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Technical Data Excerpt from PRYSMIAN'S *WIRE AