.0943	1.131	0.283	25,400	24,900	25,100
Canary	900000	0.7069	0.7985	54 x 0.1291	7 x 0.1291	1.162	0.387	32,300	30,500	31,400

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Table 34-(Continued)

ACSR – PHYSICAL CHARACTERISTICS (Continued)

ACSR Code word	Cross section: Aluminum: Circular mils	Cross section: Aluminum: Square inches	Cross section: Total: Square inches	Stranding, number and diameter of strands, inches: Aluminum	Stranding, number and diameter of strands, inches: Steel	Diameter, inches: Complete conductor	Diameter, inches: Steel core	Ultimate strength, pounds: Zinc coated core: Standard weight coating	Ultimate strength, pounds: Zinc coated core: Class B coating	Ultimate strength, pounds: Zinc coated core: Class C coating
Catbird	954000	0.7493	0.7701	36 x 0.1628	1 x 0.1628	1.140	0.1628	19,520	19,000	18,890
Rail	**954000**	**0.7493**	**0.8011**	**45 x 0.1456**	**7 x 0.0971**	**1.165**	**0.291**	**26,900**	**26,600**	**26,400**
Cardinal	**954000**	**0.7493**	**0.8464**	**54 x 0.1329**	**7 x 0.1329**	**1.196**	**0.399**	**34,200**	**33,300**	**32,300**
Tanager	1033500	0.8117	0.8342	36 x 0.1694	1 x 0.1694	1.186	0.1694	21,100	20,600	20,500
Ortolan	1033500	0.8117	0.8678	45 x 0.1515	7 x 0.1010	1.213	0.303	28,900	28,600	28,300
Curlew	1033500	0.8117	0.9169	54 x 0.1384	7 x 0.1384	1.246	0.415	37,100	36,100	35,000
Bluejay	**1113000**	**0.8741**	**0.9346**	**45 x 0.1573**	**7 x 0.1049**	**1.259**	**0.315**	**30,900**	**30,600**	**30,300**
Finch	**1113000**	**0.8741**	**0.9849**	**54 x 0.1436**	**19 x 0.0862**	**1.293**	**0.431**	**40,200**	**40,200**	**40,100**
Bunting	1192500	0.9366	1.001	45 x 0.1628	7 x 0.1085	1.302	0.326	33,200	32,800	32,500
Grackle	1192500	0.9366	1.0552	54 x 0.1486	19 x 0.0892	1.333	0.446	43,100	43,100	43,000
Bittern	**1272000**	**0.9990**	**1.068**	**45 x 0.1681**	**7 x 0.1121**	**1.345**	**0.336**	**35,400**	**35,000**	**34,700**
Pheasant	**1272000**	**0.9990**	**1.1256**	**54 x 0.1535**	**19 x 0.0921**	**1.382**	**0.461**	**44,800**	**44,200**	**43,600**
Dipper	1351500	1.062	1.135	45 x 0.1733	7 x 0.1155	1.385	0.345	37,600	37,200	36,800
Martin	1351500	1.062	1.1959	54 x 0.1582	19 x 0.0949	1.424	0.475	47,600	47,000	46,300
Bobolink	**1431000**	**1.124**	**1.202**	**45 x 0.1783**	**7 x 0.1189**	**1.427**	**0.357**	**39,800**	**39,400**	**39,000**
Plover	**1431000**	**1.124**	**1.2663**	**54 x 0.1628**	**19 x 0.0977**	**1.465**	**0.489**	**50,400**	**49,800**	**49,000**
Nuthatch	1510500	1.186	1.268	45 x 0.1832	7 x 0.1221	1.466	0.366	41,600	40,700	39,900
Parrot	1510500	1.186	1.3366	54 x 0.1672	19 x 0.1003	1.506	0.502	53,200	52,500	51,800
Lapwing	**1590000**	**1.249**	**1.335**	**45 x 0.1880**	**7 x 0.1253**	**1.502**	**0.376**	**43,800**	**42,700**	**41,800**
Falcon	**1590000**	**1.249**	**1.4076**	**54 x 0.1716**	**19 x 0.1030**	**1.545**	**0.515**	**56,000**	**55,300**	**54,500**
Chukar	1780000	1.398	1.512	84 x 0.1456	19 x 0.0874	1.602	0.437	53,600	53,600	53,100
Bluebird	2156000	1.693	1.828	84 x 0.1602	19 x 0.0961	1.762	0.481	63,400	62,700	62,000
Kiwi	2167000	1.702	1.776	72 x 0.1735	7 x 0.1157	1.737	0.347	50,900	50,500	50,200

Table 35

EXTRA HIGH STRENGTH ACSR CONDUCTORS – PHYSICAL CHARACTERISTICS

Code word	Aluminum: Circular mils	Aluminum: Square inches	Total: Square inches	Stranding Number and Diameter of Strands, Inches: Aluminum	Stranding Number and Diameter of Strands, Inches: Steel	Diameter Inches: Comp cond.	Diameter Inches: Steel core	Ultimate Strength, Pounds: Zinc Coated Core: A	Ultimate Strength, Pounds: Zinc Coated Core: B	Ultimate Strength, Pounds: Zinc Coated Core: C
Magpie	20900	0.0164	0.0383	3 x 0.0834	4 x 0.0834	0.250	–	4,165	4,165	4,050
.....	27800	0.0218	0.0383	4 x 0.0834	3 x 0.0834	0.250	–	3,380	3,380	3,300
Shrike	33200	0.0261	0.0608	3 x 0.1052	4 x 0.1052	0.316	–	6,410	6,240	6,065
.....	44300	0.0347	0.0608	4 x 0.1052	3 x 0.1052	0.316	–	5,200	5,075	4,940
Snipe	52800	0.0415	0.0967	3 x 0.1327	4 x 0.1327	0.398	–	9,890	9,330	8,780
.....	70400	0.0553	0.0967	4 x 0.1327	3 x 0.1327	0.398	–	8,020	7,600	7,190
Shoebill	**57500**	**0.0451**	**0.1053**	**3 x 0.1384**	**4 x 0.1384**	**0.415**	–	**10,750**	**10,150**	**9,550**
.....	76600	0.0601	0.1053	4 x 0.1384	3 x 0.1384	0.415	–	8,720	8,270	7,820
.....	72100	0.0566	0.1344	8 x 0.0949	11 x 0.0949	0.474	0.2847	14,360	13,980	13,580
Grouse	**80000**	**0.0628**	**0.0847**	**8 x 0.1000**	**1 x 0.1670**	**0.367**	**0.1670**	**5,200**	**4,655**	**4,550**
.....	84700	0.0665	0.1579	8 x 0.1029	11 x 0.1029	0.514	0.3087	16,850	16,360	15,900
Petrel	**101800**	**0.0800**	**0.1266**	**12 x 0.0921**	**7 x 0.0921**	**0.461**	**0.2763**	**9,860**	**9,615**	**9,385**
.....	107100	0.0841	0.1997	8 x 0.1157	11 x 0.1157	0.578	0.3471	21,220	20,640	20,060
Minorca	**110800**	**0.0870**	**0.1378**	**12 x 0.0961**	**7 x 0.0961**	**0.481**	**0.2883**	**10,730**	**10,480**	**10,220**
Leghorn	**134600**	**0.1057**	**0.1674**	**12 x 0.1059**	**7 x 0.1059**	**0.530**	**0.3177**	**12,920**	**12,620**	**12,310**
.....	135000	0.1060	0.2517	8 x 0.1299	11 x 0.1299	0.649	0.3897	25,960	24,500	23,050
Guinea	**159000**	**0.1249**	**0.1977**	**12 x 0.1151**	**7 x 0.1151**	**0.576**	**0.3453**	**15,200**	**14,850**	**14,880**
Dotterel	**176900**	**0.1389**	**0.2199**	**12 x 0.1214**	**7 x 0.1214**	**0.607**	**0.3642**	**16,400**	**15,640**	**14,830**
Dorking	**190800**	**0.1499**	**0.2373**	**12 x 0.1261**	**7 x 0.1261**	**0.631**	**0.3783**	**17,730**	**16,860**	**16,000**
Brahma	**203200**	**0.1596**	**0.3020**	**16 x 0.1127**	**19 x 0.0977**	**0.714**	**0.4885**	**27,500**	**26,800**	**26,100**
Cochin	**211300**	**0.1660**	**0.2628**	**12 x 0.1327**	**7 x 0.1327**	**0.664**	**0.3981**	**19,640**	**18,700**	**17,700**

Table 36

CHARACTERISTICS OF ALUMINUM CABLE STEEL REINFORCED

(ACSR/AW – Equal Diameter)

Total Aluminum Area Cir. Mils	Cross Section: Aluminum Wires Sq. In.	Cross Section: Total Sq. In.	Stranding number & dia. of wires – inches: Aluminum	Stranding number & dia. of wires – inches: Alumoweld	Diameter – Inches: Complete Cable	Diameter – Inches: Alumoweld Core
27,340	0.02059	0.02402	6 x 0.0661	1 x 0.0661	0.198	0.0661
34,480	0.02601	0.03035	6 x 0.0743	1 x 0.0743	0.223	0.0743
43,480	0.03278	0.03824	6 x 0.0834	1 x 0.0834	0.250	0.0834
44,390	0.03277	0.04108	7 x 0.0772	1 x 0.1029	0.257	0.103
54,820	0.04137	0.04827	6 x 0.0937	1 x 0.0937	0.281	0.0937
69,140	0.05215	0.06084	6 x 0.1052	1 x 0.1052	0.316	0.105
70,590	0.05216	0.06541	7 x 0.0974	1 x 0.1299	0.325	0.130
87,180	0.06584	0.07681	6 x 0.1182	1 x 0.1182	0.355	0.118
109,900	0.08298	0.09681	6 x 0.1327	1 x 0.1327	0.398	0.133
138,700	0.1046	0.1221	6 x 0.1490	1 x 0.1490	0.447	0.149
174,800	0.1317	0.1537	6 x 0.1672	1 x 0.1672	0.502	0.167
220,400	0.1662	0.1939	6 x 0.1878	1 x 0.1878	0.563	0.188
270,500	0.2094	0.2210	18 x 0.1217	1 x 0.1217	0.609	0.122
275,400	0.2096	0.2368	6 x 0.2109	7 x 0.0703	0.633	0.211
277,700	0.2095	0.2437	26 x 0.1013	7 x 0.0788	0.642	0.236
312,200	0.2355	0.2739	26 x 0.1074	7 x 0.0835	0.680	0.251
341,100	0.2642	0.2789	18 x 0.1367	1 x 0.1367	0.684	0.137
350,100	0.2645	0.3075	26 x 0.1138	7 x 0.0885	0.721	0.266
356,000	0.2642	0.3259	30 x 0.1059	7 x 0.1059	0.741	0.318
403,000	0.3122	0.3295	18 x 0.1486	1 x 0.1486	0.743	0.149
413,700	0.3120	0.3627	26 x 0.1236	7 x 0.0961	0.783	0.288
420,700	0.3121	0.3850	30 x 0.1151	7 x 0.1151	0.806	0.345
483,600	0.3747	0.3955	18 x 0.1628	1 x 0.1628	0.814	0.163
492,500	0.3747	0.4233	24 x 0.1410	7 x 0.0940	0.846	0.282
496,400	0.3749	0.4360	26 x 0.1355	7 x 0.1054	0.858	0.316
504,800	0.3747	0.4621	30 x 0.1261	7 x 0.1261	0.883	0.378
564,200	0.4369	0.4612	18 x 0.1758	1 x 0.1758	0.879	0.176
574,500	0.4372	0.4939	24 x 0.1523	7 x 0.1015	0.914	0.305
579,200	0.4371	0.5083	26 x 0.1463	7 x 0.1138	0.927	0.341
589,000	0.4371	0.5391	30 x 0.1362	7 x 0.1362	0.953	0.409
624,600	0.4753	0.5370	24 x 0.1588	7 x 0.1059	0.953	0.318
629,600	0.4749	0.5522	26 x 0.1525	7 x 0.1186	0.966	0.356
639,500	0.4751	0.5834	30 x 0.1420	19 x 0.0852	0.994	0.426
656,600	0.4996	0.5643	24 x 0.1628	7 x 0.1085	0.977	0.326
661,900	0.4995	0.5808	26 x 0.1564	7 x 0.1216	0.990	0.365

COPPERWELD STEEL CO.

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Table 36–(Continued)

CHARACTERISTICS OF ALUMINUM CABLE STEEL REINFORCED

(ACSR/AW – Equal Diameter)

Total Aluminum Area Cir. Mils	Cross Section: Aluminum Wires Sq. In.	Cross Section: Total Sq. In.	Stranding number & dia. of wires – inches: Aluminum	Stranding number & dia. of wires – inches: Alumoweld	Diameter – Inches: Complete Cable	Diameter – Inches: Alumoweld Core
672,300	0.4995	0.6135	30 x 0.1456	19 x 0.0874	1.019	0.437
688,200	0.5238	0.5917	24 x 0.1667	7 x 0.1111	1.000	0.333
738,700	0.5619	0.6347	54 x 0.1151	7 x 0.1151	1.036	0.345
744,600	0.5620	0.6535	26 x 0.1659	7 x 0.1290	1.051	0.387
756,200	0.5617	0.6897	30 x 0.1544	19 x 0.0926	1.081	0.463
808,700	0.6242	0.6674	45 x 0.1329	7 x 0.0886	1.063	0.266
820,800	0.6251	0.7061	54 x 0.1214	7 x 0.1214	1.093	0.364
827,400	0.6247	0.7263	26 x 0.1749	7 x 0.1360	1.108	0.408
840,300	0.6245	0.7669	30 x 0.1628	19 x 0.0977	1.140	0.489
902,900	0.6873	0.7764	54 x 0.1273	7 x 0.1273	1.146	0.382
929,200	0.7069	0.7985	54 x 0.1291	7 x 0.1291	1.162	0.387
970,500	0.7492	0.8011	45 x 0.1456	7 x 0.0971	1.165	0.291
984,900	0.7491	0.8462	54 x 0.1329	7 x 0.1329	1.196	0.399
1,051,000	0.8123	0.8685	45 x 0.1516	7 x 0.1011	1.213	0.303
1,067,000	0.8124	0.9177	54 x 0.1384	7 x 0.1384	1.246	0.415
1,132,000	0.8745	0.9350	45 x 0.1573	7 x 0.1049	1.259	0.315
1,148,000	0.8746	0.9854	54 x 0.1436	19 x 0.0862	1.293	0.431
1,213,000	0.9367	1.001	45 x 0.1628	7 x 0.1085	1.302	0.326
1,230,000	0.9365	1.055	54 x 0.1486	19 x 0.0892	1.333	0.446
1,294,000	0.9987	1.068	45 x 0.1681	7 x 0.1121	1.345	0.336
1,312,000	0.9993	1.126	54 x 0.1535	19 x 0.0921	1.382	0.461
1,375,000	1.061	1.134	45 x 0.1733	7 x 0.1151	1.386	0.347
1,394,000	1.061	1.196	54 x 0.1582	19 x 0.0949	1.424	0.475
1,456,000	1.124	1.201	45 x 0.1783	7 x 0.1189	1.427	0.357
1,476,000	1.124	1.267	54 x 0.1628	19 x 0.0977	1.465	0.489
1,537,000	1.186	1.268	45 x 0.1832	7 x 0.1221	1.466	0.366
1,558,000	1.190	1.340	54 x 0.1675	19 x 0.1004	1.506	0.502
1,617,000	1.247	1.333	45 x 0.1878	7 x 0.1252	1.502	0.376
1,640,000	1.249	1.407	54 x 0.1716	19 x 0.1030	1.545	0.515
1,816,000	1.399	1.513	84 x 0.1456	19 x 0.0874	1.602	0.437
86,970	0.06283	0.08474	8 x 0.1000	1 x 0.1670	0.367	0.167
116,600	0.07994	0.1266	12 x 0.0921	7 x 0.0921	0.461	0.276
127,000	0.08704	0.1378	12 x 0.0961	7 x 0.0961	0.481	0.288
154,200	0.1057	0.1674	12 x 0.1059	7 x 0.1059	0.530	0.318
182,200	0.1249	0.1977	12 x 0.1151	7 x 0.1151	0.576	0.345
202,700	0.1389	0.2199	12 x 0.1214	7 x 0.1214	0.607	0.364
218,600	0.1499	0.2373	12 x 0.1261	7 x 0.1261	0.631	0.378
242,100	0.1660	0.2628	12 x 0.1327	7 x 0.1327	0.663	0.398
248,500	0.1596	0.3021	16 x 0.1127	19 x 0.0977	0.714	0.489

COPPERWELD STEEL CO.

Table 37
ACSR COMPRESTO CONDUCTORS

Size AWG or MCM	Stranding		Nominal Bare COMPRESTO Diameter-In.	Strength (Pounds) Breaking	Pounds Per 1000 Ft.	D-C Resistance at 20° C. ohms/1000 ft. IACS	
	Alum.	Steel				61% Conductivity	62% Conductivity
6	6	1 x 0.0661	0.182	1170	36.1	0.6573	0.6470
4	6	1 x 0.0834	0.229	1830	57.4	0.4134	0.4068
4	7	1 x 0.1029	0.236	2288	67.1	0.4134	0.4068
3	6	1 x 0.0937	0.258	2250	72.4	0.3279	0.3227
2	6	1 x 0.1052	0.290	2790	91.3	0.2600	0.2558
2	7	1 x 0.1299	0.298	3525	106.7	0.2600	0.2558
1	6	1 x 0.1182	0.326	3480	115.2	0.2062	0.2029
1/0	6	1 x 0.1327	0.365	4280	145.2	0.1635	0.1608
2/0	6	1 x 0.1490	0.410	5345	183.1	0.1297	0.1276
3/0	6	1 x 0.1672	0.461	6675	230.9	0.1028	0.1012
4/0	6	1 x 0.1878	0.517	8420	291.1	0.08155	0.08024
266.8	18	1 x 0.1217	0.559	7100	289.7	0.06500	0.06395
300.0	18	1 x 0.1291	0.593	7990	326.0	0.05781	0.05687
336.4	18	1 x 0.1367	0.628	8950	365.3	0.05155	0.05072

OLIN CONDUCTORS METALS DIVISION

Table 38
PHYSICAL AND ELECTRICAL CHARACTERISTICS OF ALUMOWELD WIRE AND STRAND

NO. AND SIZE OF WIRES	NOMINAL DIAMETER Inch	BREAKING LOAD Lbs.	WEIGHT Lbs. per 1000 Ft.	WEIGHT Lbs. per Mile	RESISTANCE Ohms per 1000 Ft. at 68°F.	CROSS-SECTION Cir. Mils	CROSS-SECTION Sq. In.
Strand							
37 No. 5 Awg	1.27	142,800	2,802	14,800	.04247	1,225,000	.9619
37 No. 6 Awg	1.13	120,200	2,222	11,730	.05356	971,300	.7629
37 No. 7 Awg	1.01	100,700	1,762	9,305	.06754	770,300	.6050
37 No. 8 Awg	.899	84,200	1,398	7,379	.08516	610,900	.4798
37 No. 9 Awg	.801	66,770	1,108	5,852	.1074	484,400	.3805
37 No. 10 Awg	.713	52,950	879.0	4,641	.1354	384,200	.3017
19 No. 5 Awg	.910	73,350	1,430	7,552	.08224	628,900	.4940
19 No. 6 Awg	.810	61,700	1,134	5,990	.1037	498,800	.3917
19 No. 7 Awg	.721	51,730	899.5	4,750	.1308	395,500	.3107
19 No. 8 Awg	.642	43,240	713.5	3,767	.1649	313,700	.2464
19 No. 9 Awg	.572	34,290	565.8	2,987	.2079	248,800	.1954
19 No. 10 Awg	.509	27,190	448.7	2,369	.2622	197,300	.1549
7 No. 5 Awg	.546	27,030	524.9	2,772	.2264	231,700	.1820
7 No. 6 Awg	.486	22,730	416.3	2,198	.2803	183,800	.1443
7 No. 7 Awg	.433	19,060	330.0	1,743	.3535	145,700	.1145
7 No. 8 Awg	.385	15,930	261.8	1,382	.4458	115,600	.09077
7 No. 9 Awg	.343	12,630	207.6	1,096	.5621	91,650	.07198
7 No. 10 Awg	.306	10,020	164.7	869.4	.7088	72,680	.05708
7 No. 11 Awg	.272	7,945	130.6	689.4	.8938	57,640	.04527
7 No. 12 Awg	.242	6,301	103.6	546.8	1.127	45,710	.03590
3 No. 5 Awg	.392	12,230	224.5	1,186.0	.5177	99,310	.07800
3 No. 6 Awg	.349	10,280	178.1	940.2	.6528	78,750	.06185
3 No. 7 Awg	.311	8,621	141.2	745.6	.8232	62,450	.04905
3 No. 8 Awg	.277	7,206	112.0	591.3	1.038	49,530	.03890
3 No. 9 Awg	.247	5,715	88.81	468.9	1.309	39,280	.03085
3 No. 10 Awg	.220	4,532	70.43	371.8	1.651	31,150	.02446
Solid Wire							
4 Awg	.2043	5,081	93.63	494.3	1.222	41,740	.03278
5 Awg	.1819	4,290	74.25	392.0	1.541	33,100	.02600
6 Awg	.1620	3,608	58.88	310.9	1.943	26,250	.02062
7 Awg	.1443	3,025	46.69	246.6	2.450	20,820	.01635
8 Awg	.1285	2,529	37.03	195.6	3.089	16,510	.01297
9 Awg	.1144	2,005	29.37	155.1	3.896	13,090	.01028
10 Awg	.1019	1,590	23.29	123.0	4.912	10,380	.008155
11 Awg	.09074	1,261	18.47	97.52	6.194	8,234	.006467
12 Awg	.08081	1,000	14.65	77.33	7.811	6,530	.005129

Modulus of Elasticity: Strand, 23,000,000; Solid Wire, 23,500,000. Coefficient of Linear Expansion: .000,007.2 per degree Fahrenheit.

COPPERWELD STEEL CO.

Table 39

PHYSICAL PROPERTIES OF GALVANIZED STEEL GUY WIRE

Number of Wires in Strand	Nominal Diameter of the Strand Inches	Nominal Diameter of Coated Wires in Strand Inches	Approximate Weight of Strand per 1000 Ft. (Lbs.)	MINIMUM BREAKING STRENGTH OF STRAND, LBS.				
				Common Grade	Siemens-Martin Grade	High Strength Grade	Extra High Strength Grade	Utilities Grade *
3	1/4	0.120	116.7	1,821	2,979	4,629	6,600	3,150
3	1/4	0.120	116.7	.....	.....	.....	.....	4,500
3	5/16	0.145	170.6	2,443	4,007	6,214	8,914	6,500
3	3/8	0.165	220.3	3,171	5,186	8,057	11,528	8,500
7	1/8	0.041	31.8	540	910	1,330	1,830	.....
7	5/32	0.052	51.3	870	1,470	2,140	2,940	.....
7	3/16	0.062	72.9	1,150	1,900	2,850	3,990	.....
7	3/16	0.065	80.3	.....	.....	.....	.....	2,400**
7	7/32	0.072	98.3	1,540	2,560	3,850	5,400	.....
7	1/4	0.080	121	1,900	3,150	4,750	6,650	.....
7	9/32	0.093	164	2,570	4,250	6,400	8,950	4,600**
7	5/16	0.104	205	3,200	5,350	8,000	11,200	.....
7	5/16	0.109	225	.....	.....	.....	.....	6,000**
7	3/8	0.120	273	4,250	6,950	10,800	15,400	11,500**
7	7/16	0.145	399	5,700	9,350	14,500	20,800	18,000**
7	1/2	0.165	517	7,400	12,100	18,800	26,900	25,000**
7	9/16	0.188	671	9,600	15,700	24,500	35,000	.....
7	5/8	0.207	813	11,600	19,100	29,600	42,400	.....
19	1/2	0.100	504	7,620	12,700	19,100	26,700	.....
19	9/16	0.113	637	9,640	16,100	24,100	33,700	.....
19	5/8	0.125	796	11,000	18,100	28,100	40,200	.....
19	3/4	0.150	1,155	16,000	26,200	40,800	58,300	.....
19	7/8	0.177	1,581	21,900	35,900	55,800	79,700	.....
19	1	0.200	2,073	28,700	47,000	73,200	104,500	.....
37	1	0.143	2,057	28,300	46,200	71,900	102,700	.....
37	1 1/8	0.161	2,691	36,000	58,900	91,600	130,800	.....
37	1 1/4	0.179	3,248	44,600	73,000	113,600	162,200	.....

*The Utilities Grade is used principally by communication and power and light industries.
**Also called Specification Grade. Can be furnished to conform to Western Union and A. T. & T. specifications.

Table 40

PHYSICAL PROPERTIES OF STRAIGHT ARMOR RODS

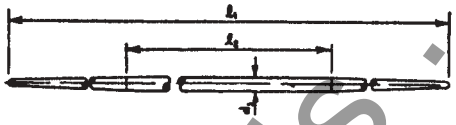
For Stranded Aluminum Conductor

Stranded Aluminum		Armor rods				Nominal weight, pounds (Per set)	Armor rods				Maximum distance between supports, inches	Nominal weight, pounds (Per set)
Size cm or AWG	Strands Al	Number of rods (Per set)	Dimensions in inches d	l	D over-all dia. ①		Number of rods (Per set)	Dimensions in inches d	l	D over-all dia. ①		
2	7	10	0.120	45	0.532	0.51	10	0.120	57	0.532	12	0.5
1/0	7	10	0.160	50	0.688	0.98	10	0.160	66	0.688	16	1.3
2/0	7	10	0.178	55	0.770	1.3	10	0.178	71	0.770	16	1.7
3/0	7	12	0.155	60	0.774	1.3	12	0.155	76	0.774	16	1.7
4/0	7	12	0.174	65	0.870	1.8	12	0.174	81	0.870	16	2.3
266,800	7	12	0.195	65	1.038	2.4	12	0.195	81	0.976	16	3.0
336,400	19	14	0.186	70	1.028	2.7	14	0.186	86	1.038	16	3.2
397,500	19	16	0.166	70	1.056	2.4	16	0.166	86	1.056	16	3.0
477,000	19	16	0.186	70	1.165	3.0	16	0.186	86	1.165	16	3.7

Table 41

PHYSICAL PROPERTIES OF TAPERED ARMOR RODS

For A.C.S.R.



ACSR			Armor rods						
				Dimensions in inches					
Size cm or AWG	Stranding Al	Stranding S.	No. of rods (Per set)	l_1	l_2	d_1	D over-all dia. at cr. ①	½ Length assembled (approx.)	Nominal weight, pounds (Per set)
2/0	6	1	10	42½	30	0.194	0.835	20	1.1
3/0	6	1	10	41½	28	0.218	0.938	19	1.3
4/0	6	1	10	42½	27	0.244	1.051	20	1.8
2/0	6	1	10	58½	46	0.194	0.835	28	1.7
3/0	6	1	10	57½	44	0.218	0.938	27	2.1
4/0	6	1	10	57½	42	0.244	1.051	27	2.7
266,800	18	1	10	45	28½	0.258	1.125	21	1.9
266,800	6	7	10	66	31	0.273	1.179	27	2.7
266,800	26	7	10	66	31	0.273	1.188	27	2.7
300,000	26	7	10	45½	27	0.289	1.258	21	2.7
336,400	18	1	10	45½	27	0.289	1.262	21	2.7
336,400	26	7	10	71½	31½	0.314	1.349	31	4.0
336,400	30	7	10	71½	31½	0.314	1.369	31	4.0
397,500	18	1	10	71½	31½	0.314	1.371	31	4.0
397,500	26	7	10	73	31	0.332	1.447	30	4.4
397,500	30	7	10	75	31	0.342	1.490	31	4.8
477,000	18	1	10	76	31	0.352	1.518	31	5.1
477,000	24	7	10	85	39	0.362	1.570	35	6.3
477,000	26	7	10	86	38	0.372	1.602	35	6.6
477,000	30	7	10	86	37	0.383	1.649	35	7.0
556,500	18	1	10	86	38	0.372	1.623	35	6.6
556,500	24	7	10	86	36	0.394	1.702	35	7.3
556,500	26	7	10	86	36	0.394	1.715	35	7.3
556,500	30	7	10	99	47	0.405	1.763	41	9.3
605,000	24	7	10	99	47	0.405	1.763	41	9.3
605,000	26	7	10	99	46	0.416	1.798	41	9.7
605,000	30	19	10	100	45	0.428	1.850	41	10
636,000	24	7	10	99	46	0.416	1.809	41	9.7
636,000	26	7	10	100	45	0.428	1.846	41	10
636,000	30	19	10	112	56	0.441	1.901	47	12
666,600	24	7	10	100	45	0.428	1.856	41	10
715,500	54	7	10	112	56	0.441	1.918	47	12
715,500	26	7	10	113	55	0.454	1.959	47	13
715,500	30	19	10	114	54	0.466	2.013	48	14
795,000	36	1	10	112	56	0.441	1.922	47	12
795,000	45	7	10	113	55	0.454	1.971	47	13
795,000	54	7	10	114	54	0.466	2.025	48	14
795,000	24	7	10	114	54	0.466	2.025	48	14
795,000	26	7	10	114	54	0.466	2.040	48	14
795,000	30	19	10	114	51	0.494	2.128	47	16
874,500	54	7	10	114	51	0.494	2.134	47	16
900,000	54	7	10	114	51	0.494	2.150	47	16
954,000	45	7	10	114	51	0.494	2.153	47	16
954,000	54	7	12	111	61	0.394	1.984	47	12
1,033,500	45	7	12	112	60	0.405	2.023	48	13
1,033,500	54	7	12	112	59	0.416	2.078	47	14
1,113,000	45	7	12	112	59	0.416	2.091	47	14
1,113,000	54	19	12	113	58	0.428	2.149	48	15
1,192,500	45	7	12	113	58	0.428	2.158	48	15
1,192,500	54	19	12	112	56	0.441	2.220	47	15
1,272,000	45	7	12	112	56	0.441	2.227	47	15
1,272,000	54	19	12	113	55	0.454	2.290	47	16
1,351,500	45	7	14	111	62	0.383	2.152	48	14
1,351,500	54	19	14	111	62	0.383	2.190	48	14
1,431,000	45	7	14	111	61	0.394	2.215	47	15
1,431,000	54	19	14	111	61	0.394	2.253	47	15
1,510,500	45	7	14	112	60	0.405	2.276	48	15
1,510,500	54	19	14	112	60	0.405	2.316	48	15
1,590,000	45	7	14	112	60	0.405	2.312	48	15
1,590,000	54	19	14	112	59	0.416	2.377	47	16
101,800	12	7	10	42½	29¾	0.200	0.861	20	1.1
110,800	12	7	10	42½	29¾	0.206	0.893	20	1.2
134,600	12	7	10	41¾	27	0.230	0.990	19	1.4
159,000	12	7	10	43	27	0.251	1.078	20	2.7
176,900	12	7	10	45	28½	0.258	1.123	21	2.9
190,800	12	7	10	66	31	0.273	1.177	27	2.7
203,200	16	19	10	71	32	0.305	1.324	29	3.6
211,300	12	7	10	45½	27	0.269	1.241	21	2.7

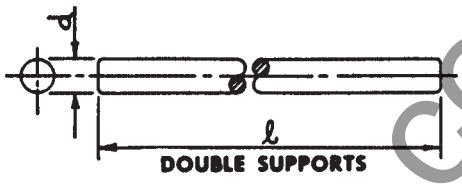
Choose suspension clamps or pin insulators with grooves that will provide a snug fit. The grooves should preferably be not more than 15 per cent greater than dimension D.

ROME CABLE DIVISION OF ALCOA

Table 42

PHYSICAL PROPERTIES OF ARMOR RODS

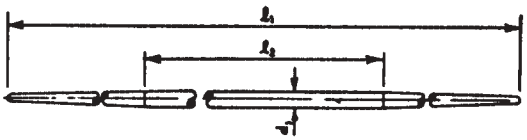
For A.C.S.R.



SINGLE SUPPORT — DOUBLE SUPPORTS

ACSR			Armor rods				Nominal weight, pounds (Per set)	Armor rods				Maximum distance between supports, inches	Nominal weight, pounds (Per set)
Size cm or AWG	Stranding		Number of rods (Per set)	Dimensions in inches				Number of rods (Per set)	Dimensions in inches				
	Al	S.		d	l	D over-all dia. ①			d	l	D over-all dia. ①		
6	6	1	8	0.118	35	0.434	0.30	8	0.118	47	0.434	12	0.34
5	6	1	8	0.135	35	0.493	0.40	8	0.135	47	0.493	12	0.52
4	6	1	8	0.149	40	0.548	0.55	8	0.149	52	0.548	12	0.72
4	7	1	8	0.149	40	0.555	0.55	8	0.149	52	0.555	12	0.72
3	6	1	10	0.120	45	0.521	0.51	10	0.120	57	0.521	12	0.65
2	6	1	10	0.135	45	0.586	0.64	10	0.135	57	0.586	12	0.81
2	7	1	10	0.135	45	0.595	0.64	10	0.135	57	0.595	12	0.81
1	6	1	10	0.149	50	0.653	0.87	10	0.149	62	0.653	12	1.1
1/0	6	1	10	0.174	50	0.746	1.2	10	0.174	66	0.746	16	1.6
2/0	6	1	12	0.149	55	0.745	1.2	12	0.149	71	0.745	16	1.5
3/0	6	1	12	0.166	60	0.834	1.6	12	0.166	76	0.834	16	2.0
4/0	6	1	12	0.186	65	0.939	2.2	12	0.188	81	0.939	16	2.6
266,800	18	1	12	0.195	65	0.999	2.4	12	0.195	81	0.999	16	3.0
336,400	18	1	14	0.186	70	1.056	2.7	14	0.186	86	1.056	16	3.2
397,500	18	1	16	0.166	70	1.075	2.4	16	0.166	86	1.075	16	3.0
477,000	18	1	16	0.186	70	1.186	3.0	16	0.186	86	1.186	16	3.7
80,000	8	1	10	0.160	50	0.687	0.98						

Table 43



TAPERED ARMOR RODS FOR STRANDED ALUMINUM CONDUCTOR

Stranded aluminum		Armor rods						Nominal weight, pounds (Per set)
			Dimensions in inches					
Size cm or AWG	Stranding	No. of rods (Per set)	l_1	l_2	d_1	D over-all dia. at cr. ①	½ Length assembled (approx.)	
3/0	7	10	42½	29¾	0.200	0.864	20	1.1
4/0	7	10	41¾	27½	0.224	0.970	19	1.4
266,800	7 or 19	10	43	27	0.251	1.095	20	1.7
336,400	19	10	45	27	0.281	1.228	26	2.7
397,500	19	10	71½	31½	0.314	1.352	29	4.0
477,000	19 or 37	10	75	31	0.342	1.479	31	4.8
556,500	19 or 37	10	86	38	0.372	1.602	35	6.6
636,000	37	10	86	36	0.394	1.706	35	7.3
715,500	37 or 61	10	99	46	0.416	1.807	41	9.7
795,000	37 or 61	10	112	56	0.441	1.910	47	12
874,500	37 or 61	10	114	54	0.466	2.010	47	14
954,000	37 or 61	10	114	54	0.466	2.058	47	14
1,033,500	37 or 61	12	111	61	0.394	1.960	47	12
1,113,000	61	12	112	60	0.405	2.026	48	13
1,272,000	61	12	113	58	0.428	2.156	48	15
1,192,500	61	12	112	59	0.416	2.090	47	14
1,351,500	61	12	112	56	0.441	2.222	47	15
1,431,000	61	12	113	55	0.454	2.287	47	16
1,510,500	61	14	111	62	0.383	2.183	48	14
1,590,000	61 or 91	14	111	61	0.394	2.242	47	15

Choose suspension clamps or pin insulators with grooves that will provide a snug fit. The grooves should preferably be not more than 15 per cent greater than dimension D.

Table 44

PHYSICAL PROPERTIES OF ALUMINUM ALLOY PREFORMED ARMOR RODS

For Aluminum Based Conductors

DIAMETER RANGE		**NOMINAL COND. SIZE	RODS PER SET	LENGTH INCHES	ROD DIAMETER INCHES	COLOR CODE
MIN. IN.	MAX. IN.					
.194	.207	Turkey	7	40"S 52"D	.121	Blue
.208	.219	#4, 7-WAA Compresto	7	40"S 52"D	.121	Black
.220	.228	Thrush	8	40"S 52"D	.121	White
.229	.243	#4, 7W AA	8	40"S 52"D	.121	Brown
.244	.259	Swan	7	40"S 52"D	.146	Orange
.260	.273	#3, 7W AA	7	42"S 54"D	.146	Green
.274	.289	#3 7W AAAC	8	42"S 54"D	.146	Yellow
.290	.308	#2, 7W AA	8	42"S 54"D	.146	Purple
.309	.326	Sparrow	9	44"S 56"D	.136	Red
.327	.346	#1, 7W AA	9	46"S 58"D	.146	Blue
.347	.366	Robin	9	48"S 60"D	.146	Black
.367	.389	Grouse	10	50"S 62"D	.146	White
.390	.413	Raven	9	52"S 64"D	.167	Yellow
.414	.436	#2/0, 7W AA	10	52"S 64"D	.146	Brown
.437	.463	Quail	10	54"S 66"D	.167	Blue
.464	.490	Minorca	10	54"S 66"D	.167	Green

DIAMETER RANGE		**NOMINAL COND. SIZE	RODS PER SET	LENGTH INCHES	ROD DIAMETER INCHES	COLOR CODE
MIN. IN.	MAX. IN.					
.491	.521	Pigeon	11	56"S 68"D	.167	Orange
.522	.551	Leghorn	11	58"S 70"D	.167	Purple
.552	.585	Penguin	11	60"S 72"D	.182	Red
.586	.606	266.8 19-37W AA	12	62"S 74"D	.182	Black
.607	.630	Waxwing	12	64"S 76"D	.182	White
.631	.655	Partridge	12	64"S 76"D	.182	Yellow
.656	.679	Cochin	13	66"S 76"D	.182	Brown
.680	.703	Merlin	12	68"S 80"D	.204	Blue
.704	.740	Linnet	12	72"S 84"D	.204	Green
.741	.782	Oriole	13	72"	.204	Orange
.783	.814	Ibis	11	76"	.250	Purple
.815	.845		11	76"	.250	Red
.846	.907	Flicker	12	78"	.250	Blue
.908	.929	Dove	13	80"	.250	Green
.930	.976	Peacock	13	88"	.250	White
.977	1.016	Rook	11	92"	.310	Yellow
1.017	1.035	Egret	12	94"	.310	Brown
1.036	1.064	Tern	12	96"	.310	Blue
1.065	1.098	Condor	12	96"	.310	Green
1.099	1.139	Drake	12	100"	.310	Orange
1.140	1.161	Mallard	13	100"	.310	Purple
1.162	1.208	Cardinal	13	100"	.310	Red
1.209	1.269	Curlew	12	100"	.365	Black
1.270	1.327	Bunting	12	100"	.365	White

**Nominal conductor size indicates one of various conductors within each range to which Armor Rods may be applied.

Note: Right Hand Lay Standard

NOTE: Applied overall diameter computed as follows:

Rod Size, .204" x 2 . . . . = .408"
Conductor OD . . . . . = .741"
Total Applied OD. . . . . 1.149"

Table 45

PHYSICAL PROPERTIES OF ALUMINUM ALLOY PREFORMED LINE GUARDS

For Aluminum Based Conductors

DIAMETER RANGE		NOMINAL* SIZE		RODS PER SET	* LENGTH INCHES	ROD DIAMETER INCHES	COLOR CODE
MIN. IN.	MAX. IN.	ACSR	AA				
.194	.207	#6, 6/1	#4 Solid	7	17 (S) 29 (D)	.102	Blue
.208	.219			7	17 (S) 29 (D)	.121	Black
.220	.228	#5, 6/1		7	17 (S) 29 (D)	.121	White
.229	.243		#4, 7W	8	19 (S) 31 (D)	.121	Brown
.244	.259	#4 6/1 7/1		8	19 (S) 31 (D)	.121	Orange
.260	.273		#3, 7W	8	19 (S) 31 (D)	.121	Green
.274	.289			9	21 (S) 33 (D)	.121	Yellow
.290	.308		#2, 7W	9	21 (S) 33 (D)	.121	Purple
.309	.326	#2 6/1 7/1		9	21 (S) 33 (D)	.121	Red
.327	.346		#1, 7W	10	21 (S) 33 (D)	.121	Blue
.347	.366	#1, 6/1		10	23 (S) 35 (D)	.121	Black
.367	.389		#1/0, UW	11	23 (S) 35 (D)	.121	White
.390	.413	#1/0, 6/1		11	25 (S) 37 (D)	.121	Yellow
.414	.436		#2/0 7W	12	25 (S) 37 (D)	.121	Brown
.437	.463	#2/0 6/1 7/1		13	27 (S) 39 (D)	.121	Blue
.464	.490		#3/0 7-19W	13	27 (S) 39 (D)	.121	Green
.491	.521	#3/0, 6/1		14	29 (S) 41 (D)	.121	Orange
.522	.551		#4/0 7-19W	14	29 (S) 41 (D)	.121	Purple
.552	.585	#4/0, 6/1		15	31 (S) 43 (D)	.121	Red
.586	.606			14	31 (S) 43 (D)	.146	Black
.607	.630			14	33 (S) 45 (D)	.146	White
.631	.655			14	33 (S) 45 (D)	.146	Yellow
.656	.679			15	35 (S) 47 (D)	.146	Brown
.680	.703			15	35 (S) 47 (D)	.146	Blue
.704	.740			16	37 (S) 49 (D)	.146	Green

*S – Single support Line Guards. D – Double support Line Guards.
NOTE: Right Hand Lay Standard
*For conductors not listed, please see Conductor Reference on Page 48.

USED AS LINE GUARDS ON CONDUCTORS WHERE VIBRATION PROTECTION IS NOT ESSENTIAL. PROTECT AGAINST ABRASION, TIE-WIRE DAMAGE, FLASH-! VER BURNING.	USED AS TAP ARMOR TO PROTECT CONDUCTORS FROM WEAR AND FLASH-OVER DAMAGE UNDER HOT LINE TAPS.	USED AS PATCH RODS DESIGNED TO RESTORE FULL CONDUCTANCE AND STRENGTH OF ALUMINUM AND ACSR CONDUCTORS WHERE DAMAGE DOES NOT EXCEED 25% OF OUTER STRAND LAYER

NOTE: Applied overall diameter computed as follows:

Rod Size .121 x 2 . . . . . .= .242"
Conductor OD. . . . . .= .563"
Total Applied OD . . . . . .= .805"

Table 46

PHYSICAL PROPERTIES OF ALUMINUM ALLOY PREFORMED LINE GUARDS

For Aluminum Based Conductors

DIA. RANGE		*NOMINAL SIZES AWG OR CM		RODS PER SET	★ LENGTH INCHES	ROD DIA. INCHES	COLOR CODE
MIN. IN.	MAX. IN.	ACSR	AA				
.741	.792	397.5M, 26/7		17	39 (S) 51 (D)	.146	Orange
.793	.840	477M, 18/1	500M, 19-37W	18	39 (S) 51 (D)	.146	Purple
.841	.898	477M, 26/7	556.5M, 19W	19	41 (S) 53 (D)	.146	Blue
.899	.954	556.5M, 26/7	636M, 37W	18	43 (S) 55 (D)	.167	Green
.955	.986	605M, 26/7	715.5M, 37W	17	45 (S) 57 (D)	.182	White
.987	1.016	636M, 26/7	750M, 37W	18	45 (S) 57 (D)	.182	Yellow
1.017	1.064	715.5M, 26/7	795M, 37W	18	47 (S) 59 (D)	.182	Brown
1.065	1.098	715.5M, 30/19	874.5M, 37-61W	17	49 (S) 61 (D)	.204	Green
1.099	1.153	795M, 26/7	954M, 37W	15	49 (S) 61 (D)	.250	Orange
1.154	1.208	954M, 45/7	1033.5M, 37-61W	15	51 (S) 63 (D)	.250	Purple
1.209	1.268	1033.5M, 54/7	1192.5M, 61W	16	53 (S) 65 (D)	.250	Black
1.269	1.327	1192.5M, 45/7	1272M, 61W	17	53 (S) 65 (D)	.250	White
1.390	1.390	1272M, 45/7	1351.5M, 61W	17	55 (S) 67 (D)	.250	Yellow
1.391	1.440	1431M, 45/7	1510.5M, 61W	15	57 (S) 69 (D)	.310	Brown
1.441	1.508	1431M, 54/19	1590M, 61-91W	16	59 (S) 71 (D)	.310	Blue

*For conductors not listed, please see Conductor Reference on Page 48.

★S – Single support Line Guards D – Double support Line Guards

NOTE: Right Hand Lay Standard

NOTE: Applied overall diameter computed as follows:

Rod Size, .146" x 2 . . . . . – .292"
Conductor OD . . . . . – .783"
Total Applied OD. . . . . – 1.075"

USED AS LINE GUARDS RECOMMENDED FOR USE ON CONDUCTORS AT TIED SUPPORTS FOR MAXIMUM SPAN OF 300 FEET WHERE VIBRATION PROTECTION IS NOT ESSENTIAL, TO PROTECT AGAINST ABRASION, TIE WIRE DAMAGE AND FLASHOVER BURNING.

USED AS TAP ARMOR TO PROTECT CONDUCTORS FROM WEAR AND FLASH-OVER DAMAGE UNDER HOT LINE TAPS.

USED AS PATCH RODS DESIGNED TO RESTORE THE FULL CONDUCTANCE AND STRENGTH OF ALUMINUM AND ACSR CONDUCTORS WHERE DAMAGE DOES NOT EXCEED 25% OF OUTER STRAND LAYER.

Table 47

ALUMINUM ALLOY PREFORMED ARMOR RODS

Conductor Reference

AWG or MCM Sizes

RANGE	ACSR	ALL ALUMINUM	5005 & AAAC, KR	COMPRESTO	
				ACSR	ALL ALUMINUM
.182- .193		#6, 7W		#6, 6/1	
.194- .207	#6, 6/1	#4 Solid	#6, 3-7W		
.208- .219					#4, 7W
.220- .228	#5, 6/1		#5, 3-7W		
.229- .243		#4, 7W		#4, 7/1-6/1	
.244- .259	#4, 6/1-7/1		#4, 7W	#3, 6/1	
.260- .273		#3, 7W			#2, 7W
.274- .289			#3, 7W		
.290- .308		#2, 7W		#2, 6/1-7/1	#1, 7W
.309- .326	#2, 6/1-7/1		#2, 7W	#1, 6/1	
.327- .346		#1, 7W			1/0, 7-19W
.347- .366	#1, 6/1		#1, 7W	1/0, 6/1	
.367- .389	80M, 8/1	1/0, 7W			2/0, 7-19W
.390- .413	1/0, 6/1		1/0, 7W		
.414- .436		2/0, 7W		2/0, 6/1	3/0, 7-19W
.437- .463	2/0, 6/1-7/1 101.8M, 12/7		2/0, 7W		
.464- .490	110.8M, 12/7	3/0, 7-19W		3/0, 6/1	4/0, 7-19W
.491- .521	3/0, 6/1		3/0, 7W		
.522- .551	134.6M, 12/7	4/0, 7-19W		4/0, 6/1	250M, 19W
.552- .585	4/0, 6/1 159M, 12/7	250M, 19-37W	4/0, 7W	256.8M	300M, 19W
.586- .606		266.8M, 19W			
.607- .630	266.8M, 18/1 176.9M, 12/7				
.631- .655	266.8M, 6/7-26/7 190.8M, 12/7		266.8M, 19W		
.656- .679	211.3M, 12/7	336.4M, 19W 350M, 19W			
.680- .703	300M, 26/7 336.4M, 18/1				
.704- .740	336.4M, 26/7	397.5M, 19W	336.4M, 19W		
.741- .782	336.4M, 30/7 397.5M, 18/1				
.783- .814	397.5M, 26/7 477M, 18/1	477M, 19-37W	397.5M, 19W		
.815- .845					
.846- .907	477M, 26/7 556.5M, 18/1	556.5M, 19-37W	477M, 19W		
.908- .929	556.5M, 26/7	636M, 37W	556.5M, 19W		
.930- .976	605M, 26/7	715.5M, 37-61W			
.977-1.016	636M, 26/7		636M, 37W		
1.017-1.035	636M, 30/19	795M, 37-61W			
1.036-1.064	715.5M, 26/7 795M, 45/7				
1.065-1.098	795M, 24/7-54/7	874.5M, 37-61W			
1.099-1.139	795M, 26/7 900M, 45/7	954M, 37-61W	795M, 37W		
1.140-1.151	954M, 36/1				
1.162-1.208	900M, 54/7 954M, 45/7-54/7 1033.5M, 36/1	1033.5M, 37-61W			
1.209-1.269	1033.5M, 45/7-54/7 1113M, 45/7	1113M, 61W 1192.5M, 61W	954M, 37W 1033.5M, 61W		
1.270-1.327	1113M, 54/19 1192.5M, 45/7	1272M, 61W			

PREFORMED LINE PRODUCTS COMPANY.

Table 48

PHYSICAL PROPERTIES OF PREFORMED ALUMOWELD ARMOR RODS

For Alumoweld Strand

DIAMETER RANGE		*NOMINAL STRAND SIZE	RODS PER SET	LENGTH INCHES	ROD DIAMETER INCHES	COLOR CODE
MIN. IN.	MAX. IN.					
.169	.178	3#12	7	40''S 52''D	.102	Orange
.196	.207	3#11	7	40''S 52''D	.102	Black
.218	.225	3#10	8	40''S 52''D	.102	Green
.237	.249	1/4''-7#12 6-M-3#9	9	40''S 52''D	.102	Yellow
.264	.277	9/32''-7#11 8-M-3#8	9	42''S 54''D	.114	Blue
.296	.314	5/16''-7#10 10-M-3#7	9	46''S 58''D	.114	Black
.334	.352	11/32''-7#9 12.5-M-3#6	10	50''S 62''D	.114	Yellow
.373	.392	3/8''-7#8 16-M-3#5	10	50''S 62''D	.128	Orange
.426	.450	7/16'' 7#7 20-M	12	56''S 68''D	.128	Green
.477	.504	1/2'' 7#6	11	56''S 68''D	.144	Blue
.535	.565	9/16'' 7#5	12	60''S 72''D	.162	Yellow
.593	.625	5/8'' 7#4	11	60''S 72''D	.183	Black

*Nominal Strand Size indicates one of various cables within each range to which Armor Rods may be applied.

NOTE: Left Hand Lay Standard

NOTE: Applied overall diameter computed as follows:

Rod Size .102'' x 2 . . . . . = .204''
Strand OD . . . . . = .174''
Total Applied OD . . . . . = .378''

PREFORMED LINE PRODUCTS COMPANY

Table 49

PREFORMED GALVANIZED STEEL ARMOR RODS

For ACSR Conductor

DIAMETER RANGE		*NOMINAL SIZE	RODS PER SET	LENGTH INCHES	ROD DIAMETER INCHES	COLOR CODE
MIN. IN.	MAX. IN.					
.244	.259	6/1 #4 – 7/1	10	40"S 52"D	.086	Orange
.309	.326	6/1 #2 – 7/1	11	44"S 56"D	.100	Red
.347	.373	#1 – 6/1	12	48"S 60"D	.100	Black
.390	.413	1/0 – 6/1	11	52"S 64"D	.119	Yellow
.437	.463	2/0 – 6/1	11	54"S 66"D	.138	Blue
.491	.521	3/0 – 6/1	12	56"S 68"D	.138	Orange
.552	.585	4/0 – 6/1	12	60"S 72"D	.159	Red

For Galvanized Steel Strand

.229	.243	1/4 – 7W	10	40"	.086	Black
.244	.259	1/4 – 3W	10	40"	.086	Yellow
.309	.326	3W 5/16 – 7W	11	44"	.100	Black
.347	.373	3W 3/8 – 7W	12	48"	.100	Orange
.414	.436	7/16 – 7W	12	52"	.119	Green
.491	.521	19W 1/2 – 7W	12	56"	.138	Blue

*Nominal Conductor/Strand size indicates one of various cables within each range to which Armor Rods may be applied.

Note: Left Hand Lay Standard

NOTE: Applied overall diameter computed as follows:

Rod Size .100" x 2 . . . . . = .200"
Strand/Conductor OD. . . . = .198"
Total Applied OD . . . . . = .398"

PREFORMED LINE PRODUCTS COMPANY.

Table 50

CADMIUM COPPER ARMOR RODS

For Copper and †Copper Covered Steel-Copper Conductor

DIAMETER RANGE		**NOMINAL COND. SIZE	RODS PER SET	LENGTH INCHES	ROD *DIA. INCHES	COLOR CODE
MIN. INCHES	MAX. INCHES					
.160	.168	#6, Solid	7	38 50	.102	Green
.179	.188	#6, 7-W	7	40 52	.102	Black
.196	.207	#8A	8	40 52	.102	Gray
.226	.236	#6A	8	40 52	.102	Black
.250	.263	#3, 7-W	9	42 54	.102	Gray
.278	.295	#4A	10	42 54	.102	Red
.315	.333	#2, 3-W	9	46 58	.128	Blue
.353	.372	#2A	10	50 62	.128	Green
.373	.392	#1/0, 12-W	9	52 64	.144	Red
.409	.425	#2/0, 7-W	10	54 66	.144	Blue
.426	.450	#2/0, 12-W	10	54 66	.162	Gray
.451	.476	#3/0, 7-W	10	56 68	.162	Green
.477	.504	#3/0, 12-W	11	56 68	.162	Red
.505	.534	#4/0, 7-W	11	58 70	.162	Black
.535	.565	#4/0, 12-W	12	58 70	.162	Blue
.566	.592	250 Mcm, 19-W	12	60 72	.162	Gray
.593	.625	250 Mcm, 12-W	13	60 72	.162	Green

†For use in corrosive areas.
Left hand lay standard.
NOTE: The applied Armor Rod O.D. is determined by: 2 x Rod *Dia. + Conductor Dia.
**Nominal Conductor Size indicates one of various conductors within each range to which Armor Rod may be applied.

PREFORMED

Table 51

COPPER-COVERED STEEL ARMOR RODS

For Copper Covered Steel Strand and †Copper Covered Steel – Copper Conductor

DIAMETER RANGE		**NOMINAL STRAND SIZE	RODS PER SET	LENGTH INCHES	ROD *DIA. INCHES	COLOR CODE
MIN. INCHES	MAX. INCHES					
.169	.178	3#12	7	52	.102	Red
.196	.207	3#11, 8A	7	40 52	.102	Gray
.218	.225	3#10 4M	8	40 52	.102	Red
.226	.236	6A	8	40 52	.102	Black
.237	.249	6M–1/4''–7#12 3#9	9	42 54	.102	Blue
.264	.277	8M–9/32''–7#11 3#8	9	42 54	.102	Green
.278	.295	4A	10	42 54	.102	Red
.296	.314	10M–5/16''–7#10 3#7	9	44 56	.114	Black
.334	.352	12.5M–11/32'' 7#9 3#6	9	48 60	.128	Gray
.353	.372	14M, 2A	10	50 62	.128	Green
.373	.392	7#8, 3/8'' 16M, 3#5	9	52 64	.144	Red
.409	.425	18M	10	54 66	.144	Blue
.426	.450	7#7, 7/16''	10	54 66	.162	Gray
.477	.504	7#6, 1/2''	11	56 68	.162	Red
.505	.534	19#10 25M	11	58 70	.162	Black
.535	.565	7#5	12	58 70	.162	Blue
.566	.592	19#9	12	60 72	.162	Gray
.593	.625	7#4	13	60 72	.162	Green

†For use in non-corrosive areas.
Left hand lay standard.

Table 52

ASA SCHEDULE 40 ALUMINUM PIPE CONDUCTORS

Physical Properties

NOMINAL PIPE SIZE IN.	DIAMETER IN.		WALL THICKNESS IN.	AREA SQ. IN.	WT./FT. LB.	MOMENT OF INERTIA IN.	SECTION MODULUS IN.^{3}	RADIUS OF GYRATION IN.^{4}
	OUTSIDE	INSIDE						
½	0.840	0.622	0.109	0.2503	0.294	0.0171	0.0407	0.2613
¾	1.050	0.824	0.113	0.3326	0.391	0.0370	0.0705	0.3337
1	1.315	1.049	0.133	0.4939	0.581	0.0873	0.1328	0.4205
1¼	1.660	1.380	0.140	0.6685	0.786	0.1947	0.2346	0.5397
1½	1.900	1.610	0.145	0.7995	0.940	0.3099	0.3262	0.6226
2	2.375	2.067	0.154	1.0745	1.264	0.6657	0.5606	0.7871
2½	2.875	2.469	0.203	1.7041	2.004	1.530	1.064	0.9474
3	3.500	3.068	0.216	2.2285	2.621	3.017	1.724	1.164
3½	4.000	3.548	0.226	2.6795	3.151	4.788	2.394	1.337
4	4.500	4.026	0.237	3.1740	3.733	7.232	3.214	1.510
5	5.563	5.047	0.258	4.2999	5.057	15.16	5.451	1.878
6	6.625	6.065	0.280	5.5814	6.564	28.15	8.498	2.245
8	8.625	7.981	0.322	8.3956	9.878	72.51	16.813	2.938

Table 53

ASA SCHEDULE 40 ALUMINUM PIPE CONDUCTORS

Electrical Properties

NOMINAL PIPE SIZE IN.	X_a INDUCTIVE REACTANCE 1-FT SPACING OHMS/1000 FT	6063—T6 ①						6061-T6 ②					
		DC RESISTANCE AT 20°C OHMS/1000 FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ 60 CYCLE AMP			DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS③ 60 CYCLE AMP		
					④	⑤	⑥				④	⑤	⑥
½	0.0790	61.41	1.00	72.15	310	365	405	81.44	1.00	92.23	270	320	355
¾	0.0736	46.21	1.00	54.30	390	460	495	61.14	1.00	69.24	345	410	440
1	0.0682	31.12	1.00	36.57	520	620	650	41.21	1.00	46.68	460	550	575
1¼	0.0627	22.99	1.00	27.02	665	800	810	30.48	1.00	34.52	590	705	720
1½	0.0595	19.22	1.00	22.59	770	930	925	25.45	1.00	28.82	680	825	820
2	0.0542	14.30	1.00	16.82	980	1210	1150	18.94	1.00	21.45	865	1050	1020
2½	0.0498	9.020	1.001	10.61	1340	1630	1550	11.95	1.00	13.53	1180	1440	1370
3	0.0452	6.896	1.002	8.122	1640	2030	1890	9.138	1.00	10.35	1460	1800	1670
3½	0.0421	5.735	1.003	6.759	1900	2360	2170	7.597	1.001	8.613	1690	2090	1920
4	0.0393	4.842	1.004	5.713	2180	2710	2460	6.415	1.002	7.280	1940	2400	2180
5	0.0343	3.574	1.005	4.221	2780	3470	3080	4.735	1.002	5.373	2470	3070	2730
6	0.0302	2.754	1.006	3.257	3500	—	3735	—	—	—	3040	—	3245

① 6063-T6–53% IACS typical.
② 6061-T6–40% IACS typical.
③ Ratings based on 30-C over 40-C ambient; conductors horizontal; conductor spacing sufficient to eliminate proximity effect.
④ Conductors in still but unconfined air. Normal oxidized surface, indoors ($e = 0.35$).
⑤ Conductors in still but unconfined air, painted with flat nonmetallic paint ($e = 0.90$).
⑥ Conductors outdoors with a 2-ft/sec crosswind. Normal oxidized surface ($e = 0.50$).

*Nema CC1-1981

ALUMINUM COMPANY OF AMERICA

Table 54

ASA SCHEDULE 80 ALUMINUM PIPE CONDUCTORS

Physical Properties

NOMINAL PIPE SIZE IN.	DIAMETER IN.		WALL THICKNESS IN.	AREA SQ. IN.	WT./FT. LB.	MOMENT OF INERTIA IN.^{4}	SECTION MODULUS IN.^{3}	RADIUS OF GYRATION IN.
	OUTSIDE	INSIDE						
½	0.840	0.546	0.147	0.3200	0.376	0.0201	0.0478	0.2505
¾	1.050	0.742	0.154	0.4335	0.510	0.0448	0.0853	0.3214
1	1.315	0.957	0.179	0.6388	0.751	0.1056	0.1606	0.4066
1¼	1.660	1.278	0.191	0.8815	1.037	0.2418	0.2913	0.5238
1½	1.900	1.500	0.200	1.0681	1.256	0.3912	0.4118	0.6052
2	2.375	1.939	0.218	1.4773	1.737	0.8679	0.7309	0.7665
2½	2.875	2.323	0.276	2.2535	2.650	1.924	1.339	0.9241
3	3.500	2.900	0.300	3.0159	3.547	3.894	2.225	1.136
3½	4.000	3.364	0.318	3.6784	4.326	6.281	3.140	1.307
4	4.500	3.826	0.337	4.4074	5.183	9.611	4.272	1.477
5	5.563	4.813	0.375	6.1120	7.188	20.670	7.432	1.839
6	6.625	5.761	0.432	8.4053	9.884	40.501	12.227	2.195
8	8.625	7.625	0.500	12.7627	15.008	105.743	24.520	2.878

Table 55

ASA SCHEDULE 80 ALUMINUM PIPE CONDUCTORS

Electrical Properties

NOMINAL PIPE SIZE IN.	X_a INDUCTIVE REACTANCE 1-FT SPACING OHMS/1000 FT	6063—T6 ①						6061-T6 ②					
		DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ 60 CYCLE AMP ④	⑤	⑥	DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ 60 CYCLE AMP ④	⑤	⑥
½	0.0797	48.03	1.00	56.44	350	410	455	63.63	1.00	72.06	310	365	400
¾	0.0742	35.46	1.00	41.66	445	525	565	46.91	1.00	53.13	395	465	500
1	0.0688	24.06	1.00	28.27	590	705	740	31.86	1.00	36.08	525	625	655
1¼	0.0632	17.44	1.00	20.49	765	920	930	23.11	1.00	26.17	675	815	825
1½	0.0599	14.39	1.00	16.91	890	1080	1070	19.06	1.00	21.59	785	950	945
2	0.0546	10.41	1.002	12.30	1150	1390	1350	13.78	1.00	15.61	1020	1230	1200
2½	0.0502	6.819	1.007	8.068	1530	1870	1780	9.033	1.004	10.27	1360	1660	1580
3	0.0456	5.096	1.01	6.048	1910	2350	2190	6.751	1.005	7.683	1700	2090	1940
3½	0.0424	4.179	1.013	4.974	2220	2750	2530	5.536	1.007	6.313	1980	2440	2240
4	0.0396	3.488	1.018	4.172	2560	3170	2880	4.620	1.01	5.284	2270	2820	2560
5	0.0346	2.515	1.026	3.032	3280	4090	3640	3.331	1.016	3.833	2920	3650	3230
*6	0.0306	1.829	1.046	2.248	4205	—	4490	—	—	—	3650	—	3900

*Nema CC1-1981

① 6063-T6 – 53% IACS typical.
② 6061-T6 – 40% IACS typical.
③ Ratings based on 30°C rise over 40°C ambient; conductor spacing sufficient to eliminate proximity effect.
④ Conductors in still but unconfined air. Normal oxidized surface, indoors (e=0.35).
⑤ Conductors in still but unconfined air, painted with flat nonmetallic paint (e=0.90).
⑥ Conductors outdoors with a 2-ft./sec. crosswind. Normal oxidized surface (e=0.50).

Table 56

ALUMINUM ROUND TUBE CONDUCTORS

Physical Properties

DIAMETER, IN.		WALL THICKNESS IN.	AREA SQ. IN.	WT./FT. LB.	MOMENT OF INERTIA IN.4	SECTION MODULUS IN.3	RADIUS OF GYRATION IN.
OUTSIDE O.D.	INSIDE I.D.						
6	5.376	0.312	5.584	6.567	22.65	7.547	2.014
6	5.250	0.375	6.627	7.793	26.33	8.774	1.993
6	5.000	0.500	8.639	10.16	32.94	10.98	1.953
8	7.376	0.312	7.547	8.875	55.84	13.96	2.720
8	7.250	0.375	8.983	10.56	65.45	16.36	2.699
8	7.000	0.500	11.78	13.85	83.21	20.80	2.658
10	9.376	0.312	9.511	11.18	111.7	22.34	3.427
10	9.250	0.375	11.34	13.34	131.5	26.30	3.046
10	9.000	0.500	14.92	17.55	168.8	33.76	3.363
12	11.250	0.375	13.70	16.11	231.6	38.60	4.112
12	11.000	0.500	18.06	21.24	299.2	49.86	4.070
12	10.750	0.625	22.33	26.27	362.3	60.39	4.028

Table 57

ALUMINUM ROUND TUBE CONDUCTORS

Electrical Properties

OUTSIDE DIAMETER IN.	WALL THICKNESS IN.	X_a INDUCTIVE REACTANCE 1-FT. SPACING OHMS/1000 FT.	EC-H141 ①					NO. 2 EC-T61 ②				
			DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.	CURRENT RATINGS ③ 60 CYCLE AMP		DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.	CURRENT RATINGS ③ 60 CYCLE AMP	
						④	⑤				④	⑤
6	0.312	0.0326	2.391	1.02	2.930	3450	4300	2.559	1.02	3.102	3350	4180
6	0.375	0.0328	2.014	1.04	2.517	3720	4640	2.156	1.03	2.640	3640	4530
6	0.500	0.0313	1.545	1.11	2.061	4110	5130	1.654	1.09	2.143	4030	5030
8	0.312	0.0258	1.769	1.02	2.168	4520	5690	1.893	1.02	2.295	4390	5540
8	0.375	0.0260	1.486	1.04	1.857	4880	6150	1.591	1.03	1.947	4770	6000
8	0.500	0.0262	1.133	1.11	1.511	5420	6820	1.213	1.10	1.586	5290	6650
10	0.312	0.0206	1.404	1.02	1.720	5580	7070	1.502	1.02	1.821	5420	6870
10	0.375	0.0207	1.177	1.04	1.471	6030	7640	1.260	1.03	1.543	5890	7460
10	0.500	0.0209	0.8948	1.11	1.193	6700	8490	0.9578	1.10	1.252	6540	8280
12	0.375	0.0164	0.9745	1.04	1.218	7160	9120	1.043	1.03	1.277	6990	8910
12	0.500	0.0166	0.7392	1.11	0.9858	7960	10100	0.7913	1.11	1.044	7730	9850
12	0.625	0.0167	0.5979	1.24	0.8907	8370	10700	0.6399	1.22	0.9279	8200	10400

① EC-H141 – 61% IACS minimum.
② No. 2 EC-T61 – 57% IACS minimum.
③ Ratings based on 30°C rise over 40°C ambient; conductors horizontal; conductor spacing sufficient to eliminate proximity effect.
④ Conductors in still but unconfined air. Normal oxidized surface, indoors (e=0.35).
⑤ Conductors in still but unconfined air, painted with a flat nonmetallic paint (e=0.90).

ALUMINUM COMPANY OF AMERICA.

Table 58

ALUMINUM RECTANGULAR BUS BAR

Current Ratings–Amperes ① ②

SIZE IN.	1 BAR				2 BARS				3 BARS				4 BARS			
	DC		AC – 60 CYCLE		DC		AC – 60 CYCLE		DC		AC – 60 CYCLE		DC		AC – 60 CYCLE	
	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④
1/4 x 1	310	305	310	305	615	605	610	600	835	815	815	800	965	940	940	910
1-1/2	435	425	430	420	860	835	845	820	1140	1100	1100	1070	1330	1290	1260	1230
2	560	545	550	535	1080	1050	1050	1020	1430	1380	1360	1320	1690	1640	1570	1530
3	790	765	775	750	1480	1430	1410	1370	1980	1920	1820	1760	2350	2260	2070	2010
4	1020	990	990	960	1850	1790	1720	1670	2490	2420	2210	2150	2990	2890	2530	2460
5	1250	1210	1200	1170	2200	2140	2010	1960	2970	2890	2570	2510	3560	3460	2930	2860
6	1470	1430	1400	1360	2530	2450	2270	2220	3420	3300	2900	2830	4100	3980	3320	3240
8	1900	1850	1780	1730	3140	3050	2750	2680	4280	4140	3530	3440	5140	4990	4050	3940
3/8 x 2	705	680	690	670	1330	1280	1260	1230	1790	1720	1630	1590	2120	2040	1860	1810
3	990	960	955	930	1810	1750	1660	1620	2450	2360	2120	2060	3020	2910	2430	2370
4	1270	1230	1200	1170	2260	2180	2000	1940	3090	2980	2550	2480	3770	3640	2930	2850
5	1550	1500	1440	1410	2670	2580	2310	2250	3660	3540	2960	2890	4480	4340	3390	3310
6	1820	1770	1680	1640	3080	2980	2620	2560	4320	4090	3350	3260	5180	5000	3830	3740
8	2350	2280	2130	2080	3800	3690	3150	3080	5260	5100	4040	3950	6430	6230	4610	4510
1/2 x 3	1160	1120	1100	1080	2040	1990	1800	1760	2870	2780	2320	2270	3510	3400	2650	2590
4	1490	1450	1380	1350	2540	2460	2150	2100	3650	3440	2760	2700	4440	4280	3160	3090
5	1800	1750	1650	1610	3000	2790	2490	2430	4200	4060	3180	3110	5200	5030	3640	3560
6	2120	2060	1900	1860	3450	3340	2800	2730	4830	4660	3580	3500	5970	5760	4100	4000
8	2740	2660	2410	2360	4280	4150	3370	3300	5970	5800	4310	4220	7400	7160	4930	4840

① Ratings based on 30°C rise over 40°C ambient in still but unconfined air; conductors horizontal; conductor spacing sufficient to eliminate proximity effect; normal oxidized surface, indoors (e=0.35).

② For multiple bar arrangements, the space between bars equal to the bar thickness.

③ EC – 61% IACS minimum.

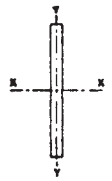
④ No. 2 EC-T61 – 57% IACS minimum.

ALUMINUM COMPANY OF AMERICA

Table 59

ALUMINUM RECTANGULAR BUS BAR

Physical and Electrical Properties



SIZE IN.	AREA SQ. IN.	WT./FT. LB.	MOMENT OF INERTIA IN.^{4}		SECTION MODULUS IN.^{3}		RADIUS OF GYRATION IN.		X_a INDUCTIVE REACTANCE 1-FT. SPACING OHMS/ 1000 FT.	EC			NO. 2 EC-T61		
			I_{x-y}	I_{y-y}	S_{x-x}	S_{y-y}	r_{x-x}	r_{y-y}		DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.	DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.
1/4 x 1	0.250	0.294	0.021	0.0013	0.042	0.010	0.289	0.072	0.0864	53.40	1.01	64.80	57.16	1.01	68.54
1-1/2	0.375	0.441	0.070	0.0020	0.094	0.016	0.434	0.072	0.0787	35.60	1.01	43.20	38.11	1.01	45.72
2	0.500	0.588	0.167	0.0026	0.167	0.021	0.578	0.072	0.0729	26.70	1.02	32.40	25.58	1.02	34.63
3	0.750	0.882	0.563	0.0039	0.375	0.031	0.867	0.072	0.0644	17.80	1.04	22.25	19.05	1.04	23.54
4	1.000	1.176	1.333	0.0052	0.667	0.042	1.156	0.072	0.0583	13.35	1.06	17.00	14.29	1.06	18.00
5	1.250	1.470	2.604	0.0065	1.042	0.052	1.445	0.072	0.0534	10.68	1.09	13.93	11.43	1.08	14.67
6	1.500	1.764	4.500	0.0077	1.500	0.063	1.734	0.072	0.0492	8.900	1.11	11.86	9.527	1.10	12.45
8	2.000	2.352	10.670	0.0100	2.667	0.083	2.312	0.072	0.0431	6.675	1.15	9.246	7.145	1.14	9.676
3/8 x 2	0.750	0.882	0.250	0.0088	0.250	0.047	0.578	0.108	0.0716	17.80	1.04	21.60	19.05	1.04	23.54
3	1.125	1.323	0.844	0.0130	0.563	0.070	0.867	0.108	0.0636	11.87	1.08	15.32	12.70	1.07	16.15
4	1.500	1.764	2.000	0.0180	1.000	0.094	1.156	0.108	0.0576	8.900	1.12	11.88	9.527	1.10	12.45
5	1.875	2.205	3.906	0.0220	1.563	0.117	1.445	0.108	0.0529	7.120	1.15	9.795	7.621	1.13	10.23
6	2.250	2.646	6.750	0.0260	2.250	0.141	1.734	0.108	0.0491	5.933	1.18	8.362	6.351	1.16	8.752
8	3.000	3.528	16.000	0.0350	4.000	0.187	2.312	0.108	0.0430	4.450	1.23	6.545	4.763	1.21	6.846
1/2 x 3	1.500	1.764	1.125	0.0310	0.750	0.125	0.867	0.145	0.0627	8.900	1.12	11.88	9.527	1.10	12.45
4	2.000	2.352	2.667	0.0420	1.333	0.167	1.156	0.145	0.0570	6.675	1.17	9.319	7.145	1.15	9.761
5	2.500	2.940	5.208	0.0520	2.083	0.208	1.445	0.145	0.0523	5.340	1.21	7.718	5.716	1.19	8.081
6	3.000	3.528	9.000	0.0630	3.000	0.250	1.734	0.145	0.0485	4.450	1.24	6.609	4.763	1.22	6.903
8	4.000	4.704	21.330	0.0830	5.332	0.332	2.312	0.145	0.0423	3.338	1.29	5.173	3.573	1.27	5.391

Table 60

ALUMINUM RECTANGULAR BUS BAR

Current Ratings–Amperes ① ②

SIZE IN.	1 BAR				2 BARS				3 BARS				4 BARS			
	DC		AC – 60 CYCLE		DC		AC – 60 CYCLE		DC		AC – 60 CYCLE		DC		AC – 60 CYCLE	
	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④	EC ③	NO. 2 EC-T61 ④
1/4 x 1	305	300	305	300	595	585	590	580	790	775	775	765	920	905	895	880
1-1/2	430	420	425	415	820	800	805	785	1080	1060	1050	1020	1270	1240	1210	1180
2	550	535	545	530	1030	1010	1010	980	1380	1340	1310	1280	1620	1560	1500	1460
3	775	750	760	735	1430	1380	1360	1310	1920	1850	1760	1700	2270	2180	2000	1940
4	990	955	960	930	1780	1720	1650	1600	2380	2300	2120	2050	2840	2740	2400	2330
5	1200	1160	1150	1120	2060	2000	1880	1830	2780	2670	2400	2330	3270	3160	2680	2610
6	1360	1320	1300	1270	2280	2220	2060	2010	3080	2970	2610	2540	3550	3440	2870	2800
8	1670	1620	1560	1520	2720	2640	2380	2320	3520	3410	2910	2840	4030	3900	3160	3080
3/8 x 2	685	670	675	660	1270	1230	1200	1170	1780	1720	1530	1490	1990	1920	1740	1700
3	960	935	930	905	1740	1680	1590	1550	2320	2250	2010	1960	2820	2730	2280	2220
4	1210	1190	1160	1130	2160	2080	1910	1860	2900	2800	2400	2340	3480	3360	2700	2630
5	1440	1420	1370	1340	2500	2420	2160	2110	3360	3250	2710	2650	3980	3850	3010	2940
6	1670	1630	1560	1520	2800	2710	2390	2330	3800	3680	3010	2940	4430	4280	3280	3200
8	2040	2000	1860	1820	3340	3240	2760	2700	4340	4210	3340	3270	4980	4320	3570	3490
1/2 x 3	1120	1100	1070	1050	1920	1870	1690	1650	2640	2560	2130	2080	3170	3070	2390	2340
4	1410	1390	1330	1300	2360	2290	2000	1960	3270	3150	2530	2470	3900	3800	2820	2750
5	1680	1650	1550	1520	2760	2680	2290	2240	3760	3630	2850	2780	4520	4370	3160	3090
6	1930	1890	1750	1710	3140	3050	2550	2490	4220	4060	3130	3050	4980	4800	3410	3330
8	2350	2310	2090	2050	3750	3640	2960	2900	4950	4790	3560	3490	5700	5510	3800	3720

① Ratings based on 30°C rise over 40°C ambient in still but unconfined air; conductors horizontal; conductor spacing sufficient to eliminate proximity effect; normal oxidized surface, indoors (e=0.35).

② For multiple bar arrangements, the space between bars is equal to the bar thickness.

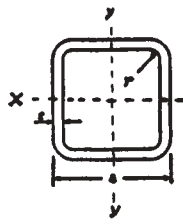
③ EC–61% IACS minimum.

④ No. 2 EC-T61–57% IACS minimum.

Table 61

ALUMINUM SQUARE TUBE CONDUCTORS

Physical Properties



SQUARE SIDE a IN.	WALL THICKNESS t IN.	OUTSIDE CORNER RADIUS r IN.	PERIMETER IN.	AREA SQ. IN.	WT./FT. LB.	x-x AND y-y AXIS		
						MOMENT OF INERTIA IN.^{4}	SECTION MODULUS IN.^{3}	RADIUS OF GYRATION IN.
3	1/4	3/8	11.36	2.643	3.108	3.272	2.181	1.113
3	3/8	1/2	11.14	3.736	4.394	4.215	2.810	1.062
3	1/2	3/4	10.71	4.571	5.375	4.598	3.065	1.003
4	1/4	1/2	15.14	3.589	4.221	8.215	4.108	1.513
4	3/8	1/2	15.14	5.236	6.158	11.30	5.652	1.469
4	1/2	3/4	14.71	6.571	7.728	13.06	6.532	1.410
5	1/4	3/4	18.71	4.482	5.271	16.26	6.503	1.905
5	3/8	3/4	18.71	6.575	7.732	22.76	9.105	1.861
5	1/2	3/4	18.71	8.571	10.08	28.32	11.33	1.818
6	1/4	3/4	22.71	5.482	6.447	29.36	9.786	2.314
6	3/8	3/4	22.71	8.075	9.496	41.59	13.86	2.269
6	1/2	3/4	22.71	10.57	12.43	52.35	17.45	2.225

Table 62

ALUMINUM SQUARE TUBE CONDUCTORS

Electrical Properties

SQUARE SIDE a IN.	WALL THICKNESS t IN.	X_a INDUCTIVE REACTANCE 1 FT. SPACING OHMS/1000 FT.	NO. 2 EC-T61 ①					EC-H141 ②				
			DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.	CURRENT RATINGS ③ 60 CYCLE AMP ④	⑤	DC RESISTANCE AT 20°C MICROHMS/FT.	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT.	CURRENT RATINGS ③ 60 CYCLE AMP ④	⑤
3	1/4	0.0455	5.407	1.04	6.683	1880	2300	5.051	1.04	6.312	1930	2370
3	3/8	0.0461	3.825	1.09	4.955	2170	2640	3.573	1.10	4.722	2210	2710
3	1/2	0.0469	3.126	1.18	4.384	2250	2760	2.921	1.19	4.176	2310	2820
4	1/4	0.0387	3.982	1.05	4.969	2450	3020	3.720	1.05	4.692	2520	3110
4	3/8	0.0390	2.729	1.11	3.600	2880	3550	2.550	1.12	3.431	2950	3630
4	1/2	0.0396	2.175	1.21	3.127	3040	3760	2.032	1.23	3.002	3110	3830
5	1/4	0.0335	3.188	1.06	4.017	2980	3700	2.979	1.06	3.794	3060	3800
5	3/8	0.0338	2.173	1.13	2.919	3490	4340	2.030	1.14	2.782	3580	4440
5	1/2	0.0340	1.667	1.24	2.457	3810	4730	1.558	1.26	2.357	3880	4820
6	1/4	0.0291	2.607	1.08	3.346	3540	4420	2.435	1.08	3.160	3640	4550
6	3/8	0.0293	1.770	1.15	2.419	4170	5200	1.653	1.16	2.304	4260	5320
6	1/2	0.0296	1.352	1.28	2.056	4520	5640	1.263	1.30	1.972	4600	5750

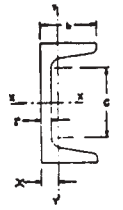
① No. EC-T61 – 57% minimum.
② EC-H141 – 61% IACS minimum.
③ Ratings based on 30°C rise over 40°C ambient; conductors horizontal; conductor spacing sufficient to eliminate proximity effect.
④ Conductors in still but unconfined air. Normal oxidized surface, indoors (e=0.35).
⑤ Conductors in still but unconfined air, painted with a flat nonmetallic paint (e=0.90).

ALUMINUM COMPANY OF AMERICA.

Table 63

ALUMINUM CHANNEL CONDUCTORS

Physical Properties

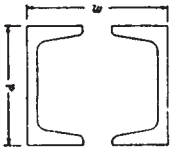


SINGLE CHANNEL

CHANNEL SIZE IN.	WEB THICKNESS t IN.	FLANGE WIDTH b IN.	SECTION AREA SQ IN.	WT/FT LB	MOMENT OF INERTIA IN.^{4}		SECTION MODULUS IN.^{3}		RADIUS OF GYRATION IN.		DISTANCE TO NEUTRAL AXIS $x1$ IN.	INNER FLAT SURFACE c IN.
					$I_{x\text{-}x}$	$I_{y\text{-}y}$	$S_{x\text{-}x}$	$S_{y\text{-}y}$	$r_{x\text{-}x}$	$r_{y\text{-}y}$		
3	0.170	1.410	1.21	1.42	1.66	0.20	1.10	0.20	1.17	0.40	0.44	1-3/4
3	0.258	1.498	1.47	1.73	1.85	0.25	1.24	0.23	1.12	0.41	0.44	1-3/4
3	0.356	1.596	1.76	2.07	2.07	0.31	1.38	0.27	1.08	0.42	0.46	1-3/4
4	0.180	1.580	1.57	1.85	3.83	0.32	1.92	0.28	1.56	0.45	0.46	2-3/4
4	0.247	1.647	1.84	2.16	4.19	0.37	2.10	0.31	1.51	0.45	0.45	2-3/4
4	0.320	1.720	2.13	2.50	4.58	0.43	2.29	0.34	1.47	0.45	0.46	2-3/4
5	0.190	1.750	1.97	2.32	7.49	0.48	3.00	0.38	1.95	0.49	0.48	3-3/4
5	0.325	1.885	2.64	3.10	8.90	0.63	3.56	0.45	1.83	0.49	0.48	3-3/4
5	0.472	2.032	3.38	3.97	10.43	0.81	4.17	0.53	1.76	0.49	0.51	3-3/4
6	0.225	1.945	2.55	3.00	13.57	0.73	4.52	0.51	2.31	0.54	0.51	4-1/2
6	0.314	2.034	3.09	3.63	15.18	0.87	5.06	0.56	2.22	0.53	0.50	4-1/2
6	0.437	2.157	3.82	4.48	17.39	1.05	5.80	0.64	2.13	0.52	0.50	4-1/2
7	0.314	2.194	3.60	4.23	24.24	1.17	6.93	0.70	2.60	0.57	0.52	5-1/2
7	0.419	2.299	4.33	5.10	27.24	1.38	7.78	0.78	2.51	0.56	0.53	5-1/2
7	0.524	2.404	5.07	5.96	30.25	1.59	8.64	0.86	2.44	0.56	0.55	5-1/2
8	0.303	2.343	4.04	4.75	36.11	1.53	9.03	0.85	2.99	0.61	0.55	6-1/4
8	0.395	2.435	4.78	5.62	40.04	1.75	10.01	0.93	2.90	0.61	0.55	6-1/4
8	0.520	2.560	5.78	6.80	45.37	2.07	11.34	1.04	2.80	0.60	0.57	6-1/4
10	0.375	3.500	7.30	8.58	109.62	7.19	21.92	2.80	3.88	0.99	0.93	7-1/2
10	0.438	3.563	7.93	9.32	114.87	7.73	22.97	2.93	3.81	0.99	0.92	7-1/2
10	0.500	3.625	8.55	10.05	120.03	8.25	24.01	3.04	3.75	0.98	0.91	7-1/2

Table 64

ELECTRICAL PROPERTIES



TWO CHANNELS

DEPTH d IN.	WIDTH w IN.	X_a INDUCTIVE REACTANCE 1-FT SPACING OHMS/1000 FT	EC-H12 ①					NO. 2 EC-T61 ②				
			DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ AMP		DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ AMP	
						DC	AC 60 CYCLE				DC	AC 60 CYCLE
3	3-9/16	0.0399	5.517	1.03	6.827	2400	2360	5.905	1.03	7.229	2330	2290
3	3-15/16	0.0420	4.541	1.05	5.729	2680	2610	4.861	1.05	6.066	2600	2530
3	3-15/16	0.0435	3.793	1.09	4.967	2970	2830	4.060	1.08	5.211	2870	2770
4	4-3/16	0.0388	4.252	1.04	5.312	2940	2890	4.551	1.04	5.625	2860	2810
4	4-3/16	0.0391	3.628	1.06	4.621	3170	3080	3.883	1.05	4.846	3090	3010
4	4-3/8	0.0393	3.134	1.08	4.066	3460	3330	3.354	1.07	4.266	3360	3250
5	5	0.0337	3.388	1.05	4.275	3550	3470	3.627	1.05	4.527	3450	3370
5	5	0.0338	2.528	1.09	3.313	4120	3940	2.707	1.08	3.474	4000	3850
5	5	0.0341	1.975	1.18	2.800	4660	4290	2.114	1.17	2.939	4530	4190
6	6	0.0293	2.618	1.07	3.365	4320	4190	2.802	1.06	3.530	4210	4090
6	6	0.0294	2.160	1.10	2.855	4770	4550	2.312	1.09	2.995	4640	4440
6	6	0.0295	1.747	1.15	2.414	5310	4950	1.870	1.14	2.534	5160	4840
7	7	0.0254	1.854	1.12	2.495	5480	5180	1.985	1.11	2.618	5330	5060
7	7	0.0258	1.542	1.17	2.167	6020	5560	1.650	1.16	2.275	5850	5430
7	7	0.0260	1.317	1.25	1.978	6510	5820	1.409	1.23	2.060	6330	5710
8	8	0.0226	1.652	1.12	2.223	6130	5790	1.769	1.11	2.333	5950	5650
8	8	0.0228	1.396	1.17	1.963	6670	6160	1.495	1.16	2.061	6480	6010
8	8	0.0230	1.155	1.27	1.763	7330	6510	1.236	1.25	1.836	7130	6370
10	10	0.0175	0.9144	1.23	1.352	9140	8240	0.9788	1.22	1.419	8870	8040
10	10	0.0176	0.8417	1.30	1.314	9520	8350	0.9010	1.28	1.371	9250	8180
10	10	0.0178	0.7807	1.34	1.257	9890	8540	0.8357	1.32	1.311	9610	8360

① EC-H12–61% IACS minimum.

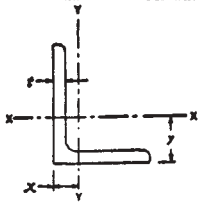
② No. 2 EC-T61–57% IACS minimum.

③ Ratings based on 30°C rise over 40°C ambient in still but unconfined air; conductors horizontal; conductor spacing sufficient to eliminate proximity effect; normal oxidized surface, indoors (e=0.35).

Table 65

ALUMINUM ANGLE CONDUCTORS

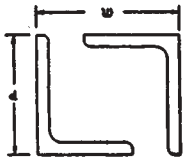
Physical Properties



SINGLE ANGLE

ANGLE SIZE IN.	WEB THICKNESS t	SECTION AREA SQ.IN.	WT/FT LB	MOMENT OF INERTIA IN.^{4}		SECTION MODULUS IN.^{3}		RADIUS OF GYRATION IN.		DISTANCE TO NEUTRAL AXIS IN.	
				$I_{x\text{-}x}$	$I_{y\text{-}y}$	$S_{x\text{-}x}$	$S_{y\text{-}y}$	$r_{x\text{-}x}$	$r_{y\text{-}y}$	$y1$	$x1$
2-1/2 x 2	1/4	1.07	1.26	0.65	0.37	0.38	0.25	0.78	0.58	0.78	0.53
2-1/2 x 2	3/8	1.55	1.83	0.91	0.51	0.54	0.36	0.76	0.57	0.83	0.58
2-1/2 x 2-1/2	1/4	1.19	1.40	0.69	0.69	0.39	0.39	0.76	0.76	0.71	0.71
2-1/2 x 2-1/2	3/8	1.74	2.05	0.98	0.98	0.56	0.56	0.75	0.75	0.76	0.76
3 x 3	1/4	1.43	1.68	1.18	1.18	0.54	0.54	0.91	0.91	0.82	0.82
3 x 3	3/8	2.10	2.47	1.70	1.70	0.80	0.80	0.90	0.90	0.87	0.87
3 x 3	1/2	2.74	3.23	2.16	2.16	1.04	1.04	0.89	0.89	0.92	0.92
4 x 3	1/4	1.69	1.99	2.68	1.29	0.96	0.56	1.26	0.87	1.21	0.72
4 x 3	3/8	2.49	2.93	3.88	1.86	1.42	0.83	1.25	0.86	1.26	0.77
4 x 3	1/2	3.25	3.83	4.96	2.36	1.85	1.08	1.24	0.85	1.31	0.82
4 x 3	5/8	3.99	4.69	5.95	2.82	2.25	1.32	1.22	0.84	1.36	0.86
4 x 4	1/4	1.94	2.28	2.94	2.94	1.00	1.00	1.23	1.23	1.07	1.07
4 x 4	3/8	2.86	3.38	4.26	4.26	1.48	1.48	1.22	1.22	1.12	1.12
4 x 4	1/2	3.75	4.41	5.46	5.46	1.93	1.93	1.21	1.21	1.17	1.17
4 x 4	5/8	4.61	5.42	6.56	6.56	2.36	2.36	1.19	1.19	1.22	1.22
5 x 3-1/2	3/8	3.05	3.58	7.56	3.04	2.21	1.15	1.58	1.00	1.58	0.84
5 x 3-1/2	1/2	4.00	4.70	9.77	3.91	2.90	1.50	1.56	0.99	1.63	0.89
5 x 3-1/2	5/8	4.92	5.79	11.82	4.70	3.56	1.84	1.55	0.98	1.68	0.94
6 x 4	3/8	3.60	4.24	13.02	4.63	3.17	1.50	1.90	1.13	1.90	0.91
6 x 4	1/2	4.74	5.58	16.95	6.01	4.19	1.98	1.89	1.13	1.96	0.97
6 x 4	5/8	5.85	6.88	20.63	7.27	5.17	2.44	1.88	1.11	2.01	1.02

Table 66



Electrical Properties

TWO ANGLES

DEPTH d IN.	WIDTH w IN.	DC RESISTANCE AT 20°C MICROHMS/FT	EC-H12 ①				NO. 2EC-T61 ②				
			R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ AMP		DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS ③ AMP	
					DC	AC 60 CYCLE				DC	AC 60 CYCLE
2-1/2	3	6.238	1.03	7.720	2010	1980	6.678	1.03	8.174	1950	1920
2-1/2	3	4.306	1.09	5.640	2420	2310	4.610	1.08	5.917	2350	2260
2-1/2	3-1/2	5.609	1.04	7.010	2230	2190	6.004	1.03	7.350	2170	2140
2-1/2	3-1/2	3.836	1.09	5.024	2700	2580	4.106	1.08	5.270	2620	2520
3	4	4.668	1.05	5.888	2610	2550	4.997	1.04	6.176	2540	2490
3	4	3.179	1.11	4.239	3160	3000	3.402	1.10	4.448	3080	2930
3	4	2.436	1.20	3.559	3570	3260	2.627	1.19	3.688	3490	3200
4	4	3.950	1.05	4.983	2980	2910	4.228	1.04	5.226	2900	2840
4	4	2.681	1.11	3.608	3620	3420	2.869	1.11	3.785	3520	3340
4	4	2.054	1.22	3.011	4110	3730	2.198	1.20	3.136	4000	3650
4	4	1.673	1.40	2.814	4550	3840	1.791	1.37	2.915	4420	3780
4	5	3.441	1.06	4.382	3390	3290	3.683	1.05	4.596	3290	3210
4	5	2.334	1.14	3.197	4110	3850	2.498	1.13	3.355	4000	3760
4	5-1/4	1.780	1.24	2.652	4710	4230	1.905	1.21	2.739	4580	4160
4	5-1/4	1.448	1.42	2.471	5220	4380	1.550	1.38	2.542	5070	4320
5	5	1.880	1.16	2.972	4340	4090	2.013	1.12	3.118	4220	3990
5	5	1.669	1.24	2.486	4960	4460	1.786	1.21	2.569	4830	4380
5	5	1.357	1.40	2.282	5490	4640	1.452	1.37	2.365	5340	4560
6	6	1.854	1.14	2.540	5060	4740	1.985	1.13	2.666	4910	4620
6	6	1.408	1.26	2.132	5790	5160	1.508	1.23	2.204	5620	5070
6	6	1.141	1.42	1.947	6420	5390	1.221	1.38	2.004	6240	5310

① EC-H12G61% IACS minimum.

② No. 2 EC-T61–57% IACS minimum.

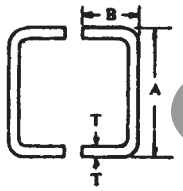
③ Ratings based on 30°C rise over 40°C ambient in still but unconfined air; conductors horizontal; conductor spacing sufficient to eliminate proximity effect; normal oxidized surface, indoors (e=0.35).

ALUMINUM COMPANY OF AMERICA

Table 67

ALUMINUM CHANNEL CONDUCTORS OF UNIFORM THICKNESS

Physical And Electrical Properties



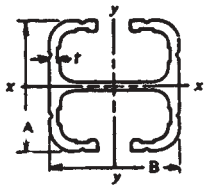
A	B	T	AREA SQ IN. ①	WT LB/FT ①	EC-F		
					R_{dc} AT 65°C ① MICROHMS/FT	$\frac{R_{ac}}{R_{dc}}$ 65°C ①	R_{ac} AT 65°C ① MICROHMS/FT
3	1.312	0.25	2.45	2.94	6.88	1.04	7.15
4	1.75	0.25	3.39	4.07	4.97	1.04	5.16
4	1.75	0.437	5.54	6.65	2.99	1.14	3.40
4	1.75	0.625	7.34	8.80	2.30	1.32	3.05
5	2.187	0.562	8.05	9.65	2.10	1.23	2.58
5	2.187	0.625	9.68	11.60	1.74	1.36	2.37
6	2.687	0.437	8.93	10.70	1.89	1.13	2.14
7	3.187	0.375	9.27	11.10	1.82	1.16	2.12
7	3.187	0.562	13.34	15.95	1.26	1.35	1.72
7	3.187	0.625	14.19	17.04	1.19	1.44	1.72
7	3.187	0.687	15.93	19.15	1.06	1.59	1.68
8	3.687	0.500	14.10	16.90	1.195	1.29	1.54
9	4.125	0.500	15.93	19.10	1.08	1.29	1.39
9	4.125	0.625	19.53	23.50	0.862	1.47	1.27
10	4.625	0.625	22.03	26.50	0.764	1.52	1.16
11	5.312	0.312	12.97	15.60	1.30	1.18	1.53
11	5.312	0.375	15.47	18.60	1.09	1.22	1.33
11	5.312	0.500	20.30	24.40	0.880	1.33	1.17
11	5.312	0.562	22.63	27.20	0.745	1.44	1.07
11	5.312	0.625	24.47	30.00	0.675	1.55	1.04
11	5.312	0.687	27.32	32.80	0.618	1.64	1.01
12	5.812	0.625	27.32	32.80	0.618	1.53	0.940

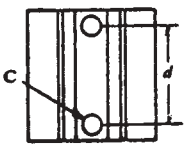
① For 2 channels as shown in diagram.

Table 68

ALUMINUM INTEGRAL WEB CHANNELL CONDUCTORS ①

Physical And Electrical Properties





SIZE IN.		WALL THICKNESS t IN.	AREA SQ IN.	WT/FT LB	VENT HOLES		MOMENT OF INERTIA IN.^{4}		SECTION MODULUS IN.^{3}		X_a INDUCTIVE REACTANCE 1-FT SPACING OHMS/1000 FT	NO 2 EC-T61 ②			
A	B				DIAMETER C IN.	DISTANCE BETWEEN HOLES d IN.	I_{x-x}	I_{y-y}	S_{x-x}	S_{y-y}		DC RESISTANCE AT 20°C MICROHMS/FT	R_{ac}/R_{dc} AT 70°C	AC RESISTANCE AT 70°C MICROHMS/FT	CURRENT RATINGS AMP AC-60 CYCLE ③
6	4	0.375	6.02	7.08	7/8	4	14.5	14.0	4.8	7.0	0.0379	2.374	1.38	3.90	3,500
6	5	0.375	7.60	8.94	7/8	4	22.8	26.4	7.6	10.5	0.0335	1.880	1.38	3.08	4,050
8	8	0.500	16.12	18.96	1-1/4	6	92.0	138.0	23.0	34.5	0.0247	0.8865	1.64	1.72	7,000
11	11	0.625	26.10	30.96	1-1/4	6	281.7	451.8	51.1	82.1	0.0172	0.5475	1.72	1.12	10,000
12	12	0.625	32.27	37.95	1-1/4	8	312.0	653.0	52.0	109.0	0.0154	0.4428	1.76	0.93	12,000

① Patent applied for.
② No. 2 EC-T61–57% IACS minimum.
③ Ratings based on 30°C rise over 40°C ambient in still but unconfined air, conductors horizontal; conductor spacing sufficient to eliminate proximity effect; normal oxidized surface, indoors (e=0.35).

Table 69

CORRECTION FOR PROXIMITY EFFECT IN BUSES

Single Phase Circuits – Horizontal Plane – 12" separation or less.

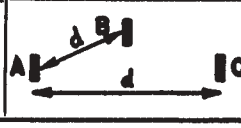
Relative current-carrying capacity referred to 1.00 for a conductor remote from its return conductor.

Size	CORRECTION FACTOR			Size	CORRECTION FACTOR		
	S=3 In.	S=6 In.	S=12 In.		S=3 In.	S=6 In.	S=12 In.
MCM				Extra Heavy Pipe Size			
500	0.99	1.00	1.00				
750	0.99	1.00	1.00	¾"	0.99	1.00	1.00
1,000	0.98	0.99	1.00	1"	0.98	0.99	1.00
1,500	0.97	0.98	1.00	1¼"	0.95	0.98	0.99
2,000	0.96	0.98	0.99	1½"	0.90	0.97	0.98
IPS				2"	0.85	0.96	0.97
1"	0.99	1.00	1.00	2½"		0.95	0.96
1½"	0.93	0.98	0.99	3"		0.80	0.95
2"	0.88	0.97	0.99	3½"		0.75	0.94
2½"		0.95	0.98	4"			0.93
3"		0.90	0.96				
3½"		0.83	0.95				
4"			0.94				

S=Separation Between Conductor Center Lines.

Table 70

FORCES ON BUSES DUE TO SHORT CIRCUIT CURRENTS

Max. Force "F" in Lbs. Per Ft.	Short Circuit Current I	Type of Fault	Configuration	Force on Conductor
$F=K\frac{5.4I^2X10^{-7}}{d}$	DC			+ or −
$F=K\frac{10.8I^2X10^{-7}}{d}$	RMS Symmetrical	Single Phase Symmetrical		A or B
$F=K\frac{43.2I^2X10^{-7}}{d}$	RMS Symmetrical	Single Phase Asymmetrical		A or B
$F=K\frac{34.9I^2X10^{-7}}{d}$	RMS Symmetrical	Three Phase Asymmetrical		A or C
$F=K\frac{37.5I^2X10^{-7}}{d}$	RMS Symmetrical	Three Phase Asymmetrical		B
$F=K\frac{37.5I^2X10^{-7}}{d}$	RMS Symmetrical	Three Phase Asymmetrical		A, B or C

F=Maximum lateral force between conductors (either attractive or repulsive) in pounds per linear foot of conductor.

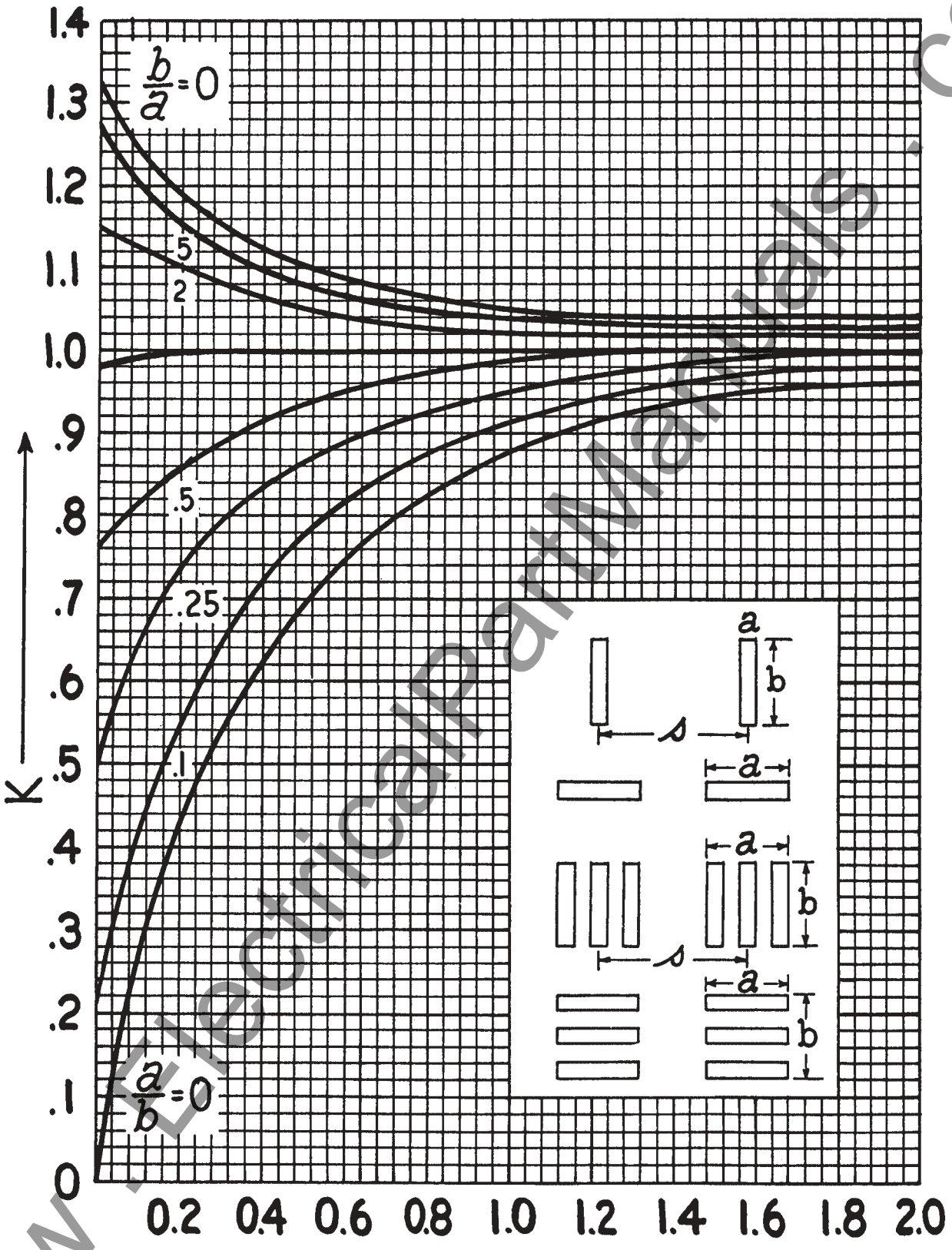
K=Shape correction factor (see table on page 63) important only where the dimensions of the conductors are relatively large compared with the distances between the conductors. K=1 for round conductors.

I=Short circuit current—in the equations for the AC circuits I represents the RMS value of the symmetrical wave short circuit current.

d=Conductor spacing in inches—center to center.

The above equations are based upon the formula $f=\frac{i_1 \times i_2}{d}$ in which the quantities are in cgs units; the force "f" in Dynes per centimeter, the current "i" in absolute amperes, the distance "d" in centimeters.

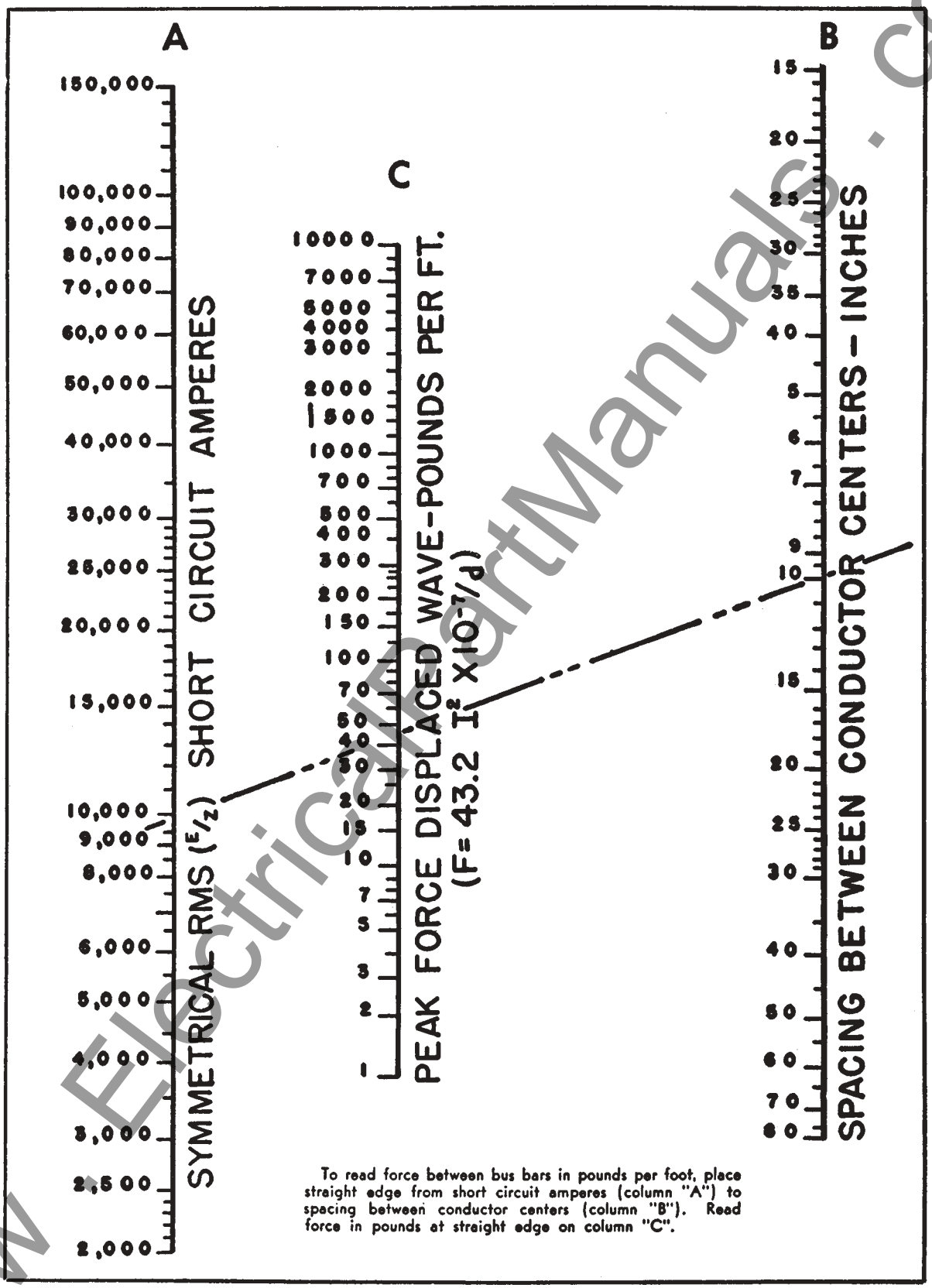
SHAPE CORRECTION FACTOR "K" FOR RECTANGULAR COPPER BARS*



NOTE: The numbers placed against each curve in the figure are values of $\frac{a}{b}$ except in the case of top curve, for which $\frac{b}{a}=0$.

*Chase Brass and Copper Company.

CHART FOR DETERMINING MAXIMUM SHORT CIRCUIT FORCE IN BUSES

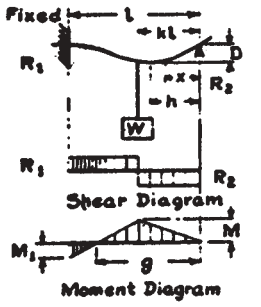


To read force between bus bars in pounds per foot, place straight edge from short circuit amperes (column "A") to spacing between conductor centers (column "B"). Read force in pounds at straight edge on column "C".

The American Brass Company.

BEAM FORMULAE FOR HORIZONTAL BUSES

Concentrated Loads - Bus Taps - Jumpers.
Load at any point - one end fixed, one end supported.



$R_1 = \frac{Wk(3-k^2)}{2}$ $R_2 = \frac{W(2-3k+k^3)}{2}$

$W\,max = \frac{2fS}{kl(2-3k+k^3)}$, if $k < .414$

$W\,max = \frac{2fS}{kl(1-k^2)}$, if $k > .414$

$D = \frac{Wkl^3(1-k^2)^3}{3(3-k^2)^2EI}$, if $k < .414$

$D = \frac{Wkl^3(k-1)^2\sqrt{\frac{k}{2+k}}}{6EI}$, if $k > .414$

$M = \frac{Wkl(2-3k+k^3)}{2}$

$M_1 = \frac{Wkl(1-k^2)}{2}$

$Mx = R_2x$, if $x < kl$

$Mx = R_2x - W(x-kl)$, if $x > kl$.

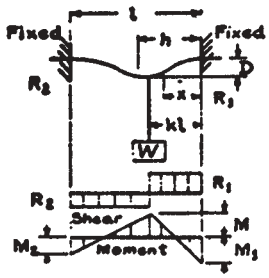
$g = \frac{2l}{(3-k^2)}$

$h = \frac{l(1+k^2)}{(3-k^2)}$, if $k < .414$

$h = l\sqrt{\frac{k}{(2+k)}}$, if $k > .414$

$D\,max = \frac{.0098Wl^3}{EI}$, if $k = .414$

Concentrated Loads - Bus Taps - Jumpers
Load at any point - both ends fixed



$R_1 = W(1-3k^2+2k^3)$ $R_2 = Wk^2(3-2k)$

$W\,max. = \frac{fS}{kl(1-k)^2}$, if $k < .5$

$D\,max = \frac{2Wk^2l^3(1-k)^3}{3EI(3-2k)^2}$, if $k < .5$

$h = \frac{l}{3-2k}$, if $k < .5$

$M = 2Wk^2l(1-k)^2$, if $k < .5$

$M_1 = Wkl(1-k)^2$, if $k < .5$

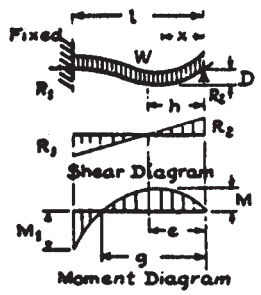
$M_2 = Wk^2l(1-k)$, if $k < .5$

$Mx = R_1x - M_1$, if $x < kl$

$Mx = R_2(1-x) - M_2$, if $x > kl$

$g = \frac{kl}{1+2k}$

Uniform Loads - Short Circuits - Ice - Wind
Load uniformly distributed - one end fixed, one end supported.



$R_1 = \frac{5W}{8}$ $R_2 = \frac{3W}{8}$

$Vx = \frac{W(3l-8x)}{8l}$

$W\,max. = \frac{8fS}{l}$

$D\,Max. = \frac{.0054Wl^3}{EI}$ $h = .422l$

$M = .07 \cdot Wl$

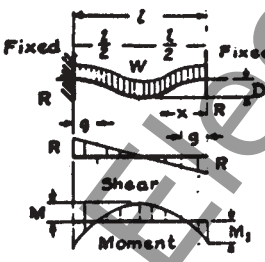
$M_1 = \frac{Wl}{8}$

$Mx = \frac{Wx(3l-4x)}{8l}$

$e = \frac{3l}{8}$

$g = \frac{3l}{4}$

Uniform Loads - Short Circuits - Ice - Wind
Load uniformly distributed - both ends fixed



$R = \frac{W}{2}$ $Vx = \frac{W}{2l}(l-2x)$

$W\,max. = \frac{12fS}{l}$

$D\,max. = \frac{Wl^3}{384EI}$

$M = \frac{Wl}{24}$

$M_1 = \frac{Wl}{12}$

$Mx = \frac{W}{12}\left(6x - l - \frac{6x^2}{l}\right)$

$g = .211l$

NOTATIONS:

R=Reaction, in pounds.
W=Superimposed Load, in pounds.
V=Vertical Shear, in pounds.
M=Bending Moment, in inch-pounds.
D=Deflection, in inches.
l=Length of Span, in inches.
k=Distance from end to load divided by span, in inches.
h=Distance from end to point of maximum deflection, in inches.
<=Is less than.
g=Distance from end to nearest point of zero moment, in inches.
e=Distance from end to point of maximum positive moment, in inches.
f=Bending Stress on extreme fiber, in pounds per square inch.
I=Moment of Inertia, in inches^4.
S=Section Modulus, in inches^3.
E=Modulus of Elasticity, in pounds per square inch.
>=Is greater than.

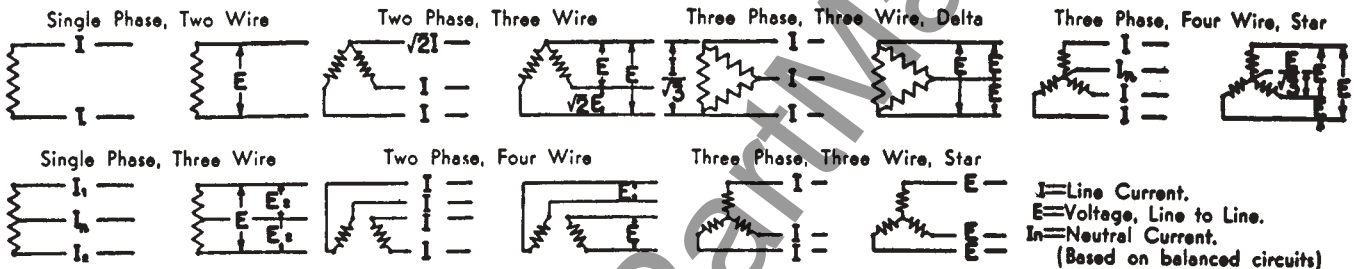
Table 71 ALTERNATING CURRENT FORMULAE

To Find	Value Known	SYSTEM			
		Direct Current	Single-Phase	Two-Phase—Four Wire	Three-Phase
Amperes I	Hp	$I=\frac{746\ Hp}{EXeff}$	$I=\frac{746\ Hp}{EXeffXpf}$	$I=\frac{746\ Hp}{2XEXeffXpf}$	$I=\frac{746\ Hp}{1.73XEXeffXpf}$
Amperes I	Kw	$I=\frac{1000\ Kw}{E}$	$I=\frac{1000\ Kw}{EXpf}$	$I=\frac{1000\ Kw}{2XEXpf}$	$I=\frac{1000\ Kw}{1.73XEXpf}$
Amperes I	Kva		$I=\frac{1000\ Kva}{E}$	$I=\frac{1000\ Kva}{2E}$	$I=\frac{1000\ Kva}{1.73E}$
Kilowatts Input Kw		$Kw=\frac{IXE}{1000}$	$Kw=\frac{IXEXpf}{1000}$	$Kw=\frac{IXEX2Xpf}{1000}$	$Kw=\frac{IXEX1.73Xpf}{1000}$
Kilovolts—Amperes Kva			$Kva=\frac{IXE}{1000}$	$Kva=\frac{IXEX2}{1000}$	$Kva=\frac{IXEX1.73}{1000}$
Horse-power Output		$Hp=\frac{IXEXeff}{746}$	$Hp=\frac{IXEXeffXpf}{746}$	$Hp=\frac{IXEX2XeffXpf}{746}$	$Hp=\frac{IXEX1.73XeffXpf}{746}$

I = = Line current in amperes.
E = = Line-to-line volts.
Kw = = Input in kilowatts.
Kva = = Input in kilovolt-amperes.
Hp = = Output in horsepower.
eff = = Efficiency in decimals.
pf = = Power factor in decimals.

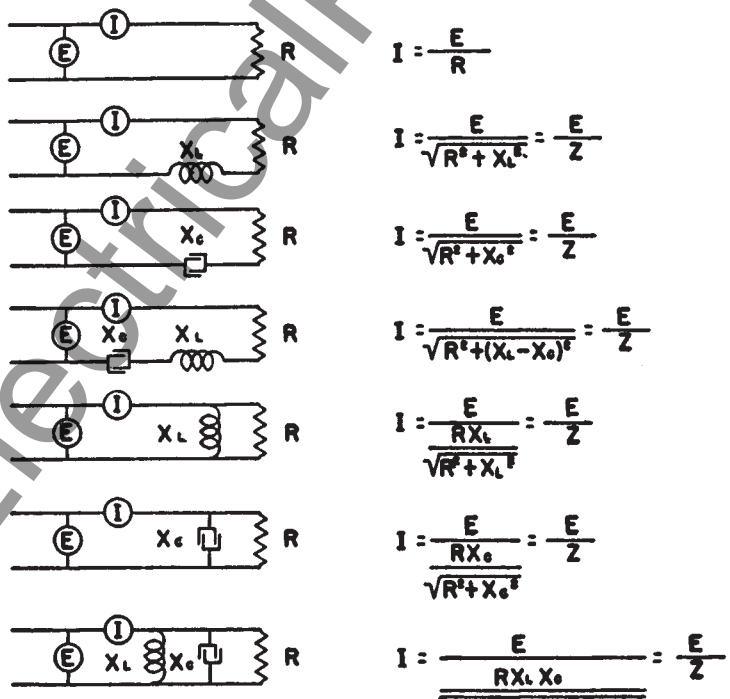
In two-phase, three-wire, balanced circuits, the amperes in the common conductor are 1.41 times that in either of the other two.

SYSTEM DIAGRAMS



I=Line Current.
E=Voltage, Line to Line.
In=Neutral Current.
(Based on balanced circuits)

Table 72 FORMULAE FOR DETERMINING AMPERES IN AC CIRCUITS



$$I=\frac{E}{R}$$

$$I=\frac{E}{\sqrt{R^2+X_L^2}}=\frac{E}{Z}$$

$$I=\frac{E}{\sqrt{R^2+X_c^2}}=\frac{E}{Z}$$

$$I=\frac{E}{\sqrt{R^2+(X_L-X_c)^2}}=\frac{E}{Z}$$

$$I=\frac{E}{\frac{RX_L}{\sqrt{R^2+X_L^2}}}=\frac{E}{Z}$$

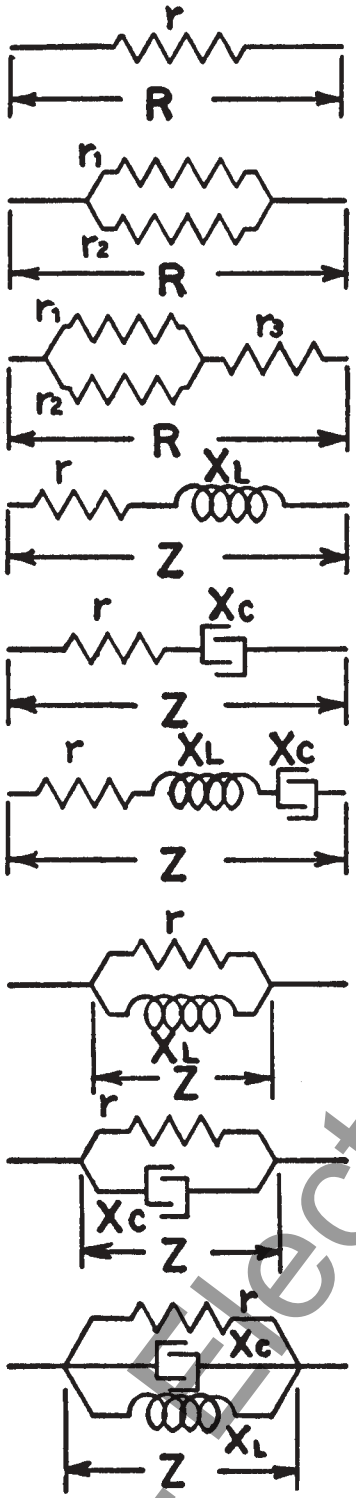
$$I=\frac{E}{\frac{RX_c}{\sqrt{R^2+X_c^2}}}=\frac{E}{Z}$$

$$I=\frac{E}{\frac{RX_L\,X_c}{\sqrt{X_L^2\,X_c^2+R^2(X_L-X_c)^2}}}=\frac{E}{Z}$$

R=Resistance in ohms.
Z=Impedance in ohms.
I=Current in amperes.
E =Pressure in volts.
X_L=Inductive reactance in ohms=$2\pi fL$
Xc=Condensive reactance in ohms=$\frac{1}{2\pi fc}$
f=Frequency in cycles per second.
L=Inductance in Henrys.
c=Capacitance in Farads.

Table 73

FORMULAE FOR COMBINING RESISTANCE AND REACTANCE



$$R = r$$

$$R = \frac{1}{\frac{1}{r_1} + \frac{1}{r_2}} = \frac{r_1 r_2}{r_1 + r_2}$$

$$R = \frac{1}{\frac{1}{r_1} + \frac{1}{r_2}} + r_3 = \frac{r_1 r_2}{r_1 + r_2} + r_3$$

$$Z = \sqrt{r^2 + X_L^2}$$

$$Z = \sqrt{r^2 + X_c^2}$$

$$Z = \sqrt{r^2 + (X_L - X_c)^2}$$

$$Z = \frac{1}{\sqrt{\left(\frac{1}{r}\right)^2 + \left(\frac{1}{X_L}\right)^2}} = \frac{r X_L}{\sqrt{r^2 + X_L^2}}$$

$$Z = \frac{1}{\sqrt{\left(\frac{1}{r}\right)^2 + \left(\frac{1}{X_c}\right)^2}} = \frac{r X_c}{\sqrt{r^2 + X_c^2}}$$

$$Z = \frac{1}{\sqrt{\left(\frac{1}{r}\right)^2 + \left(\frac{1}{X_L} - \frac{1}{X_c}\right)^2}} = \frac{r X_L X_c}{\sqrt{X_L^2 X_c^2 + r^2 (X_L - X_c)^2}}$$

R=Resistance in ohms.

Z=Impedance in ohms.

X_L=Inductive reactance in ohms=$2\pi f L$

X_c=Condensive reactance in ohms=$\frac{1}{2\pi f c}$

f=Frequency in cycles per second.

L=Inductive in Henrys.

c=Capacitance in Farads.

Table 74

OVERHEAD LINE CONDUCTORS — REACTANCE SPACING FACTORS

K_L — INDUCTIVE REACTANCE SPACING FACTOR

Spacing Feet	0	1	2	3	4	5	6	7	8	9
					Ohms per Phase per Mile at 60 cps					
0		0	.0841	.1333	.1682	.1953	.2174	.2361	.2523	.2666
10	.2794	.2910	.3015	.3112	.3202	.3286	.3364	.3438	.3507	.3573
20	.3635	.3694	.3751	.3805	.3856	.3906	.3953	.3999	.4043	.4086
30	.4127	.4167	.4205	.4243	.4279	.4314	.4348	.4382	.4414	.4445
40	.4476	.4506	.4535	.4564	.4592	.4619	.4646	.4672	.4697	.4722

K_c — SHUNT CAPACITIVE REACTANCE SPACING FACTOR

Spacing Feet	0	1	2	3	4	5	6	7	8	9
					Megohms per Phase per Mile at 60 cps					
0		0	.0206	.0326	.0411	.0478	.0532	.0577	.0617	.0652
10	.0683	.0711	.0737	.0761	.0783	.0803	.0823	.0841	.0858	.0874
20	.0889	.0903	.0917	.0930	.0943	.0955	.0967	.0978	.0989	.0999
30	.1009	.1019	.1028	.1037	.1046	.1055	.1063	.1071	.1079	.1087
40	.1094	.1102	.1109	.1116	.1123	.1129	.1136	11.42	.1149	.1155

K_r — EARTH RESISTANCE FACTOR

Use 0.286 Ohms per Phase per Mile at 60 cps

K_e — EARTH REACTANCE FACTOR

Earth Resistivity Meter Ohms ρ	1	5	10	50	100	500	1000	5000	10000
				Ohms per Phase per Mile at 60 cps					
K_e	2.05	2.35	2.47	2.77	2.89	3.19	3.31	3.61	3.73

FORMULAE

1. Positive and negative sequence impedance (ordinary line-to-neutral constants) — $Z_1 = Z_2 = R + j(X_L + K_L)$
*2. Zero sequence impedance — $Z_0 = (R + K_r) + j(X_L + K_a - 2K_L)$
3. Positive and negative sequence shunt capacitive reactance (ordinary line-to-neutral constants) — $X_1 = X_2 = X_c + K_c$
4. Positive and negative sequence shunt capacitive susceptance (ordinary line-to-neutral constants) — $B_1 = B_2 = \frac{1}{X_c + K_c}$
5. Zero sequence shunt capacitive reactance — See "Symmetrical Components" by Wagner and Evans.

*Formula (2) gives the zero sequence impedance for a line without a ground wire. For corrections for the presence of ground wires, see method described by Wagner and Evans in "Symmetrical Components," or the method to be published by W. A. Lewis, Professor of Electrical Engineering, Cornell University.

EXAMPLE

Determine the positive and zero sequence impedance of hollow conductor design 50R2 at 60 cycles for 14-foot equivalent spacing, no ground wires, and earth resistivity of 100 meter ohms.

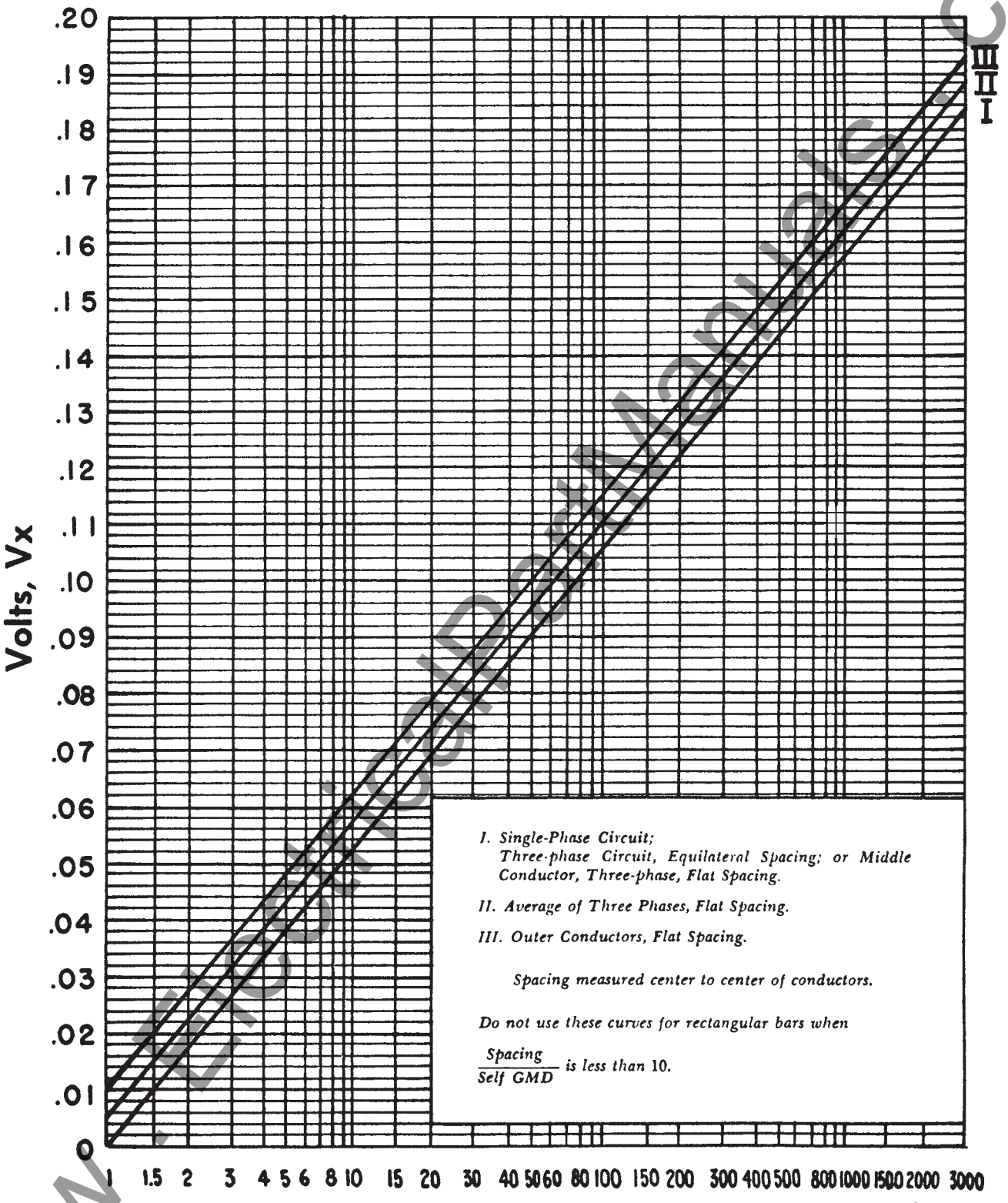
$R = 0.2756$ ohms/phase/mile
$X_L = 0.4554$ ohms/phase/mile
$K_L = 0.3202$ ohms/phase/mile
$K_r = 0.286$ ohms/phase/mile
$K_e = 2.89$ ohms/phase/mile

Positive sequence impedance: $Z_1 = R + j(X_L + K_L)$
$= 0.2756 + j0.7756$ (ohms/phase/mile)

Zero sequence impedance: $Z_0 = (R + K_r) + j(X_L + K_e - 2K_L)$
$= 0.5616 + j2.705$ (ohms/phase/mile)

Anaconda Wire and Cable Company.

REACTANCE VOLTS DROP TO NEUTRAL, PER FOOT TRANSMITTED, PER 1000 AMPERES, AT 60 CYCLES



NOTE: See Table 75, for tabulations of values of this chart.

Chase Brass and Copper Company.

Table 75

REACTANCE VOLTS DROP$_1$ V^x_1 TO NEUTRAL

Per Foot Transmitted, per 1000 Amperes, at 60 Cycles

(Equals reactance in ohms per 1000 ft. of conductor)

$\frac{S}{G}$	Vx	Differences For All Columns Of Vx	$\frac{S}{G}$	Vx	$\frac{S}{G}$	Vx	$\frac{S}{G}$	Vx
1.1	.0022	22	10	.0529	100	.1058	1,000	.1587
1.2	.0042	20	11	.0551	110	.1080	1,100	.1609
1.3	.0060	18	12	.0571	120	.1100	1,200	.1629
1.4	.0077	17	13	.0589	130	.1118	1,300	.1647
1.5	.0093	16	14	.0606	140	.1135	1.400	.1664
1.6	.0108	15	15	.0622	150	.1151	1,500	.1680
1.7	.0122	14	16	.0637	160	.1166	1,600	.1695
1.8	.0135	13	17	.0651	170	.1180	1,700	.1709
1.9	.0147	12	18	.0664	180	.1193	1,800	.1722
2.0	.0159	12	19	.0676	190	.1205	1,900	.1734
2.1	.0170	11	20	.0688	200	.1217	2,000	.1746
2.2	.0181	11	21	.0699	210	.1228	2.100	.1757
2.3	.0191	10	22	.0710	220	.1239	2,200	.1768
2.4	.0201	10	23	.0720	230	.1249	2,300	.1778
2.5	.0211	10	24	.0730	240	.1259	2,400	.1788
2.6	.0220	9	25	.0740	250	.1269	2,500	.1798
2.7	.0229	9	26	.0749	260	.1278	2,600	.1807
2.8	.0237	8	27	.0758	270	.1287	2,700	.1816
2.9	.0245	8	28	.0766	280	.1295	2,800	.1824
3.0	.0253	8	29	.0774	290	.1303	2,900	.1832
3.5	.0288	35	30	.0782	300	.1311	3,000	.1840
4.0	.0319	31	35	.0817	350	.1346		
4.5	.0346	27	40	.0848	400	.1377		
5.0	.0370	24	45	.0875	450	.1404		
5.5	.0392	22	50	.0899	500	.1428		
6.0	.0412	20	55	.0921	550	.1450		
6.5	.0430	18	60	.0941	600	.1470		
7.0	.0447	17	65	.0959	650	.1488		
7.5	.0463	16	70	.0976	700	.1505		
8.0	.0478	15	75	.0992	750	.1521		
8.5	.0492	14	80	.1007	800	.1536		
9.0	.0505	13	85	.1021	850	.1550		
9.5	.0517	12	90	.1034	900	.1563		
Do not use this column for rectangular bars.		12	95	.1046	950	.1575		

For other frequencies, change in proportion to the frequency.

G=self geometric mean distance of the conductor (given in Bus conductor tables).

For single-phase circuits, three-phase circuits with equilateral spacing or for the middle conductor of three-phase circuits with flat spacing, the equivalent spacing is:

S=center to center spacing between conductors,

For the average drop to neutral, three-phase flat spacing,*

S=1.260 x spacing,

For the outer conductors, three-phase flat spacing,

S=approx. 1.5 x spacing.

See also page 70 for chart of these tabulated values. For greater accuracy, interpolate from values of table or calculate directly from the following formula:

$$V_x = .0529 \text{ Log}_{10} \frac{\text{Equiv. Spacing in inches}}{\text{Self GMD}}$$

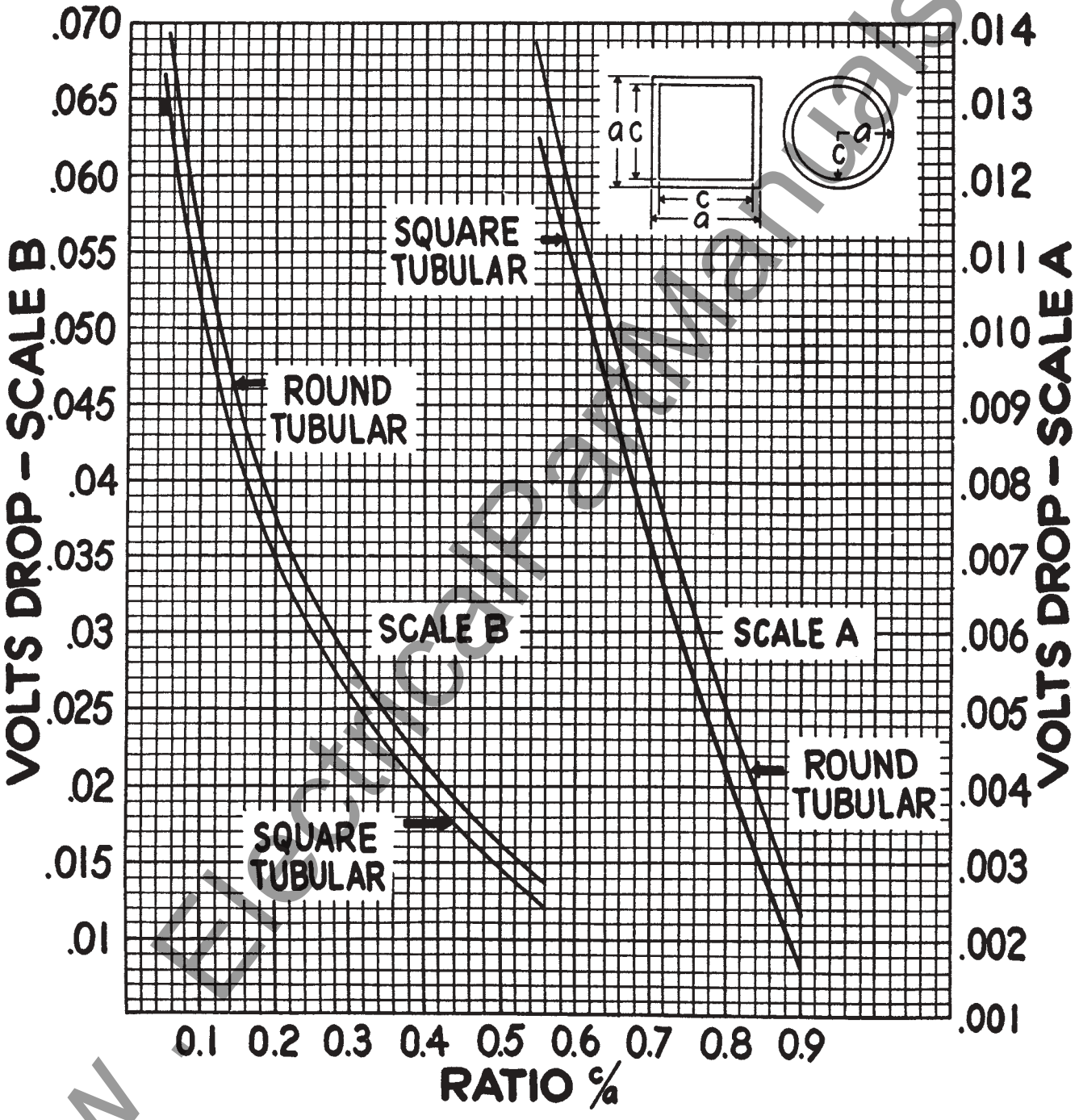
This method does not hold for rectangular bars when $\frac{\text{Spacing}}{\text{Self GMD}}$ is less than 10.

The reactance drop added vectorially to the straight resistance drop will give the total voltage drop in the conductor; for formulae, see Table 73, page 66.

Chase Brass and Copper Company.

SINGLE-PHASE, CONCENTRIC, SQUARE AND ROUND TUBULAR BUSES. REACTANCE VOLTS DROP PER FOOT OF BUS LENGTH, PER 1000 AMPERES AT 60 CYCLES

(Equals reactance in ohms per 1000 ft. of bus length)



Chase Brass and Copper Company.

BASIS OF CALCULATIONS FOR BUS CONDUCTOR TABLES*

Breaking strength is given for tensile strength of 40,000 lbs. per sq. in.

Yield strength is given at tensile stress of 25,000 lbs. per sq. in.

Self GMD is self geometric mean distance, a function of size and shape of the conductor, for use in determining reactance voltage drop from chart on page 64.

R_{20} is DC resistance at 20°C. and 98% conductivity in microhms per foot.

The DC resistance at 70°C. and 98% conductivity in microhms per foot $= R_{20} \times 1.1925$.

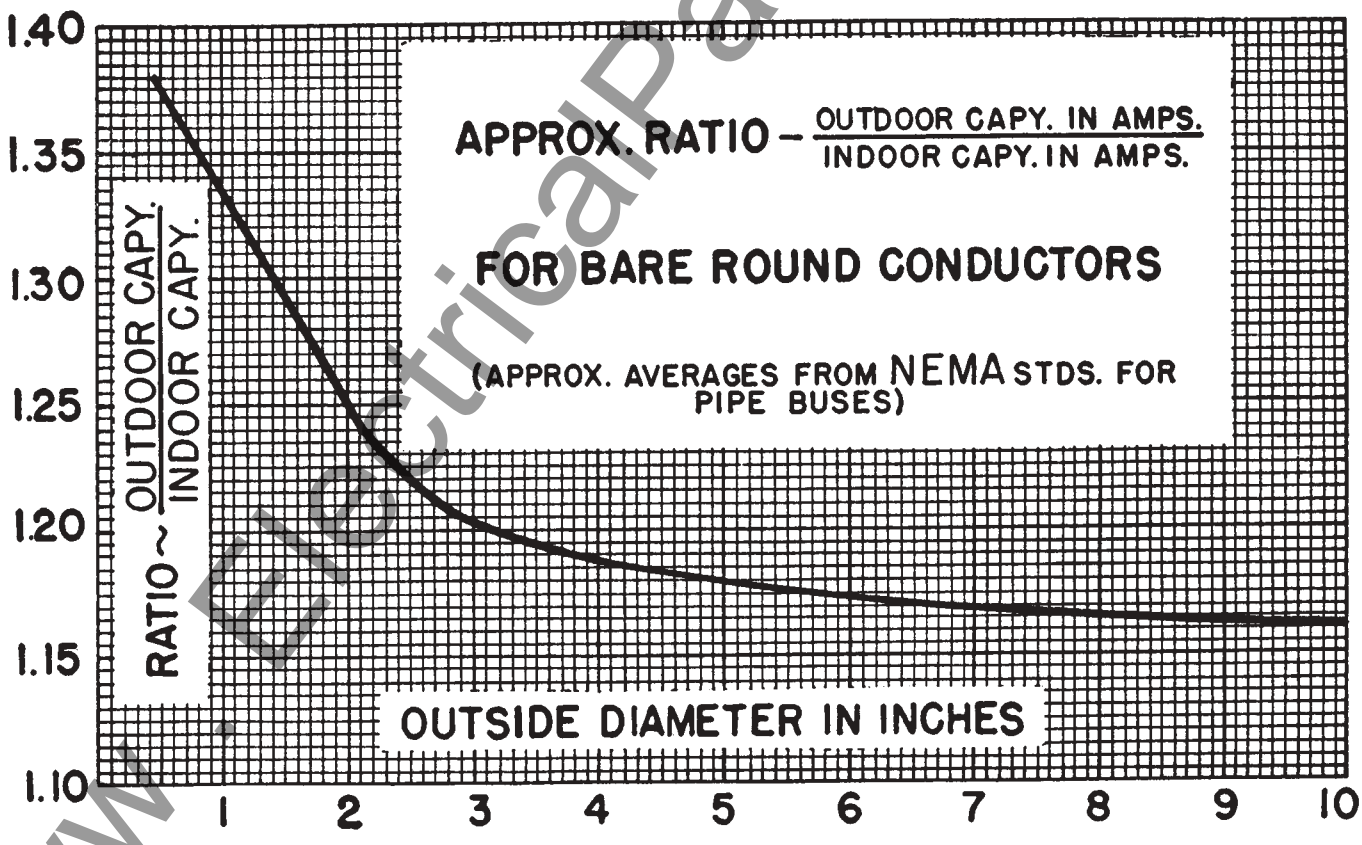
R'/R is 60 cycle skin effect ratio at 70°C.

R'_{20} is 60 cycle resistance of isolated conductor at 70°C. in microhms per ft.

$$= R_{20} \times 1.1925 \times \frac{R'}{R}$$

Ampere capacities indoors are for conductors in still air without special enclosures and a 40°C. ambient temperature. For very close phase spacing proximity effect will reduce these ratings somewhat. For approximate outdoor capacities multiply table values by the ratio of outdoor capacity to indoor capacity for the corresponding size of conductor from chart below. All resistances are based on 98% conductivity and current carrying capacities are for steady currents over long enough periods for thermal equilibrium (I^2R loss=heat dissipated).

$$\text{Ohms} = \text{microhms} \times 10^{-6}$$



*Chase Brass and Copper Company. This information pertains to tables herein used by permission of same manufacturer and does not necessarily apply to tables of other sources.

Table 76

RELATIVE CURRENT CARRYING CAPACITIES†

For conductors of the same diameter and cross section of metal, having different values of conductivity.
Conductor temperature, 70°C.

MATERIAL	CONDUCTIVITY PER CENT	RELATIVE CURRENT CARRYING CAPACITY
Copper and Copper Alloys	100	1.00
	95	0.98
	90	0.96
	85	0.94
	80	0.91
	75	0.88
	70	0.86
	65	0.83
	60	0.80
	55	0.77
	50	0.74
ALUMINUM	61	0.78
	55	0.74
	50	0.71

†NOTE: The relative current capacities at temperatures above and below 70°C. are slightly different from the values given on account of the change of temperature coefficient with conductivity. The difference will not be appreciable except for copper alloys of low conductivity, e.g., for 50% conductivity the relative current carrying capacities are 0.73 at 50°C. and 0.75 at 90°C.

REF: Frick, C. W., "Current Carrying Capacity of Bare Cylindrical Conductors for Indoor and Outdoor Service," General Electric Review, August, 1931.

Table 77

USEFUL CHARACTERISTICS OF ALUMINUM AND COPPER CONDUCTORS AT 20°C.

Characteristic	Aluminum	Copper
Conductivity	60.97%	99.00%
Resistivity	13.36 microhms per sq. in. per ft.	8.23 microhms per sq. in. per ft.
Resistance-Temperature Coefficient	0.00403 per Deg. C.	0.00393 per Deg. C.
Length-Temperature Coefficient	0.000023 per Deg. C.	0.0000167 per Deg. C.
Density	0.09766 lb. per cu. in.	0.32120 lb. per cu. in.
Relative Density	1	3.29
Modulus of Elasticity	10,000,000 lb. per sq. in.	16,000,000 lb. per sq. in.

Aluminum Company of America.

Table 78

PROPERTIES OF COPPER ALLOYS

ALLOY NOMENCLATURE	CHEMICAL COMPOSITION (NOMINAL) %					Conductivity at 68°F (20°C)		Tensile Strength x10³ Lbs./in.²		Elongation % in 2 inches		*Yield Strength x10³ Lbs./in.²		Rockwell Hardness		Melting Point °F	Density Lbs./in.³	Linear Coefficient of Thermal Expansion per °F x10⁻⁶	Modulus of Elasticity x10⁶ Lbs./in.²
	Cu	Zn	Pb	Sn	Other	Electrical % ‡IACS	Thermal Btu/ft/hr/ft²/°F	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft				
WROUGHT ALLOYS																			
Electrolytic Copper	99.9	....	....	....	....	101	226	55	32	6	55	50	10	60B	40F	1,981	.322	9.8	17
Gilding Metal	95	5	....	....	....	56	135	56	34	5	45	50	10	64B	46F	1,950	.320	10.0	17
90% Commercial Bronze	90	10	....	....	....	44	109	61	38	5	45	54	10	65B	55F	1,910	.318	10.2	17
Leaded Commercial Bronze	89	8	2	....	1% Ni	42	104	52	37	18	45	45	12	58B	55F	1,900	.319	10.2	17
Red Brass	85	15	....	....	....	37	92	65	40	10	50	55	12	75B	57F	1,880	.316	10.4	17
Yellow Brass	65	35	....	....	....	27	67	65	48	15	63	55	15	75B	65F	1,710	.306	11.3	15
Leaded Brass	67	32.5	0.5	....	....	26	67	75	47	7	60	60	15	80B	64F	1,720	.307	11.2	15
Free-Cutting Brass	61.5	35.5	3.0	....	....	26	67	58	49	25	53	45	18	78B	68F	1,650	.307	11.4	14
Admiralty Brass	71	28	....	1.0	As 05	25	64	95	51	4	60	75	20	93B	25B	1,720	.308	11.2	16
Naval Brass	60	39.25	....	0.75	....	26	67	85	57	15	40	65	23	90B	50B	1,650	.304	11.8	15
Silicon Bronze (A)	95.8	....	....	....	3.1% Si-1.1% Mn	7	21	95	58	12	60	60	22	91B	60B	1,880	.308	10.0	17
Silicon Bronze (B)	98.25	....	....	....	1.5% Si-.25% Mn	11	31	67	40	10	46	53	15	77B	55F	1,935	.316	9.9	17
Aluminum Silicon Bronze	91	....	....	....	7% Al-2% Si	7	22	95	85	25	35	53	43	82B	75B	1,814	.278	9.2	14
Phosphor Bronze	92	....	....	8	....	13	36	93	55	10	70	2		93B	75F	1,880	.318	10.1	16
CAST ALLOYS							As Cast												
Composition	85	5	5	5	....	13–16.4	....	33 to 46		15 to 35		17 to 24		60F to 72F		1,825	.314 to .321	10.9	9.1–14.8
Gunmetal	88	2	....	10	....	11–14	....	30 to 45		15 to 40		18 to 22		66F to 84F		1,830	.314 to .318	10.1	10.6–16
Leaded Yellow Brass	60	38	1	1	....	20–26	....	35 to 45		15 to 25		14 to 20		50F to 80F		1,700	.300 to .306	12.0	13–15
High-Strength Yellow Brass	58.5	39.25	....	....	1% Fe-1% Al-.25% Mn	16–20	....	70 to 88		20 to 35		28 to 40		89F to 99F		1,690	.289 to .307	12.0	13–15
Aluminum Bronze	90	....	....	....	9% Al-1% Fe	12–15	....	60 to 70		12 to 20		20 to 25		76F to 88F		1,850	.260 to .275	9.7	14–16

*Yield strength is defined as the stress which produces a permanent set of 0.5 per cent of the initial gage length.
‡By IACS is meant the International Annealed Copper Standard which is the internationally accepted value for the resistivity of annealed copper, of 100% conductivity. This value is 10.371 ohms per mil. foot at 20-degrees Centigrade, and was adopted by the International Electro-Technical Committee in 1913.

Table 79

PROPERTIES OF ALUMINUM ALLOYS†

Alloy Number	CONDUCTIVITY At 68°F (20°C)		Tensile Strength Lbs./in.²	*Yield Strength Lbs./in.²	Elongation % in 2 inches (½" rod)	Melting Point °F	Density Lbs./in.³	Linear Coefficient of Thermal Expansion Per °F x 10⁻⁶	Modulus of Elasticity x 10⁶ Lbs./in.²
	Electrical % IACS	Thermal Btu/ft/hr/ft²/°F							
Electrical Conductor Grade	61	126	12,000	4,000	....	1,200	0.098	13.1	10.0
1100-0 (2S-0)	59	128	13,000	5,000	45	1,200	0.098	13.1	10.0
3003-0 (3S-0)	50	111	16,000	6,000	40	1,200	0.099	12.9	10.0
2024-0 (24S-0)	50	109	27,000	11,000	22	1,062	0.100	12.9	10.6
5052-0 (52S-0)	35	80	27,000	12,000	30	1,150	0.097	13.2	10.2
6061-0 (61S-0)	45	99	18,000	8,000	30	1,142	0.098	13.1	10.0
6063-0 (63S-F) (extruded)	50	111	22,000	13,000	....	1,170	0.098	13.0	10.0
7075-0 (75S-0)	..	..	33,000	15,000	16	1,035	0.101	13.1	10.4
43	37	85	19,000	9,000	6.0	1,105	0.095	12.2	10.3
122T2	41	92	27,000	20,000	1.0	1,038	0.104	12.2	10.3
195T4	35	80	32,000	16,000	8.5	1,075	0.100	12.7	10.3
212	30	70	23,000	14,000	2.0	1,060	0.102	12.2	10.3
214	35	80	25,000	12,000	9.0	1,130	0.094	13.3	10.3
220T4	21	51	46,000	25,000	14.0	995	0.091	13.6	10.3
355T6	36	82	35,000	25,000	2.5	1,080	0.096	12.2	10.3
356T6	39	82	33,000	24,000	4.0	1,075	0.095	12.0	10.3

*Yield strength defined as the stress which produces a permanent set of 0.2 per cent of initial gage length.
†Aluminum Company of America.

Table 80

PHYSICAL CONSTANTS OF METALS

*ELEMENTS	DENSITY Lbs./in.³ at 20°C (68°F)	MELTING POINT °F	SPECIFIC HEAT Btu/lb/°F at Room Temp	LINEAR COEFFICIENT OF THERMAL EXPANSION Per °C at Room Temp. x 10-6	THERMAL CONDUCTIVITY Btu/ft/hr/ft.²/°F at Room Temp.	ELECTRICAL RESISTIVITY Ohms (mil. ft.) at 20°C (68°F)	ELECTRICAL CONDUCTIVITY % IACS† at 20°C (68°F)
Aluminum(Electrical Conductor Grade)	.097	1216	0.226	23	126	17.0	61.0
Antimony	.238	1167	0.049	11.29	10.63	234.	4.4
Barium	.126	1562	0.068	....	.....	.....	.....
Beryllium	.067	2345	0.425	12.3	93.1	111.	9.3
Cadmium	.312	609	0.55	29.8	52.5	45.6	22.5
Calcium	.056	1564	0.157	25.	.....	27.6	37.5
Chromium	.257	2822	0.12	8.1	39.9	78.7	13.2
Cobalt	.320	2714	0.099	12.08	39.9	58.3	17.8
Copper (Electrolytic)	.321	1981	0.092	16.6	222.2	10.3	101.
Gold	.695	1945	0.031	14.4	171.0	14.5	71.2
Iron	.283	2795	0.108	11.9	45.9	58.9	17.6
Lead	.408	621	0.030	29.5	20.05	124.3	8.4
Lithium	.019	367	0.79	56.	41.2	51.1	20.3
Magnesium	.063	1204	0.249	25.7	89.5	26.9	38.7
Manganese	.268	2268	0.107	23	.....	.....	.....
Mercury	.486	-38	0.033	....	4.8	576.	1.8
Molybdenum	.367	4748	0.065	5.49	84.6	28.7	36.2
Nickel	.320	2646	0.112	13.7	33.8	41.5	25.2
Platinum	.771	3224	0.032	8.8	40.1	59.1	17.5
Silver	.378	1761	0.056	18.9	235.0	9.75	106.4
Tin	.263	450	0.054	....	38.0	69.2	15.0
Tungsten	.695	6098	0.034	4.0	115.1	33.0	31.3
Vanadium	.202	3110	0.115	....	.....	156.5	6.6
Zinc	.257	787	0.09	....	64.7	.....	.....

*Unless otherwise stated, all values listed are for pure metals.

†By IACS is meant the International Annealed Copper Standard which is the internationally accepted value for the resistivity of annealed copper of 100% conductivity. This value is 10.371 ohms per mil. foot at 20-degrees Centigrade, and was adopted by the International Electro-Technical Committee in 1913.

Table 81

POTENTIALS OF METALS*S*

METAL	VOLTS
Platinum	−0.86
Silver	−0.7987
Mercury (ous)	−0.7928
Copper	−0.3469
Hydrogen	0.000
Lead	+0.132
Tin	+0.146
Nickel	+0.20
Cobalt	+0.23
Iron (ferrous)	+0.34
Cadmium	+0.420
Zinc	+0.770
Aluminum	+1.337
Magnesium	+1.8
Sodium	+2.715
Potassium	+2.925

*These signs indicate terminal potentials of a galvanic system, and not of the electrolyte.

Table 82

GALVANIC SERIES OF METALS

Corroded end (anodic)	Nickel
	Brasses
Magnesium	Bronzes
Aluminum	Monel
Duralumin	Copper
Zinc	Chromium iron (passive)
Cadmium	Chromium-nickel-iron (passive)
Iron	
Chromium iron (active)	Silver Solder
Chromium-nickel-iron (active)	Silver
	Gold
	Platinum
Soft solder	
Tin	Protected end (cathodic)
Lead	

Table 83

TIME TO CHANGE SPEED OF ROTATING MASS

$$\text{Time (Sec.)} \quad \frac{WR^2 \times \text{Change in R.P.M.}}{308 \times \text{Torque (Ft. Lbs.)}}$$

$$WR^2 \text{ (disc)} = \frac{\text{Weight (Lbs.)} \times [\text{radius (ft.)}]^2}{2}$$

$$WR^2 \text{ (rim)} = \frac{\text{Wt. (Lbs.)} \times [(\text{outer rad. in ft.})^2 + (\text{inner rad. in ft.})^2]}{2}$$

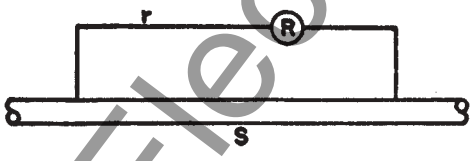
POWER TRANSMISSION BY SHAFT

$$HP = \frac{\text{Torque in ft. Lbs.} \times \text{R.P.M.}}{5250}$$

Table 84

ELECTROLYSIS – CURRENT IN PIPE LINES
PIPE LINES

$$\text{Current in Amperes} = \frac{1000\,W\,(R + r)}{R \times S \times L} \times e$$



W=Weight of pipe in pounds per ft.

L=Length of test section in feet.

R=Resistance of Voltmeter in ohms.

r=Resistance of leads in ohms.

S=Resistivity of pipe material in micro ohms per Lb. Ft. (for steel pipe S=215.8)

e=Reading on meter in millivolts.

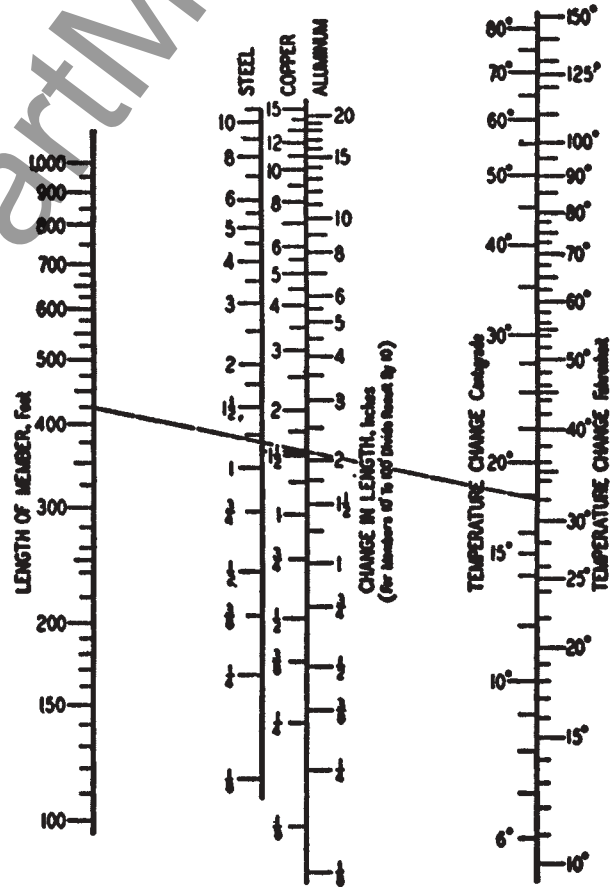
Table 85

Coefficients of linear expansion for commonly used bus supporting structures and bus materials are:

Material	per °F.	per °C.
Copper	0.00000928	0.0000168
Aluminum	0.0000128	0.0000231
Steel	0.0000067	0.0000120
Concrete	0.0000079	0.0000143
Brickwork	0.0000031	0.0000055

EXPANSION OF STEEL, COPPER AND ALUMINUM†

With Different Temperature Changes



Note that scale for steel is read opposite the steel scale on copper-aluminum scale, not where the line between the length and temperature scales crosses the steel scale.

†Prepared by W. B. Morton, of the Pennsylvania Power & Light Company, and by Basil Payne, of NEPSCO Service, Inc.

"USED BY PERMISSION."

Table 86

NUMBER OF CONDUCTORS IN CONDUIT OR TUBING

Rubber Covered, Types RF-32, RUF, R, RH, RW, RU, and RUW.
Thermoplastic, Types TF, T and TW. One to Nine Conductors.
For more than nine conductors see Table 9.
(See Sections 3013, 3466 and 3486 – 1951 N.E.C.)
CHAPTER 10, TABLE 4 – 1951 N.E.C.

SIZE AWG MCM	Number of Conductors In One Conduit or Tubing								
	1	2	3	4	5	6	7	8	9
18	½	½	½	½	½	½	½	¾	¾
16	½	½	½	½	½	½	¾	¾	¾
14	½	½	½	½	¾	¾	1	1	1
12	½	½	½	¾	¾	1	1	1	1¼
10	½	¾	¾	¾	1	1	1	1¼	1¼
8	½	¾	¾	1	1¼	1¼	1¼	1½	1½
6	½	1	1	1¼	1½	1½	2	2	2
4	½	1¼	*1¼	1½	1½	2	2	2	2½
3	¾	1¼	1¼	1½	2	2	2	2½	2½
2	¾	1¼	1¼	2	2	2	2½	2½	2½
1	¾	1½	1½	2	2½	2½	2½	3	3
0	1	1½	2	2	2½	2½	3	3	3
00	1	2	2	2½	2½	3	3	3	3½
000	1	2	2	2½	3	3	3	3½	3½
0000	1¼	2	2½	3	3	3	3½	3½	4
250	1¼	2½	2½	3	3	3½	4	4	4½
300	1¼	2½	2½	3	3½	4	4	4½	4½
350	1¼	3	3	3½	3½	4	4½	4½	5
400	1½	3	3	3½	4	4	4½	5	5
500	1½	3	3	3½	4	4½	5	5	6
600	2	3½	3½	4	4½	5	6	6	6
700	2	3½	3½	4½	5	5	6	6	....
750	2	3½	3½	4½	5	6	6	6	....
800	2	3½	4	4½	5	6	6	....	....
900	2	4	4	5	6	6	6	....	....
1,000	2	4	4	5	6	6	....	....	....
1,250	2½	4½	4½	6	6	....	....	....	....
1,500	3	5	5	6	....	....	....	....	....
1,750	3	5	6	6	....	....	....	....	....
2,000	3	6	6	....	....	....	....	....	....

Where a service run of conduit or electrical metalic tubing does not exceed 50 feet in length and does not contain more than the equivalent of two quarter bends from end to end two No. 4 insulated and one No. 4 bare conductors may be installed in 1-inch conduit or tubing.

Table 87

NUMBER OF CONDUCTORS IN CONDUIT OR TUBING

Lead-Covered Types RL and RHL – 600 V.
(See Sections 3466 and 3486 – 1951 N.E.C.)
CHAPTER 10, TABLE 5 – 1951 N.E.C.

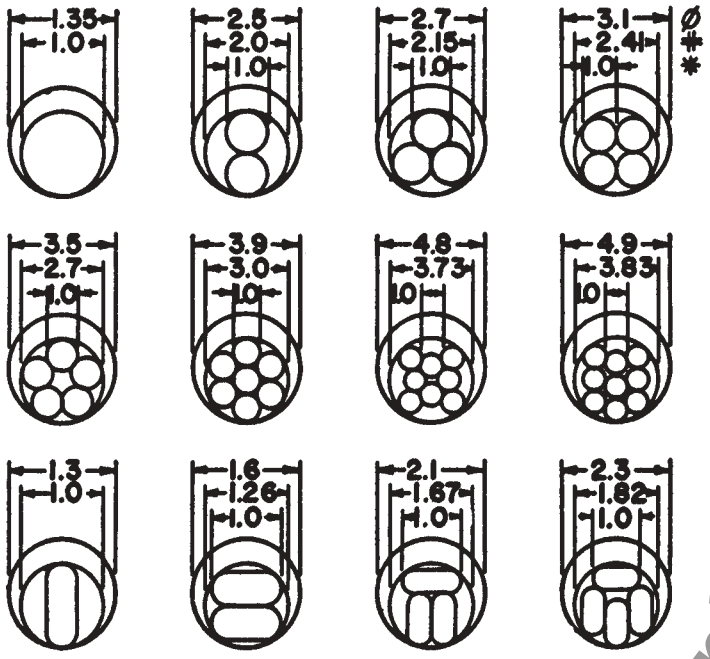
SIZE AWG MCM	Number of Conductors In One Conduit or Tubing											
	Single-Conductor Cable				2-Conductor Cable				3-Conductor Cable			
	1	2	3	4	1	2	3	4	1	2	3	4
14	½	¾	¾	1	¾	1	1	1¼	¾	1¼	1½	1½
12	½	¾	¾	1	¾	1	1¼	1¼	1	1¼	1½	2
10	½	¾	1	1	¾	1¼	1¼	1½	1	1½	2	2
8	½	1	1¼	1½	1	1¼	1½	2	1	2	2	2½
6	¾	1¼	1½	1½	1¼	1½	2	2½	1¼	2½	3	3
4	¾	1¼	1½	1½	1¼	2	2½	2½	1½	3	3	3½
3	¾	1¼	1½	2	1¼	2	2½	3	1½	3	3	3½
2	1	1¼	1½	2	1¼	2	2½	3	1½	3	3½	4
1	1	1½	2	2	1½	2½	3	3½	2	3½	4	4½
0	1	2	2	2½	2	2½	3	3½	2	4	4½	5
00	1	2	2	2½	2	3	3½	4	2½	4	4½	5
000	1¼	2	2½	2½	2	3	3½	4	2½	4½	4½	6
0000	1¼	2½	2½	3	2½	3	3½	4½	3	5	6	6
250	1¼	2½	3	3	....	....	....	....	3	6	6	....
300	1½	3	3	3½	....	....	....	....	3½	6	6	....
350	1½	3	3	3½	....	....	....	....	3½	6	6	....
400	1½	3	3	3½	....	....	....	....	3½	6	6	....
500	1½	3	3½	4	....	....	....	....	4	6	....	....
600	2	3½	4	4½	....	....	....	....	....	....	....	....
700	2	4	4	5	....	....	....	....	....	....	....	....
750	2	4	4	5	....	....	....	....	....	....	....	....
800	2	4	4½	5	....	....	....	....	....	....	....	....
900	2½	4	4½	5	....	....	....	....	....	....	....	....
1,000	2½	4½	4½	6	....	....	....	....	....	....	....	....
1,250	3	5	5	6	....	....	....	....	....	....	....	....
1,500	3	5	6	6	....	....	....	....	....	....	....	....
1,750	3	6	6	....	....	....	....	....	....	....	....	....
2,000	3½	6	6	....	....	....	....	....	....	....	....	....

The above sizes apply to straight runs or with nominal offsets equivalent to not more than two quarter-bends.

Table 88

CONDUIT SIZES FOR CABLES

Multipliers for One or More Cables Per Conduit



Shown at left is the multiplier # for the smallest equivalent diameter of a group of cables and the multiplier Θ to determine the required internal diameter of the conduit for the same, expressed in terms of the diameter of a single cable*.

Note: The multiplier shown to obtain the required conduit diameter is for cables up to 250 MCM and runs not over 100 feet long having not more than two 90° bends or a total of 180° in bends. (More than 180° in bends between pull boxes is not recommended.)

For more difficult conduit runs, and runs having three or more cables over 250 MCM, increase the internal diameter of the conduit to 120%.

Example 1: To determine the required minimum internal diameter, in inches, of a conduit for three, #2/0—3000 volt, single conductor cables.

Diameter of one, #2/0—3000 volt cable=1.0 × .795= .795"

Minimum internal diameter of conduit=2.7 × .795= 2.146"

From table below a 2½" conduit is required.

Minimum group diameter of the three cables is 2.15 × .795=1.709"

Example 2: To determine the required minimum internal diameter, in inches, of a conduit for two, 4-conductor #9, 600 volt cables.

Diameter of one, 4-conductor #9, cable=1.0 × .788= .788"

Minimum internal diameter of conduit=2.5 × .788= 1.97"

From table below a 2" conduit is required.

Minimum group diameter of the two cables is 2.0 × .788=1.576".

INTERNAL DIAMETERS OF IRON CONDUITS									
½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½	4
.623	.824	1.05	1.38	1.61	2.07	2.47	3.07	3.55	4.03

Table 89

RIGID METAL CONDUIT

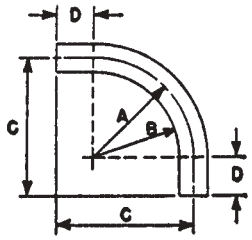
Trade Size, Inches	Length	External Diam., Inches	Nominal Internal Diam., Inches	Nominal Wall Thickness Inches	Minimum Weight 10 Lengths Pounds	Threads Per Inch
½	9' 11¼"	0.840	0.622	0.109	79	14
¾	9' 11¼"	1.050	0.824	0.113	105	14
1	9' 11"	1.315	1.049	0.133	153	11½
1¼	9' 11"	1.666	1.380	0.140	201	11½
1½	9' 11"	1.900	1.610	0.145	249	11½
2	9' 11"	2.375	2.067	0.154	334	11½
2½	9' 10½"	2.875	2.469	0.203	527	8
3	9' 10½"	3.500	3.068	0.216	690	8
3½	9' 10¼"	4.000	3.548	0.226	831	8
4	9' 10¼"	4.500	4.026	0.237	982	8
5	9' 10"	5.563	5.047	0.258	1,344	8
6	9' 10"	6.625	6.065	0.280	1,770	8

Table 90

ELECTRICAL METALLIC TUBING

Weight and Dimensions

SIZE INCHES	DIAMETER, INCHES		Approx. Wt. Per 100 Ft. Lbs.
	External	Internal	
⅜	0.577	0.493	23
½	0.706	0.622	28.5
¾	0.922	0.824	43.5
1	1.163	1.049	64
1¼	1.508	1.380	95
1½	1.738	1.610	110
2	2.195	2.067	140



STANDARD 90° BEND

Table 91

SPECIAL LARGE RADIUS ELBOW FOR THICK WALL CONDUIT

Radius Offset Tangent	A C D	12" 21" 9"	15" 24" 9"	18" 28" 10"	24" 35" 11"	30" 41" 11"	36" 47" 11"	42" 54" 12"	48" 60" 12"
Length Before Bending		3'0"	3'6"	4'0"	4'11"	5'9"	6'6"	7'6"	8'5"
Offset		B							
TRADE SIZE	1"	11.34	14.34	17.34	23.34	29.34	35.34	41.34	47.34
	1¼"	11.17	14.17	17.17	23.17	29.17	35.17	41.17	47.17
	1½"	11.05	14.05	17.05	23.05	29.05	35.05	41.05	47.05
	2"	10.81	13.81	16.81	22.81	28.81	34.81	40.81	46.81
	2½"	10.56	13.56	16.56	22.56	28.56	34.56	40.56	46.56
	3"		13.25	16.25	22.25	28.25	34.25	40.25	46.25
	3½"			16.00	22.00	28.00	34.00	40.00	46.00
	4"			15.75	21.75	27.75	33.75	39.75	45.75
	4½"			15.50	21.50	27.50	33.50	39.50	45.50
	5"					27.22	33.22	39.22	45.22
	6"							38.69	44.69

Table 92

STANDARD RADIUS ELBOW

Trade Size	DIMENSIONS IN INCHES				Length Before Bending	Wt., Pounds Each
	A	B	C	D		
½"	4.00	3.58	6.73	2.73	11.75	0.83
¾"	4.50	3.98	7.47	2.97	13.00	1.23
1"	5.75	5.09	8.48	2.73	14.50	2.03
1¼"	7.25	6.42	9.93	2.68	16.75	3.18
1½"	8.25	7.30	11.27	3.02	19.00	4.32
2"	9.50	8.31	13.54	4.04	23.00	7.05
2½"	10.50	9.06	15.25	4.75	26.00	12.61
3"	13.00	11.25	17.29	4.29	29.00	18.40
3½"	15.00	13.00	19.72	4.72	33.00	25.30
4"	16.00	13.75	20.93	4.93	35.00	31.76
4½"	18.00	15.50	23.36	5.36	39.00	41.10
5"	24.00	21.22	30.15	6.15	50.00	61.70
6"	30.00	26.69	36.44	6.44	60.00	95.90

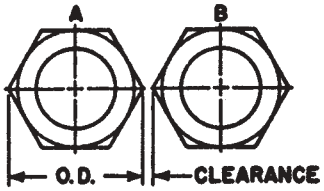
Table 93

INTERNAL AREA OF CONDUIT OR TUBING

SIZE (Inches)	Internal Diameter (Inches)	Area Square Inches	SIZE	Internal Diameter (Inches)	Area Square Inches
½	.622	.30	3	3.068	7.38
¾	.824	.53	3½	3.548	9.90
1	1.049	.86	4	4.026	12.72
1¼	1.380	1.50	4½	4.506	15.95
1½	1.610	2.04	5	5.047	20.00
2	2.067	3.36	6	6.065	28.89
2½	2.469	4.79			

Table 94

RECOMMENDED CONDUIT SPACING FOR ADEQUATE LOCK-NUT CLEARANCE



SPACING IN INCHES — CENTER TO CENTER															
Trade Size—Conduit "A"			½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Lock-Nut Outside Dia.			1⅛	1⅜	1 1/16	2 3/16	2 7/16	3	3 7/16	4 3/16	4 13/16	5⅜	6	6 1/16	7 15/16
Trade Size-Conduit "B"	½	Minimum	1 3/16												
		Recommended	1⅜												
	¾	Minimum	1 5/16	1 7/16											
		Recommended	1½	1⅝											
	1	Minimum	1½	1⅝	1¾										
		Recommended	1¾	1⅞	2										
	1¼	Minimum	1¾	1⅞	2	2¼									
		Recommended	2	2⅛	2¼	2½									
	1½	Minimum	1 15/16	2 1/16	2 3/16	2 7/16	2 9/16								
		Recommended	2⅛	2¼	2⅜	2⅝	2¾								
	2	Minimum	2 3/16	2 5/16	2½	2¾	2⅞	3⅛							
		Recommended	2⅜	2½	2¾	3	3⅛	3⅜							
	2½	Minimum	2 7/16	2 9/16	2¾	3	3⅛	3⅜	3⅝						
		Recommended	2⅝	2¾	3	3¼	3⅜	3⅝	4						
	3	Minimum	2 13/16	2 15/16	3 1/16	3 5/16	3 7/16	3¾	4	4 5/16					
		Recommended	3	3⅛	3⅜	3⅝	3¾	4	4⅜	4¾					
	3½	Minimum	3⅛	3¼	3⅜	3⅝	3¾	4 1/16	4 5/16	4⅝	4 15/16				
		Recommended	3⅜	3½	3⅝	3⅞	4	4⅜	4⅝	5	5⅜				
	4	Minimum	3 7/16	3 9/16	3 11/16	3 15/16	4 1/16	4⅜	4⅝	4 15/16	5¼	5 9/16			
		Recommended	3¾	3⅞	4	4¼	4⅜	4¾	5	5⅜	5⅝	6			
	4½	Minimum	3¾	3⅞	4	4¼	4⅜	4⅝	4⅞	5¼	5 9/16	5⅞	6⅛		
		Recommended	4	4⅛	4¼	4½	4¾	5	5¼	5⅝	6	6¼	6½		
	5	Minimum	4⅛	4¼	4⅜	4⅝	4¾	5	5¼	5 9/16	5⅞	6 3/16	6½	6 13/16	
		Recommended	4⅜	4½	4⅝	4⅞	5	5⅜	5⅝	6	6¼	6⅝	7	7¼	
	6	Minimum	4¾	4⅞	5	5¼	5⅜	5⅝	5⅞	6 3/16	6½	6 13/16	7⅛	7 7/16	8⅛
		Recommended	5	5⅛	5¼	5½	5⅝	6	6¼	6⅝	7	7¼	7⅝	8	8⅝

Table 95

TEMPERATURE CONVERSION CHART FAHRENHEIT TO CENTIGRADE

Formula:—Degrees C.=5/9 (°F.—32)

Deg. F	0	1	2	3	4	5	6	7	8	9
	DEGREES CENTIGRADE									
−40	−40	−40.6	−41.1	−41.7	−42.2	−42.8	−43.3	−43.9	−44.4	−45.0
−30	−34.4	−35.0	−35.6	−36.1	−36.7	−37.2	−37.8	−38.3	−38.9	−39.4
−20	−28.9	−29.4	−30.0	−30.6	−31.1	−31.7	−32.2	−32.8	−33.3	−33.9
−10	−23.3	−23.9	−24.4	−25.0	−25.6	−26.1	−26.7	−27.2	−27.8	−28.3
− 0	−17.8	−18.3	−18.9	−19.4	−20.0	−20.6	−21.1	−21.7	−22.2	−22.8
+ 0	−17.8	−17.2	−16.7	−16.1	−15.6	−15.0	−14.4	−13.9	−13.3	−12.8
10	−12.2	−11.7	−11.1	−10.6	−10.0	− 9.4	− 8.9	− 8.3	− 7.8	− 7.2
20	− 6.7	− 6.1	− 5.6	− 5.0	− 4.4	− 3.9	− 3.3	− 2.8	− 2.2	− 1.7
30	− 1.1	− 0.6	+ 0	0.6	1.1	1.7	2.2	2.8	3.3	3.9
40	4.4	5.0	5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4
50	10.0	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.4	15.0
60	15.6	16.1	16.7	17.2	17.8	18.3	18.9	19.4	20.0	20.6
70	21.1	21.7	22.2	22.9	23.3	23.9	24.4	25.0	25.6	26.1
80	26.7	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7
90	32.2	32.8	33.3	33.9	34.4	35.0	35.6	36.1	36.7	37.2
100	37.8	38.3	38.9	39.4	40.0	40.6	41.1	41.7	42.2	42.8
110	43.3	43.9	44.4	45.0	45.6	46.1	46.7	47.2	47.8	48.3
120	48.9	49.4	50.0	50.6	51.1	51.7	52.2	52.8	53.3	53.9
130	54.4	55.0	55.5	56.1	56.6	57.2	57.8	58.3	58.9	59.4
140	60.0	60.5	61.1	61.7	62.2	62.8	63.3	63.9	64.4	65.0
150	65.5	66.1	66.6	67.2	67.8	68.3	68.9	69.4	70.0	70.5
160	71.1	71.6	72.2	72.8	73.3	73.9	74.4	75.0	75.5	76.1
170	76.6	77.1	77.8	78.3	78.9	79.4	80.0	80.5	81.1	81.6
180	82.2	82.8	83.3	83.9	84.4	85.0	85.5	86.1	86.6	87.1
190	87.8	88.3	88.9	89.4	90.0	90.5	91.1	91.6	92.2	92.8
200	93.3	93.9	94.4	95.0	95.5	96.1	96.6	97.1	97.8	98.3
210	98.9	99.4	100.0	100.5	101.1	101.6	102.2	102.8	103.3	103.9
220	104.4	105.0	105.5	106.1	106.6	107.2	107.8	108.3	108.9	109.4
230	110.0	110.5	111.1	111.6	112.2	112.8	113.3	113.9	114.4	115.0
240	115.5	116.1	116.6	117.2	117.8	118.3	118.9	119.4	120.0	120.5
250	121.1	121.6	122.2	122.8	123.3	123.9	124.4	125.0	125.5	126.1
260	126.6	127.2	127.8	128.3	128.9	129.4	130.0	130.5	131.1	131.6
270	132.2	132.8	133.3	133.9	134.4	135.0	135.5	136.1	136.6	137.2
280	137.8	138.3	138.9	139.4	140.0	140.5	141.1	141.6	142.2	142.8
290	143.3	143.9	144.4	145.0	145.5	146.1	146.6	147.2	147.8	148.3
300	148.9	149.4	150.0	150.5	151.1	151.6	152.2	152.8	153.3	153.9
310	154.4	155.0	155.6	156.1	156.7	157.2	157.8	158.3	158.9	159.4
320	160.0	160.6	161.1	161.7	162.2	162.8	163.3	163.9	164.4	165.0
330	165.6	166.1	166.7	167.2	167.8	168.3	168.9	169.4	170.0	170.6
340	171.1	171.7	172.2	172.8	173.3	173.9	174.4	175.0	175.6	176.1
350	176.7	177.2	177.8	178.3	178.9	179.4	180.0	180.6	181.1	181.7
360	182.2	182.8	183.3	183.9	184.4	185.0	185.6	186.1	186.7	187.2
370	187.8	188.3	188.9	189.4	190.0	190.6	191.1	191.7	192.2	192.8
380	193.3	193.9	194.4	195.0	195.6	196.1	196.7	197.2	197.8	198.3
390	198.9	199.4	200.0	200.6	201.1	201.7	202.2	202.8	203.3	203.9
400	204.4	205.0	205.6	206.1	206.7	207.2	207.8	208.3	208.9	209.4

For Interpolation:

°F.....0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
°C.....0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.44	0.50	0.56

Table 96

TEMPERATURE CONVERSION CHART CENTIGRADE TO FAHRENHEIT

Formula:—Degrees F=9/5 °C. + 32.

Deg. C	0	1	2	3	4	5	6	7	8	9
	DEGREES FAHRENHEIT									
−40	−40.0	−41.8	−43.6	−45.4	−47.2	−49.0	−50.8	−52.6	−54.4	−56.2
−30	−22.0	−23.8	−25.6	−27.4	−29.2	−31.0	−32.8	−34.6	−36.4	−38.2
−20	− 4.0	− 5.8	− 7.6	− 9.4	−11.2	−13.0	−14.8	−16.6	−18.4	−20.2
−10	+14.0	+12.2	+10.4	+ 8.6	+ 6.8	+ 5.0	+ 3.2	+ 1.4	− 0.4	− 2.2
− 0	+32.0	+30.2	+28.4	+26.6	+24.8	+23.0	+21.2	+19.4	+17.6	+15.8
+ 0	32.0	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.4	48.2
10	50.0	51.8	53.6	55.4	57.2	59.0	60.8	62.6	64.4	66.2
20	68.0	69.8	71.6	73.4	75.2	77.0	78.8	80.6	82.4	84.2
30	86.0	87.8	89.6	91.4	93.2	95.0	96.8	98.6	100.4	102.2
40	104.0	105.8	107.6	109.4	111.2	113.0	114.8	116.6	118.4	120.2
50	122.0	123.8	125.6	127.4	129.2	131.0	132.8	134.6	136.4	138.2
60	140.0	141.8	143.6	145.4	147.2	149.0	150.8	152.6	154.4	156.2
70	158.0	159.8	161.6	163.4	165.2	167.0	168.8	170.6	172.4	174.2
80	176.0	177.8	179.6	181.4	183.2	185.0	186.8	188.6	190.4	192.2
90	194.0	195.8	197.6	199.4	201.2	203.0	204.8	206.6	208.4	210.2
100	212.0	213.8	215.6	217.4	219.2	221.0	222.8	224.6	226.4	228.2
110	230.0	231.8	233.6	235.4	237.2	239.0	240.8	242.6	244.4	246.2
120	248.0	249.8	251.6	253.4	255.2	257.0	258.8	260.6	270.4	264.2
130	266.0	267.8	269.6	271.4	273.2	275.0	276.8	278.6	280.4	282.2
140	284.0	285.8	287.6	289.4	291.2	293.0	294.8	296.6	298.4	300.2
150	302.0	303.8	305.6	307.4	309.2	311.0	312.8	314.6	316.4	318.2
160	320.0	321.8	323.6	325.4	327.2	329.0	330.8	332.6	334.4	336.2
170	338.0	339.8	341.6	343.4	345.2	347.0	348.8	350.6	352.4	354.2
180	356.0	357.8	359.6	361.4	363.2	365.0	366.8	368.6	370.4	372.2
190	374.0	375.8	377.6	379.4	381.2	383.0	384.8	386.6	388.4	390.2
200	392.0	393.8	395.6	397.4	399.2	401.0	402.8	404.6	406.4	408.2
210	410.0	411.8	413.6	415.4	417.2	419.0	420.8	422.6	424.4	426.2
220	428.0	429.8	431.6	433.4	435.2	437.0	438.8	440.6	442.4	444.2
230	446.0	447.8	449.6	451.4	453.2	455.0	456.8	458.6	460.4	462.2
240	464.0	465.8	467.6	469.4	471.2	473.0	474.8	476.6	478.4	480.2
250	482.0	483.8	485.6	487.4	489.2	491.0	492.8	494.6	496.4	498.2
260	500.0	501.8	503.6	505.4	507.2	509.0	510.8	512.6	514.4	516.2
270	518.0	519.8	521.6	523.4	525.2	527.0	528.8	530.6	532.4	534.2
280	536.0	537.8	539.6	541.4	543.2	545.0	546.8	548.6	550.4	552.2
290	554.0	555.8	557.6	559.4	561.2	563.0	564.8	566.6	568.4	570.2
300	572.0	573.8	575.6	577.4	579.2	581.0	582.8	584.6	586.4	588.2
310	590.0	591.8	593.6	595.4	597.2	599.0	600.8	602.6	604.4	606.2
320	608.0	609.9	611.6	613.4	615.2	617.0	618.8	620.6	622.4	624.2
330	626.0	627.8	629.6	631.4	633.2	635.0	636.8	638.6	640.4	642.2
340	644.0	645.8	647.6	649.4	651.2	653 0	654.8	656.6	658.4	660.2
350	662.0	663.8	665.6	667.4	669.2	671.0	672.8	674.6	676.4	678.2
360	680.0	681.8	683.6	685.4	687.2	689.0	690.8	692.6	694.4	696.2
370	698.0	699.8	701.6	703.4	705.2	707.0	708.8	710.6	712.4	714.2
380	716.0	717.8	719.6	721.4	723.2	725.0	726.8	728.6	730.4	732.2
390	734.0	735.8	737.6	739.4	741.2	743.0	744.8	746.6	748.4	750.2
400	752.0	753.8	755.6	757.4	759.2	761.0	762.8	764.6	766.4	768.2

For Interpolation:

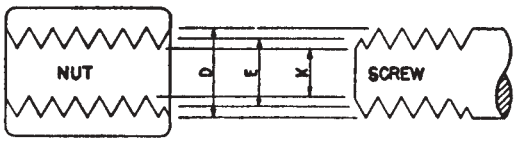
°C.....0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
°F.....0.18	0.36	0.54	0.72	0.90	1.08	1.26	1.44	1.62	1.80

Table 97
THREAD DIMENSIONS

(Reference: U. S. Dept. of Commerce C S 24-43)

NATIONAL SCREW THREAD STANDARDS

"Go" and "No Go" Pitch Diameter Limits, Classes I-II-III-IV
National Coarse NC (Formerly ASME and U. S. Standard)
National Fine NF (Formerly ASME and S. A. E. Standard) Pitches NS



D=Major Diameter
E=Pitch Diameter
K=Minor Diameter

NOTE—Class II fit will be furnished unless otherwise specified by the purchaser.

NATIONAL FINE SERIES

Size and Threads Per In.	SCREWS (RING THREAD GAGE) Loose Fit Class I	Free Fit Class II	Medium Fit Class III	Close Fit Class IV	Basic Pitch Diam. E	NUTS (PLUG THREAD GAGE) Loose Fit Class I	Free Fit Class II	Medium Fit Class III	Close Fit Class IV	Major Diam. D	Minor Diam. K
0—80NF	.0512 .0488	.0519 .0502	.0519 .0506	.0520 .0514	.0519	.0543 .0519	.0536 .0519	.0532 .0519	.0525 .0519	.0600	.0438
1—72NF	.0633 .0608	.0640 .0622	.0640 .0627	.0641 .0634	.0640	.0665 .0640	.0658 .0640	.0653 .0640	.0647 .0640	.0730	.0550
2—64NF	.0752 .0726	.0759 .0740	.0759 .0745	.0760 .0753	.0759	.0785 .0759	.0778 .0759	.0773 .0759	.0766 .0759	.0860	.0657
3—56NF	.0866 .0838	.0874 .0854	.0874 .0859	.0876 .0869	.0874	.0902 .0874	.0894 .0874	.0889 .0874	.0881 .0874	.0990	.0758
4—48NF	.0976 .0945	.0985 .0963	.0985 .0969	.0987 .0979	.0985	.1016 .0985	.1007 .0985	.1001 .0985	.0993 .0985	.1120	.0849
5—44NF	.1093 .1061	.1102 .1079	.1102 .1086	.1104 .1096	.1102	.1134 .1102	.1125 .1102	.1118 .1102	.1110 .1102	.1250	.0955
6—40NF	.1208 .1174	.1218 .1194	.1218 .1201	.1220 .1211	.1218	.1252 .1218	.1242 .1218	.1235 .1218	.1227 .1218	.1380	.1055
8—36NF	.1449 .1413	.1460 .1435	.1460 .1442	.1462 .1453	.1460	.1496 .1460	.1485 .1460	.1478 .1460	.1469 .1460	.1640	.1279
10—32NF	.1686 .1648	.1697 .1670	.1697 .1678	.1699 .1689	.1697	.1735 .1697	.1724 .1697	.1716 .1697	.1707 .1697	.1900	.1494
12—28NF	.1916 .1873	.1928 .1897	.1928 .1906	.1930 .1919	.1928	.1971 .1928	.1959 .1928	.1950 .1928	.1939 .1928	.2160	.1696
1/4—28NF	.2256 .2213	.2268 .2237	.2268 .2246	.2270 .2259	.2268	.2311 .2268	.2299 .2268	.2290 .2268	.2279 .2268	.2500	.2036
5/16—24NF	.2841 .2795	.2854 .2821	.2854 .2830	.2857 .2845	.2854	.2900 .2854	.2887 .2854	.2878 .2854	.2866 .2854	.3125	.2584
3/8—24NF	.3466 .3420	.3479 .3446	.3479 .3455	.3482 .3470	.3479	.3525 .3479	.3512 .3479	.3503 .3479	.3491 .3479	.3750	.3209
7/16—20NF	.4035 .3984	.4050 .4014	.4050 .4024	.4053 .4040	.4050	.4101 .4050	.4086 .4050	.4076 .4050	.4063 .4050	.4375	.3725
1/2—20NF	.4660 .4609	.4675 .4639	.4675 .4649	.4678 .4665	.4675	.4726 .4675	.4711 .4675	.4701 .4675	.4688 .4675	.5000	.4350
9/16—18NF	.5248 .5191	.5264 .5223	.5264 .5234	.5267 .5252	.5264	.5321 .5264	.5305 .5264	.5294 .5264	.5279 .5264	.5625	.4903
5/8—18NF	.5873 .5816	.5889 .5848	.5889 .5859	.5892 .5877	.5889	.5946 .5889	.5930 .5889	.5919 .5889	.5904 .5889	.6250	.5528
3/4—16NF	.7076 .7013	.7094 .7049	.7094 .7062	.7098 .7082	.7094	.7157 .7094	.7139 .7094	.7126 .7094	.7110 .7094	.7500	.6688
7/8—14NF	.8265 .8195	.8286 .8237	.8286 .8250	.8290 .8272	.8286	.8356 .8286	.8335 .8286	.8322 .8286	.8304 .8286	.8750	.7822
1—14NF	.9515 .9445	.9536 .9487	.9536 .9500	.9540 .9522	.9536	.9606 .9536	.9585 .9536	.9572 .9536	.9554 .9536	1.0000	.9072
1 1/8—12NF	1.0685 1.0606	1.0709 1.0653	1.0709 1.0669	1.0714 1.0694	1.0709	1.0788 1.0709	1.0765 1.0709	1.0749 1.0709	1.0729 1.0709	1.1250	1.0167
1 1/4—12NF	1.1935 1.1856	1.1959 1.1903	1.1959 1.1919	1.1964 1.1944	1.1959	1.2038 1.1959	1.2015 1.1959	1.1999 1.1959	1.1979 1.1959	1.2500	1.1417
1 3/8—12NF	1.3185 1.3106	1.3209 1.3153	1.3209 1.3169	1.3214 1.3194	1.3209	1.3288 1.3209	1.3265 1.3209	1.3249 1.3209	1.3229 1.3209	1.3750	1.2667
1 1/2—12NF	1.4435 1.4356	1.4459 1.4403	1.4459 1.4419	1.4464 1.4444	1.4459	1.4538 1.4459	1.4515 1.4459	1.4499 1.4459	1.4479 1.4459	1.5000	1.3917

Table 98

NATIONAL COARSE SERIES

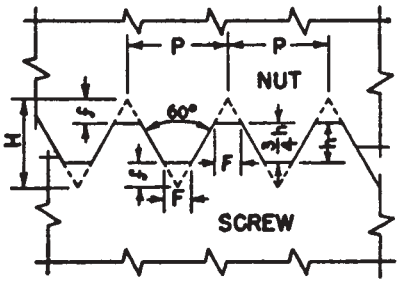
Size and Threads Per In.	SCREWS (RING THREAD GAGE)				Basic Pitch Diam. E	NUTS (PLUG THREAD GAGE)				Major Diam. D	Minor Diam. K
	Loose Fit Class I	Free Fit Class II	Medium Fit Class III	Close Fit Class IV		Loose Fit Class I	Free Fit Class II	Medium Fit Class III	Close Fit Class IV		
1—64NC	.0622 .0596	.0629 .0610	.0629 .0615	.0630 .0623	.0629	.0655 .0629	.0648 .0629	.0643 .0629	.0636 .0629	.0730	.0527
2—56NC	.0736 .0708	.0744 .0724	.0744 .0729	.0746 .0739	.0744	.0772 .0744	.0764 .0744	.0759 .0744	.0751 .0744	.0860	.0628
3—48NC	.0846 .0815	.0855 .0833	.0855 .0839	.0857 .0849	.0855	.0886 .0855	.0877 .0855	.0871 .0855	.0863 .0855	.0990	.0719
4—40NC	.0948 .0914	.0958 .0934	.0958 .0941	.0960 .0951	.0958	.0992 .0958	.0982 .0958	.0975 .0958	.0967 .0958	.1120	.0795
5—40NC	.1078 .1044	.1088 .1064	.1088 .1071	.1090 .1081	.1088	.1122 .1088	.1112 .1088	.1105 .1088	.1097 .1088	.1250	.0925
6—32NC	.1166 .1128	.1177 .1150	.1177 .1158	.1179 .1169	.1177	.1215 .1177	.1204 .1177	.1196 .1177	.1187 .1177	.1380	.0974
8—32NC	.1426 .1388	.1437 .1410	.1437 .1418	.1439 .1429	.1437	.1475 .1437	.1464 .1437	.1456 .1437	.1447 .1437	.1640	.1234
10—24NC	.1616 .1570	.1629 .1596	.1629 .1605	.1632 .1620	.1629	.1675 .1629	.1662 .1629	.1653 .1629	.1641 .1629	.1900	.1359
12—24NC	.1876 .1830	.1889 .1856	.1889 .1865	.1892 .1880	.1889	.1935 .1889	.1922 .1889	.1913 .1889	.1901 .1889	.2160	.1619
¼—20NC	.2160 .2109	.2175 .2139	.2175 .2149	.2178 .2165	.2175	.2226 .2175	.2211 .2175	.2201 .2175	.2188 .2175	.2500	.1850
5/16—18NC	.2748 .2691	.2764 .2723	.2764 .2734	.2767 .2752	.2764	.2821 .2764	.2805 .2764	.2794 .2764	.2779 .2764	.3125	.2403
⅜—16NC	.3326 .3263	.3344 .3299	.3344 .3312	.3348 .3332	.3344	.3407 .3344	.3389 .3344	.3376 .3344	.3360 .3344	.3750	.2938
7/16—14NC	.3890 .3820	.3911 .3862	.3911 .3875	.3915 .3897	.3911	.3981 .3911	.3960 .3911	.3947 .3911	.3929 .3911	.4375	.3447
½—13NC	.4478 .4404	.4500 .4448	.4500 .4463	.4504 .4485	.4500	.4574 .4500	.4552 .4500	.4537 .4500	.4519 .4500	.5000	.4001
9/16—12NC	.5060 .4981	.5084 .5028	.5084 .5044	.5089 .5069	.5084	.5163 .5084	.5140 .5084	.5124 .5084	.5104 .5084	.5625	.4542
⅝—11NC	.5634 .5549	.5660 .5601	.5660 .5618	.5665 .5644	.5660	.5745 .5660	.5719 .5660	.5702 .5660	.5681 .5660	.6250	.5069
¾—10NC	.6822 .6730	.6850 .6786	.6850 .6805	.6856 .6833	.6850	.6942 .6850	.6914 .6850	.6895 .6850	.6873 .6850	.7500	.6201
⅞— 9NC	.7997 .7897	.8028 .7958	.8028 .7979	.8034 .8010	.8028	.8128 .8028	.8098 .8028	.8077 .8028	.8052 .8028	.8750	.7307
1— 8NC	.9154 .9043	.9188 .9112	.9188 .9134	.9195 .9168	.9188	.9299 .9188	.9264 .9188	.9242 .9188	.9215 .9188	1.0000	.8376
1⅛— 7NC	1.0283 1.0159	1.0322 1.0237	1.0322 1.0263	1.0330 1.0300	1.0322	1.0446 1.0322	1.0407 1.0322	1.0381 1.0322	1.0352 1.0322	1.1250	.9394
1¼— 7NC	1.1533 1.1409	1.1572 1.1487	1.1572 1.1513	1.1580 1.1550	1.1572	1.1696 1.1572	1.1657 1.1572	1.1631 1.1572	1.1602 1.1572	1.2500	1.0644
1⅜— 6NC	1.2623 1.2478	1.2667 1.2566	1.2667 1.2596	1.2676 1.2640	1.2667	1.2812 1.2667	1.2768 1.2667	1.2738 1.2667	1.2703 1.2667	1.3750	1.1585
1½— 6NC	1.3873 1.3728	1.3917 1.3816	1.3917 1.3846	1.3926 1.3890	1.3917	1.4062 1.3917	1.4018 1.3917	1.3988 1.3917	1.3953 1.3917	1.5000	1.2835
1¾— 5NC	1.0000	1.6201 1.6085	1.6201 1.6119		1.6201		1.6317 1.6201	1.6283 1.6201		1.7500	1.4902
2— 4½NC		1.8557 1.8430	1.8557 1.8468		1.8557		1.8684 1.8557	1.8646 1.8557		2.0000	1.7113
2¼— 4½NC		2.1057 2.0930	2.1057 2.0968		2.1057		2.1184 2.1057	2.1146 2.1057		2.2500	1.9613
2½— 4NC		2.3376 2.3236	2.3376 2.3279		2.3376		2.3516 2.3376	2.3473 2.3376		2.5000	2.1752
2¾— 4NC		2.5876 2.5736	2.5876 2.5779		2.5876		2.6016 2.5876	2.5973 2.5876		2.7500	2.4252
3— 4NC		2.8376 2.8236	2.8376 2.8279		2.8376		2.8516 2.8376	2.8473 2.8376		3.0000	2.6752
3¼— 4NC		3.0876 3.0736			3.0876		3.1016 3.0876			3.2500	2.9252
3½— 4NC		3.3376 3.3236			3.3376		3.3516 3.3376			3.5000	3.1752
3¾— 4NC		3.5876 3.5736			3.5876		3.6016 3.5876			3.7500	3.4252
4— 4NC		3.8376 3.8236			3.8376		3.8516 3.8376			4.0000	3.6752

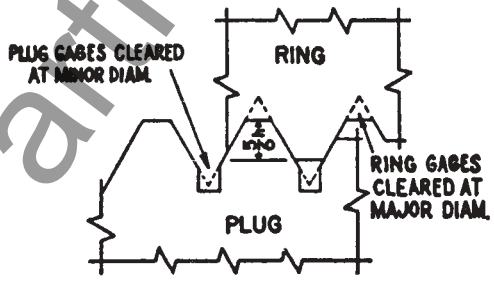
Table 99

THREAD DIMENSIONS

American National Form Thread – Special Pitches (N.S.)

Size and Threads Per In.	Major Diam. D	Pitch Diam. E	Minor Diam. K	Size and Threads Per In.	Major Diam. D	Pitch Diam. E	Minor Diam. K	Size and Threads Per In.	Major Diam. D	Pitch Diam. E	Minor Diam. K
1/4—24NS	.2500	.2229	.1959	7/8—12NS	.8750	.8209	.7667	1 3/4—10NS	1.7500	1.6850	1.6201
1/4—32NS	.2500	.2297	.2094	7/8—16NS	.8750	.8344	.7938	1 3/4—12NS	1.7500	1.6959	1.6417
5/16—20NS	.3125	.2800	.2475	1—12NS	1.0000	.9459	.8917	2—10NS	2.0000	1.9350	1.8701
5/16—32NS	.3125	.2922	.2719	1—16NS	1.0000	.9594	.9188	2—12NS	2.0000	1.9459	1.8917
3/8—20NS	.3750	.3425	.3100	1 1/8—10NS	1.1250	1.0601	1.0051	2 1/4—10NS	2.2500	2.1850	2.1201
3/8—32NS	.3750			1 1/8—14NS	1.1250	1.0786	1.0323	2 1/4—12NS	2.2500	2.1959	2.1417
1/2—16NS	.5000	.4594	.4188	1 1/4—10NS	1.2500	1.1851	1.1201	2 1/2—10NS	2.5000	2.4350	2.3701
1/2—24NS	.5000	.4729	.4459	1 1/4—14NS	1.2500	1.2036	1.1573	2 1/2—12NS	2.5000	2.4459	2.3917
5/8—16NS	.6250	5844	.5438	1 3/8—10NS	1.3750	1.3101	1.2451	2 3/4—10NS	2.7500	2.6850	2.6201
5/8—24NS	.6250			1 3/8—14NS	1.3750	1.3286	1.2823	2 3/4—12NS	2.7500	2.6959	2.6417
3/4—12NS	.7500	.6959	.6417	1 1/2—10NS	1.5000	1.4351	1.3701	3—10NS	3.0000	2.9050	2.8701
3/4—20NS	.7500			1 1/2—14NS	1.5000	1.4536	1.4073	3—12NS	3.0000	2.9459	2.8917





STANDARD SYSTEM OF MARKING

Manufacturers of small tools, recognizing the necessity of a standard system of marking taps, dies and other threading tools, will mark their tools with the nominal size, number of threads per inch, and the proper symbol to identify the thread form.

Symbols commonly used in American practice are:

N.C.—American National Coarse Thread Series.
N.F.—American National Fine Thread Series.
N.S.—American National Special Thread Series.
N.H.T.—American National Hose Coupling Threads.
N.P.T.—American National Taper Pipe Threads.
N.P.S.—American National Straight Pipe Threads.
GREASE—Undersize Straight Pipe Threads.
STEAM—Straight Pipe Threads for Coupling Taps.
CONDUIT—Oversize Straight Pipe Threads for Coupling Taps.
V—60 degree V-Thread usually with both the crest and root flatted several thousandths from the theoretical to the user's specifications.
ACME—Standardized 29 degree Thread.
S.B.—Manufacturers' Stove Bolt Standard Thread.

H=.866025 × P=Depth of 60° sharp V-thread.

h=.649519 × P=Depth of American National form of thread.

F=.125000 × P=Width of flat at crest and root of American National Form.

f=.108253 × P=Depth of Truncation from sharp V.

Dimensions and Per Cent Area of Conduit and of Tubing

Trade Size	Internal Diameter Inches	Area – Square Inches								
			Not Lead Covered				Lead Covered				
		Total 100%	1 Cond. 53%	2 Cond. 31%	3 Cond. 43%	4 Cond. and Over 40%	1 Cond. 55%	2 Cond. 30%	3 Cond. 40%	4 Cond. 38%	Over 4 Cond. 35%
½	.622	.30	.16	.09	.13	.12	.17	.09	.12	.11	.11
¾	.824	.53	.28	.16	.23	.21	.29	.16	.21	.20	.19
1	1.049	.86	.46	.27	.37	.34	.47	.26	.34	.33	.30
1¼	1.380	1.50	.80	.47	.65	.60	.83	.45	.60	.57	.53
1½	1.610	2.04	1.08	.63	.88	.82	1.12	.61	.82	.78	.71
2	2.067	3.36	1.78	1.04	1.44	1.34	1.85	1.01	1.34	1.28	1.18
2½	2.469	4.79	2.54	1.48	2.06	1.92	2.63	1.44	1.92	1.82	1.68
3	3.068	7.38	3.91	2.29	3.17	2.95	4.06	2.21	2.95	2.80	2.58
3½	3.548	9.90	5.25	3.07	4.26	3.96	5.44	2.97	3.96	3.76	3.47
4	4.026	12.72	6.74	3.94	5.47	5.09	7.00	3.82	5.09	4.83	4.45
5	5.047	20.00	10.60	6.20	8.60	8.00	11.00	6.00	8.00	7.60	7.00
6	6.065	28.89	15.31	8.96	12.42	11.56	15.89	8.67	11.56	10.98	10.11

Dimensions of Rubber-Covered and Thermoplastic-Covered Conductors

Size AWG MCM	Types RF-2, RFH-2, R, RH, RHH, RHW, RH-RW, RW THW		Types TF, T, TW, RU**, RUH**, RUW	
	Approx. Diam. Inches	Approx. Area Sq. Ins.	Approx. Diam. Inches	Approx. Area Sq. Ins.
18	.146	.0167	.106	.0088
16	.158	.0196	.118	.0109
14	2/64 in. .171	.0230	.131	.0135
14	3/64 in. .204*	.0327*		
12	2/64 in. .188	.0278	.148	.0172
12	3/64 in. .221*	.0384*		
10	.242	.0460	.168	.0224
8	.311	.0760	.228	.0408
6	.397	.1238	.323	.0819
4	.452	.1605	.372	.1087
3	.481	.1817	.401	.1263
2	.513	.2067	.433	.1473
1	.588	.2715	.508	.2027
0	.629	.3107	.549	.2367
00	.675	.3578	.595	.2781
000	.727	.4151	.647	.3288
0000	.785	.4840	.705	.3904
250	.868	.5917	.788	.4877
300	.933	.6837	.843	.5581
350	.985	.7620	.895	.6291
400	1.032	.8365	.942	.6969
500	1.119	.9834	1.029	.8316
600	1.233	1.1940	1.143	1.0261
700	1.304	1.3355	1.214	1.1575
750	1.339	1.4082	1.249	1.2252
800	1.372	1.4784	1.282	1.2908
900	1.435	1.6173	1.345	1.4208
1000	1.494	1.7531	1.404	1.5482
1250	1.676	2.2062	1.577	1.9532
1500	1.801	2.5475	1.702	2.2748
1750	1.916	2.8895	1.817	2.5930
2000	2.021	3.2079	1.922	2.9013

*The dimensions of Type RW, RHH and THW wire. Also, these dimensions to be used for new work in computing size of conduit or tubing for combinations of wires not shown in Table 1.

** No. 14 to No. 2.

No. 18 to No. 8, solid; No. 6 and larger, stranded.

The dimensions of rubber-covered conductors in column 3 of this table are to be used in computing the size of conduit or tubing for new work for combinations not shown in Table 1. The dimensions in the last column of this table may be used only for rewiring existing raceways.

Dimensions of Lead-Covered Conductors

Types RL, RHL, and RUL

Size AWG MCM	Single Conductor		Two Conductor		Three Conductor	
	Diam. Inches	Area Sq. Ins.	Diam. Inches	Area Sq. Ins.	Diam. Inches	Area Sq. Ins.
14	.28	.062	.28 x .47	.115	.59	.273
12	.29	.066	.31 x .54	.146	.62	.301
10	.35	.096	.35 x .59	.180	.68	.363
8	.41	.132	.41 x .71	.255	.82	.528
6	.49	.188	.49 x .86	.369	.97	.738
4	.55	.237	.54 x .96	.457	1.08	.916
2	.60	.283	.61 x 1.08	.578	1.21	1.146
1	.67	.352	.70 x 1.23	.756	1.38	1.49
0	.71	.396	.74 x 1.32	.859	1.47	1.70
00	.76	.454	.79 x 1.41	.980	1.57	1.94
000	.81	.515	.84 x 1.52	1.123	1.69	2.24
0000	.87	.593	.90 x 1.64	1.302	1.85	2.68
250	.98	.754	. . . . .		2.02	3.20
300	1.04	.85	. . . . .		2.15	3.62
350	1.10	.95	. . . . .		2.26	4.02
400	1.14	1.02	. . . . .		2.40	4.52
500	1.23	1.18	. . . . .		2.59	5.28

Note – No. 14 to No. 8, solid conductors; No. 6 and larger, stranded conductors. Data for 2/64-inch insulation not yet compiled.

Varnished-Cambric Insulated Conductors

Type V

The insulation thickness for varnished-cambric conductors, Type V, is the same as for rubber-covered conductors, Type R, except for Nos. 14 and 12 which have 3/64-inch insulation for varnished-cambric, and 2/64-inch insulation for rubber-covered conductors and for No. 8 which has 3/64-inch insulation for varnished-cambric, and 4/64-inch insulation for rubber-covered conductors.

Note: The above tables give the nominal size of conductors and conduit or tubing recommended for use in computing size of conduit or tubing for various combinations of conductors. The dimensions represent average conditions only, and while variations will be found in dimensions of conductors and conduits of different manufacture, these variations will not affect the computation.

CONVERSION TABLES

These units	multiplied by	equal
amperes per square cm.	6.452	amperes per sq. inch.
ampere-turns	1.257	gilberts.
ampere-turns per cm.	2.540	ampere-turns per inch.
British thermal units	778.3	foot pounds.
	$3.931X10^{-4}$	horse-power-hours.
	1055	joules.
	$2.930X10^{-4}$	kilowatt hours.
B.t.u. per min.	12.97	foot-pounds per sec.
	0.02357	horse-power.
	0.01758	kilowatts.
	17.58	watts.
B.t.u. per sq. ft. per min.	0.1221	watts per square inch.
centimeters	$3.281X10^{-2}$	feet.
	0.3937	inches.
	$6.214X10^{-6}$	miles.
	393.7	mils.
	$1.094X10^{-2}$	yards.
centimeter-dynes	$7.376X10^{-8}$	pound-feet.
centimeter-grams	$7.233X10^{-5}$	pound-feet.
centimeters per second	1.969	feet per minute.
	0.03281	feet per second.
	0.02237	miles per hour.
	$3.728X10^{-4}$	miles per minute.
cms. per sec. per sec.	0.03281	feet per sec. per sec.
circular mils	$7.854X10^{-7}$	square inches.
	0.7854	square mils.
cubic centimeters	$3.531X10^{-5}$	cubic feet.
	$6.102X10^{-2}$	cubic inches.
cubic feet	1728	cubic inches.
	0.03704	cubic yards.
	7.481	gallons.
	59.84	pints (liq.).
	29.92	quarts (liq.).
cubic feet per minute	0.1247	gallons per sec.
	62.4	pounds of water per min.
cubic inches	$5.787X10^{-4}$	cubic feet.
	$2.143X10^{-5}$	cubic yards.
	$4.329X10^{-3}$	gallons.
	$1.061X10^{5}$	mil-feet.
	0.03463	pints (liq.).
	0.01732	quarts (liq.).
cubic meters	35.31	cubic feet.
	61,023	cubic inches.
	1.308	cubic yards.
	264.2	gallons.
	2113	pints (liq.).
	1057	quarts (liq.).
cubic yards	27	cubic feet.
	202.0	gallons.
cubic yards per minute	0.45	cubic feet per second.
	3.367	gallons per second.
degrees (angle)	60	minutes.
	0.01745	radians.
	3600	seconds.
degrees per second	0.01745	radians per second.
	0.1667	revolutions per minute.
	0.002778	revolutions per second.
dynes	$2.248X10^{-6}$	pounds.
ergs	$9.480X10^{-11}$	British thermal units.
	1	dyne-centimeters.
	$7.378X10^{-8}$	foot-pounds.
	10^{-7}	joules.
ergs per second	$5.688X10^{-9}$	B.t. units per minute.
	$4.427X10^{-6}$	foot-pounds per minute.
	$7.378X10^{-8}$	foot-pounds per second.

These units	multiplied by	equal
ergs per second	$1.341X10^{-10}$	horse-power.
	10^{-10}	kilowatts.
feet of water	62.43	pounds per square foot.
	0.4335	pounds per square inch.
feet per minute	0.01667	feet per second.
	0.01136	miles per hour.
feet per second	0.5921	knots.
	0.6818	miles per hour.
	0.01136	miles per minute.
feet per second per second	0.6818	miles per hour per sec.
foot-pounds	$1.285X10^{-3}$	British thermal units.
	$1.356X10^{7}$	ergs.
	$5.050X10^{-7}$	horse-power-hours.
	1.356	joules.
	$3.766X10^{-7}$	kilowatt-hours.
foot-pounds per minute	$1.285X10^{-3}$	B.t. units per minute.
	0.01667	foot pounds per second.
	$3.030X10^{-5}$	horse-power.
	$2.260X10^{-5}$	kilowatts.
foot-pounds per second	$7.709X10^{-2}$	B.t. units per minute.
	$1.818X10^{-3}$	horse-power.
	$1.356X10^{-3}$	kilowatts.
gallons	0.1337	cubic feet.
	231	cubic inches.
gallons per minute	$2.228X10^{-3}$	cubic feet per second.
gausses	6.452	lines per square inch.
gilberts	0.7958	ampere-turns.
gilberts per centimeter	2.021	ampere-turns per inch.
grams	980.7	dynes.
	15.43	grains.
	0.03527	ounces.
	0.03215	ounces (troy).
	$2.205X10^{-3}$	pounds.
horse-power	42.40	B.t. units per min.
	33,000	foot-pounds per minute.
	550	foot-pounds per second.
	1.014	horse-power (metric).
	0.7457	kilowatts.
	745.7	watts.
horse-power (boiler)	33.520	B.t.u. per hour.
	9.804	kilowatts.
horse-power-hours	2544	British thermal units.
	$1.98X10^{6}$	foot-pounds.
	$2.684X10^{6}$	joules.
	0.7455	kilowatt-hours.
inches	$8.333X10^{-2}$	feet.
	$1.578X10^{-5}$	miles.
	10^{3}	mils.
	$2.778X10^{-2}$	yards.
inches of water	0.5781	ounces per square inch.
	5.204	pounds per square foot.
	0.03613	pounds per square inch.
joules (int.)	$9.480X10^{-4}$	British thermal units.
	10^{7}	ergs.
	0.7378	foot-pounds.
	$2.778X10^{-4}$	watt-hours.
kilograms	980,665	dynes.
	2.205	pounds.
	$1.102X10^{-3}$	tons (short).
kilolines	10^{3}	maxwells.
kilowatts	56.88	B.t. units per min.
	$4.427X10^{4}$	foot-pounds per min.
	737.8	foot-pounds per sec.
	1.341	horse-power.
	10^{3}	watts.

CONVERSION TABLES

These units	multiplied by	equal
kilowatt-hours	3413	British thermal units.
	$2.656X10^{6}$	foot-pounds.
	1.341	horse-power-hours.
	$3.6X10^{6}$	joules.
lines per square cm.	1	gausses.
lines per square inch	0.1550	gausses.
lumens per sq. ft.	1	foot-candles.
maxwells	10^{-3}	kilolines.
megalines	10^{5}	maxwells.
megohms	10^{6}	ohms.
meters	3.281	feet.
	39.37	inches.
	$6.214X10^{-4}$	miles.
meters per minute	3.281	feet per minute.
	0.05468	feet per second.
	0.03728	miles per hour.
meters per second	196.8	feet per minute.
	3.281	feet per second.
	2.237	miles per hour.
	0.03728	miles per minute.
microhms	10^{-12}	megohms.
	10^{-6}	ohms.
miles	5280	feet.
	$6.336X10^{4}$	inches.
miles per hour	88	feet per minute.
	1.467	feet per second.
miles per hr. per sec.	1.467	feet per sec. per sec.
miles per minute	88	feet per second.
	52.10	knots.
	60	miles per hour.
mil-feet	$9.425X10^{-6}$	cubic inches.
millihenries	10^{-3}	henries.
millimeters	$3.281X10^{-3}$	feet.
	0.03937	inches.
	$6.214X10^{-7}$	miles.
	39.37	mils.
mils	$8.333X10^{-5}$	feet.
	10^{-3}	inches.
minutes (angle)	$2.909X10^{-4}$	radians.
ohms	10^{-6}	megohms.
	10^{6}	microhms.
ounces	0.0625	pounds.
ounces (troy)	480	grains.
	0.08333	pounds (troy).
ounces per square inch	0.0625	pounds per square inch.
pounds	444,823	dynes.
	16	ounces.
pounds (troy)	0.8229	pounds (av.).
pounds-feet squared	144	pounds-inches squared.
pounds-inches squared	$6.945X10^{-3}$	pounds-feet squared.
pounds of water	0.01602	cubic feet.
	27.68	cubic inches.
	0.1198	gallons.
pounds of water per min.	$2.669X10^{-4}$	cubic feet per sec.
pounds per cubic foot	$5.787X10^{-4}$	pounds per cubic inch.
	$5.456X10^{-9}$	pounds per mil foot.
pounds per cubic inch	1728	pounds per cubic foot.
	$9.425X10^{-6}$	pounds per mil foot.
pounds per square foot	0.01602	feet of water.
	$6.944X10^{-3}$	pounds per square inch.
pounds per square inch	2.307	feet of water.
	144	pounds per square foot.
quadrants (angle)	90	degrees.
	5400	minutes.
	1.571	radians.

These units	multiplied by	equal
quarts (dry)	67.20	cubic inches.
quarts (liq.)	$3.342X10^{-2}$	cubic feet.
	57.75	cubic inches.
radians	57.30	degrees.
	3438	minutes.
	0.6366	quadrants.
radians per second	57.30	degrees per second.
	9.549	revolutions per minute.
	0.1592	revolutions per second.
revolutions	360	degrees.
	4	quadrants.
	6.283	radians.
revolutions per minute	6	degrees per second.
	0.1047	radians per second.
	0.01667	revolutions per second.
revolutions per second	360	degrees per second.
	6.283	radians per second.
	60	revs. per minute.
revs. per sec. per sec.	6.283	radians per sec. per sec.
	3600	revs. per min. per min.
	60	revs. per min. per sec.
seconds (angle)	$4.848X10^{-6}$	radians.
square centimeters	$1.973X10^{5}$	circular mils.
	$1.076X10^{-3}$	square feet.
	0.1550	square inches.
square feet	$2.296X10^{-5}$	acres.
	$1.833X10^{8}$	circular mils.
	144	square inches.
square inches	$1.273X10^{6}$	circular mils.
	$6.944X10^{-3}$	square feet.
	10^{6}	square mils.
square meters	$2.471X10^{-4}$	acres.
	10.76	square feet.
	1550	square inches.
	$3.861X10^{-7}$	square miles.
square miles	640	acres.
	$27.88X10^{6}$	square feet.
	$3.098X10^{6}$	square yards.
square millimeters	$1.973X10^{3}$	circular mils.
square mils	1.273	circular mils.
	10^{-6}	square inches.
square yards	9	square feet.
	$3.228X10^{-7}$	square miles.
temp. (degs. Cent.) + 273	1	abs. temp. (degs. Cent.).
temp. (degs. Cent.) + 17.8	1.8	temp. (degs. Fahr.).
temp. (degs. Fahr.) + 460	1	abs. temp. (degs. Fahr.).
temp. (degs. Fahr.) − 32	5/9	temp. (degs. Cent.).
tons (long)	2240	pounds.
tons (metric)	2205	pounds.
tons (short)	2000	pounds.
tons (short) per sq. ft.	13.89	pounds per square inch.
tons (short) per sq. in.	2000	pounds per square inch.
watts	0.05688	B.t. units per min.
	10^{7}	ergs per second.
	44.27	foot-pounds per min.
	0.7378	foot-pounds per second
	$1.341X10^{-3}$	horse-power.
	10^{-3}	kilowatts.
watt-hours	3.413	British thermal units.
	2656	foot-pounds.
	$1.341X10^{-3}$	horse-power-hours.
	10^{-3}	kilowatt-hours.
webers	10^{8}	maxwells.
yards	3	feet.
	36	inches.
	$5.682X10^{-4}$	miles.

A COMPARISON OF 1987 NEC TABLES 310-16 CONDUCTORS IN RACEWAY IN FREE AIR AND 310-27 CONDUCTORS IN UNDERGROUND ELECTRICAL DUCTS.

- See NEC Article 310-15(c) and Exception No. 4 Page 168 (Exception does not apply if more than 4 conductors in a conduit).
- Total ampacities for multiple insulated conductors rated 0 through 2000 volts.
- Raceway in free air based on ambient temperature of 30°C (86°F).
- In underground electrical ducts, ampacity based on ambient earth temperature of 20°C (68°F), 100% load factor (average load divided by peak load @ a given time span), thermal resistance (RHO) of 90 for earth fill, conductor temp. 75°C (167°F), installed per NEC Table 310-1 Page 169 details 1, 2, or 3.
- **Ampacities in ( ) per 1987 NEC Page 168 note 10(c) "In a 4-W, 3∅ Wye circuit where the major portion of the load consists of electric-discharge type lighting, data processing, or similar equipment, the neutral shall be considered to be a current-carrying conductor."**

Copper Conductors Type THW, THHN-THWN, XHHW, USE: (Eight-1000 MCM Cu THW Will Not Fit In 6" Conduit). 3 To 4 Conductors Per Raceway Except 8 In Right Hand Column													Six Raceway Ampacity	
Conductor Size AWG/MCM	One Raceway Ampacity		Two Raceway Ampacity		Three Raceway Ampacity		Four Raceway Ampacity		Six Raceway Ampacity		8 Conductors Per Raceway	
	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground
#8 Cu	50 (40)	58 (46)	**Per 1987 NEC 310-4 Only Conductors 1/0 And Larger Shall Be Permitted To Be Connected In Parallel.**									
#6 Cu	65 (52)	77 (62)										
#4 Cu	85 (68)	100 (80)										
#3 Cu	100 (80)	116 (93)										
#2 Cu	115 (92)	132 (105)										
#1 Cu	130 (104)	153 (122)										
1/0 Cu	150 (120)	175 (140)	300 (240)	308 (246)	450 (360)	438 (350)	600 (480)	549 (439)	900 (720)	726 (581)	1440 (1260)	1162 (1016)
2/0 Cu	175 (140)	200 (160)	350 (280)	352 (282)	525 (420)	498 (398)	700 (560)	624 (499)	1050 (840)	816 (653)	1680 (1470)	1306 (1142)
3/0 Cu	200 (160)	228 (182)	400 (320)	401 (321)	600 (480)	567 (454)	800 (640)	711 (569)	1200 (960)	924 (739)	1920 (1680)	1478 (1294)
4/0 Cu	230 (184)	263 (210)	460 (368)	463 (370)	690 (552)	645 (516)	920 (736)	808 (647)	1380 (1104)	1050 (840)	2208 (1932)	1680 (1470)
250 MCM Cu	255 (204)	290 (232)	510 (408)	510 (408)	765 (612)	708 (566)	1020 (816)	887 (710)	1530 (1224)	1152 (922)	2448 (2142)	1843 (1613)
300 MCM Cu	285 (228)	321 (257)	570 (456)	565 (452)	855 (684)	780 (624)	1140 (912)	978 (782)	1710 (1368)	1260 (1008)	2736 (2394)	2016 (1764)
350 MCM Cu	310 (248)	351 (281)	620 (496)	618 (494)	930 (744)	849 (679)	1240 (992)	1064 (851)	1860 (1488)	1368 (1094)	2976 (2604)	2189 (1915)
400 MCM Cu	335 (268)	376 (301)	670 (536)	662 (529)	1005 (804)	906 (725)	1340 (1072)	1136 (908)	2010 (1608)	1458 (1166)	3216 (2814)	2333 (2041)
500 MCM Cu	380 (304)	427 (342)	760 (608)	752 (601)	1140 (912)	1023 (818)	1520 (1216)	1282 (1026)	2280 (1824)	1638 (1310)	3648 (3192)	2621 (2293)
600 MCM Cu	420 (336)	468 (374)	840 (672)	824 (659)	1260 (1008)	1113 (890)	1680 (1344)	1395 (1116)	2520 (2016)	1776 (1421)	4032 (3528)	2842 (2486)
700 MCM Cu	460 (368)	509 (407)	920 (736)	896 (717)	1380 (1104)	1206 (965)	1840 (1472)	1512 (1209)	2760 (2208)	1914 (1531)	4416 (3864)	3062 (2680)
750 MCM Cu	475 (380)	529 (423)	950 (760)	931 (745)	1425 (1140)	1251 (1001)	1900 (1520)	1568 (1254)	2850 (2280)	1980 (1584)	4560 (3990)	3166 (2772)
800 MCM Cu	490 (392)	544 (435)	980 (784)	957 (766)	1470 (1176)	1284 (1027)	1960 (1568)	1609 (1287)	2940 (2352)	2028 (1622)	4704 (4116)	3245 (2839)
900 MCM Cu	520 (416)	575 (460)	1040 (832)	1012 (810)	1560 (1248)	1350 (1080)	2080 (1664)	1692 (1354)	3120 (2496)	2130 (1704)	4992 (4368)	3408 (2982)
1000 MCM Cu	545 (436)	605 (484)	1090 (872)	1065 (852)	1635 (1308)	1416 (1133)	2180 (1744)	1775 (1420)	3270 (2616)	2232 (1786)	5232 (4578)	3571 (3125)

Aluminum Conductors Type THW, THHN-THWN, XHHW, USE: 3 To 4 Conductors Per Raceway Except 8 In Right Hand Column											Six Raceway Ampacity	
Conductor Size AWG/MCM	One Raceway Ampacity		Two Raceway Ampacity		Three Raceway Ampacity		Four Raceway Ampacity		Six Raceway Ampacity		8 Conductors Per Raceway	
	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground	Free Air	Underground
#6 Al	50 (40)	60 (48)	**Per 1987 NEC 310-4 Only Conductors 1/0 And Larger Shall Be Permitted To Be Connected In Parallel.**									
#4 Al	65 (52)	78 (62)										
#2 Al	90 (72)	103 (82)										
#1 Al	100 (80)	119 (95)										
1/0 Al	120 (96)	136 (109)	240 (192)	239 (191)	360 (288)	342 (274)	480 (384)	429 (343)	720 (576)	564 (451)	1152 (1008)	902 (790)
2/0 Al	135 (108)	156 (125)	270 (216)	275 (220)	405 (324)	390 (312)	540 (432)	489 (391)	810 (648)	636 (509)	1296 (1134)	1018 (890)
3/0 Al	155 (124)	178 (142)	310 (248)	313 (251)	465 (372)	441 (353)	620 (496)	553 (442)	930 (744)	726 (581)	1488 (1302)	1162 (1016)
4/0 Al	180 (144)	205 (164)	360 (288)	361 (289)	540 (432)	504 (403)	720 (576)	632 (506)	1080 (864)	822 (658)	1728 (1512)	1315 (1151)
250 MCM Al	205 (164)	227 (182)	410 (328)	400 (320)	615 (492)	555 (444)	820 (656)	696 (556)	1230 (984)	900 (720)	1968 (1722)	1440 (1260)
300 MCM Al	230 (184)	252 (202)	460 (368)	444 (355)	690 (552)	612 (490)	920 (736)	767 (614)	1380 (1104)	990 (792)	2208 (1932)	1584 (1386)
350 MCM Al	250 (200)	276 (221)	500 (400)	486 (389)	750 (600)	666 (533)	1000 (800)	835 (668)	1500 (1200)	1074 (859)	2400 (2100)	1718 (1504)
400 MCM Al	270 (216)	297 (238)	540 (432)	523 (418)	810 (648)	714 (571)	1080 (864)	895 (716)	1620 (1296)	1146 (917)	2592 (2268)	1834 (1604)
500 MCM Al	310 (248)	338 (270)	620 (496)	595 (476)	930 (744)	810 (648)	1240 (992)	1015 (812)	1860 (1488)	1296 (1037)	2976 (2604)	2074 (1814)
600 MCM Al	340 (272)	373 (298)	680 (544)	656 (525)	1020 (816)	888 (710)	1360 (1088)	1113 (890)	2040 (1632)	1416 (1133)	3264 (2856)	2266 (1982)
700 MCM Al	375 (300)	408 (326)	750 (600)	718 (574)	1125 (900)	963 (770)	1500 (1200)	1207 (966)	2250 (1800)	1530 (1224)	3600 (3150)	2448 (2142)
750 MCM Al	385 (308)	425 (340)	770 (616)	748 (598)	1155 (924)	1002 (802)	1540 (1232)	1256 (1005)	2310 (1848)	1590 (1272)	3696 (3234)	2544 (2226)
1000 MCM Al	445 (356)	494 (395)	890 (712)	869 (696)	1335 (1068)	1155 (924)	1780 (1424)	1448 (1158)	2670 (2136)	1824 (1459)	4272 (3738)	2918 (2554)

For ambient temperatures other than 30°C (86°F) for raceway in free air multiply the ampacities shown above by the appropriate factor shown for 1987 NEC Table 310-16 at the bottom of Page 153.
For ambient soil temperatures other than 20°C (68°F) for underground raceways multiply the ampacities shown above by the appropriate factor shown for 1987 Table 310-27 at the bottom of Page 162.

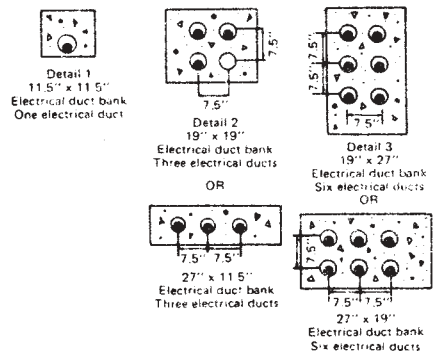
1987 NEC Page 169 Figure 310-1. Underground Raceway Installation Dimensions for Use with NEC Table 310-27.

Notes for all details:

1. Minimum burial depths to top electrical ducts or cables shall be in accordance with Section 300-5. Maximum depth to the top of electrical duct banks shall be 30".
2. For two and four electrical duct installations with electrical ducts installed in a single row, see the Notes to Tables 310-25 through 310-27, NEC Page 160.
3. For SI units: one inch = 25.4 millimeters; one foot = 305 millimeters.

Legend

- Backfill, maximum Rho = 90 (Earth or concrete)
- Electrical duct
- Cable or cables



1990 NATIONAL ELECTRICAL CODE* TABLE 310-16 — WIRE & CONDUIT TABLES

AMPACITIES OF INSULATED CONDUCTORS RATED 0-2000 VOLTS, BASED ON AMBIENT TEMPERATURE OF 30°C (86°F) — RACEWAY OR CABLE OR EARTH

TRADE SIZE OF METALLIC CONDUIT OR TUBING BASED ON NEC CHAPTER 9, TABLE 1 FOR 40% FILL AND TABLES 3A, 3B, 3C, 4 & 5B — REFER TO NEC CHAPTER 9 FOR MAXIMUM NUMBER OF CONDUCTORS IN TRADE SIZES OF METALLIC CONDUIT OR TUBING. PROPERTIES OF CONDUCTORS MUST AGREE WITH NEC CHAPTER 9 TABLE 8. DIMENSIONS OF INSULATED CONDUCTORS PER NEC CHAPTER 9 (TABLE 5 FOR COPPER — TABLE 5A FOR ALUMINUM THW, THHN, XHHW)

(UNDERLINE INSULATION TYPE INDICATES DRY AND DAMP LOCATION ONLY RATINGS) THHN IS RATED 90°C IN DRY LOCATION

Table 310-16 Ampacity Insulated **COPPER** ‡	**CU WIRE SIZE** AWG kcmil	75°C (167°F) THHW, THW RHW, USE Conduit 3W	75°C (167°F) THHW, THW RHW, USE ‡Conduit 3Ø4W	**CU WIRE SIZE** AWG kcmil	75°C (167°F) THWN, XHHW Conduit 3W	75°C (167°F) THWN, XHHW ‡Conduit 3Ø4W	**CU WIRE SIZE** AWG kcmil	▲ 90°C (194°F) FEP(14-2), THHN FEPB(14-8), XHHW Conduit 3W	▲ 90°C (194°F) FEP(14-2), THHN FEPB(14-8), XHHW ‡Conduit 3Ø4W
20	■14†	½	½	#14†	½	½	...	...	...
20	...	...	...	...	...	...	#14†	½	½
25	■12†	½	½	#12†	½	½	...	...	...
25	...	...	...	...	...	...	#12†	½	½
35	■10†	½	½	#10†	½	½	...	...	...
40	...	...	...	...	...	...	#10†	½	½
50	■8	¾	1	#8	½●	¾	...	...	...
55	...	...	...	...	...	...	#8	½●	¾
65	#6	1	1	#6	¾	¾◆	...	...	...
75	...	...	...	...	...	...	#8	¾	¾◆
85 (100★)	#4	1	1¼	#4	1	1	...	...	...
95 (100★)	...	...	...	...	...	...	#4	1	1
100 (110★)	#3	1¼	1¼	#3	1	1¼	...	...	...
110	...	...	...	...	...	...	#3	1	1¼
115 (125★)	#2	1¼	1¼	#2	1	1¼	...	...	...
130 (125★)	...	...	...	...	...	...	#2	1	1¼
130 (150★)	#1	1¼	1½	#1	1¼	1½	...	...	...
150 (150★)	...	...	...	...	...	...	#1	1¼	1¼
150 (175★)	1/0	1½	2	1/0	1¼	1½	...	...	...
170 (175★)	...	...	...	...	...	...	1/0	1¼	1½
175 (200★)	2/0	1½	2	2/0	1½	2	...	...	...
195 (200★)	...	...	...	...	...	...	2/0	1½	2
200	3/0	2	2	3/0	1½	2	...	...	...
225	...	...	...	...	...	...	3/0	1½	2
230	4/0	2	2½	4/0	2	2	...	...	...
255	250M	2½	2½	250M	2	2½	...	...	...
260	...	...	...	...	...	...	4/0	2	2
285	300M	2½	3	300M	2	2½	...	...	...
290	...	...	...	...	...	...	250M	2	2½
310	350M	2½	3	350M	2½	3	...	...	...
320	...	...	...	...	...	...	300M	2	2½
335	400M	3	3	400M	2½	3	...	...	...
350	...	...	...	...	...	...	350M	2½	3
380	...	...	...	...	...	...	400M	2½	3
380	500M	3	3½	500M	3	3	...	...	...
420	600M	3	3½	600M	3	3½	...	...	...
430	...	...	...	...	...	...	500M	3	3
460	700M	3½	4	700M	3	3½	...	...	...
475	750M	3½	4	750M	3½	4	600M	3	3½
490	800M	3½	4	800M	3½	4	...	...	...
520	900M	4	5	900M	3½	4	700M	3	3½

Table 310-16 Ampacity Insulated **ALUMINUM** ‡	**AL WIRE SIZE** AWG kcmil	75°C (167°F) THHW, USE THW Conduit 3W	75°C (167°F) THHW, USE THW ‡Conduit 3Ø4W	**AL WIRE SIZE** AWG kcmil	75°C (167°F) XHHW Conduit 3W	75°C (167°F) XHHW ‡Conduit 3Ø4W	**AL WIRE SIZE** AWG kcmil	▲ 90°C (194°F) THHN XHHW Conduit 3W	▲ 90°C (194°F) THHN XHHW ‡Conduit 3Ø4W
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
35	...	...	...	...	...	...	...	...	...
40	■8	¾	¾	#8	½	¾	...	...	...
45	...	...	...	...	...	...	...	...	...
50	#6	¾	1	#6	¾	¾	...	...	...
60	...	...	...	...	...	...	#8	¾	¾
65	#4	1	1	#4	¾	1	...	...	...
75	...	...	...	...	...	...	...	...	...
75	...	...	...	...	...	...	...	...	...
85	...	...	...	...	...	...	...	...	...
90 (100★)	#2	1	1¼	#2	1	1¼	...	...	...
100 (100★)	...	...	...	...	...	...	#2	1	1¼
100 (110★)	#1	1¼	1½	#1	1¼	1¼	...	...	...
115 (110★)	...	...	...	...	...	...	#1	1¼	1¼
120 (125★)	1/0	1¼	1½	1/0	1¼	1½	...	...	...
135 (125★)	...	...	...	...	...	...	1/0	1¼	1½
135 (150★)	2/0	1½	2	2/0	1¼	1½	...	...	...
150 (150★)	...	...	...	...	...	...	2/0	1½	1½
155 (175★)	3/0	1½	2	3/0	1½	2	...	...	...
175 (175★)	...	...	...	...	...	...	3/0	1½	2
180 (200★)	4/0	2	2	4/0	1½	2	...	...	...
205	250M	2	2½	250M	2	2	...	...	...
205 (200★)	...	...	...	...	...	...	4/0	1½	2
230	300M	2	2½	300M	2	2½	...	...	...
230	...	...	...	...	...	...	250M	2	2
250	350M	2½	3	350M	2	2½	...	...	...
255	...	...	...	...	...	...	300M	2	2½
270	400M	2½	3	400M	2½	2½	...	...	...
280	...	...	...	...	...	...	350M	2	2½
305	...	...	...	...	...	...	400M	2½	2½◇
310	500M	3	3	500M	2½	3	...	...	...
340	600M	3	3½	600M	3	3	...	...	...
350	...	...	...	...	...	...	500M	2½	3
375	700M	3	3½	700M	3	3½	...	...	...
385	750M	3	3½	750M	3	3½	600M	3	3
420	...	...	...	...	...	...	700M	3	3½
435	...	...	...	...	...	...	750M	3	3½

AMPACITY CORRECTION FACTORS

For ambient temperatures other than 30°C (86°F), multiply the ampacities shown above by the appropriate factor shown below.

Ambient Temp. °C	THHW-THW-RHW-USE	THWN-XHHW	FEP-THHN-XHHW	Ambient Temp. °F	THHW-THW	XNNW	THHN-XHHW
21-25	1.05	1.04	1.04	70-77	1.05	1.04	1.04
26-30	1.00	1.00	1.00	79-86	1.00	1.00	1.00
31-35	.94	.96	.96	88-95	.94	.96	.96
36-40	.88	.91	.91	97-104	.88	.91	.91
41-45	.82	.87	.87	106-113	.82	.87	.87
46-50	.75	.82	.82	115-122	.75	.82	.82
51-55	.67	.76	.76	124-131	.67	.76	.76
56-60	.58	.71	.71	133-140	.58	.71	.71
61-70	.33	.58	.58	142-158	.33	.58	.58
71-80	...	.41	.41	160-176	...	.41	.41

★ Ratings for three-wire, single-phase residential service entrance and feeder conductors. (NEC Note 3 to Table 310-16 for conductor types RHH-RHW-THHW-THW-THWN-THHN-XHHW-USE.) The grounded service entrance conductor (neutral) may be two AWG sizes smaller than the ungrounded conductors provided the requirements of NEC 230-42(c) and 250-23(b) are met.

‡ On a 4-wire, 3-phase wye circuit where the major portion of the load consists of electric discharge lighting, data processing, or similar equipment, derate ampacities to 80% per notes 8 & 10 to NEC Table 310-16.

◆ #6 XHHW copper requires 1″ conduit for 3Ø4W.

● #8 XHHW copper requires ¾″ conduit for 3W.

◇ 400 MCM THHN Aluminum requires 3″ conduit for 3Ø4W.

■ Special 90°C rating for THW (14-8) within electric discharge lighting equipment per NEC Article 410-31 and Table 310-13.

▲ For panelboard circuits, wire size should be no smaller than shown above for 75°C wire. 90°C wire should be used for locations where ambient temperature above 30°C is expected, and then derated per correction factors in NEC Table 310-16.

† The overcurrent protection for conductor types marked with a dagger (†) shall not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper; after any correction factors for ambient temperatures and number of conductors have been applied. (These are the values shown in this table.)

NEC 220-3 (a) Continuous and Noncontinuous Loads.

The branch-circuit rating shall not be less than the noncontinuous load plus 125 percent of the continuous load. (See Exception for 100% rated devices)

NEC 220-10 (b) Continuous and Noncontinuous Loads.

Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load. (See Exception for 100% ratings)

The ampacity of the ungrounded service conductor shall not be less than the noncontinuous load plus 125 percent of the continuous load. (See Exceptions)

NEC 430-22 (a) Single Motor Circuit Conductors.

Branch circuit conductors supplying a single motor shall have an ampacity not less than 125 percent of the motor full-load current rating. (See Exceptions)

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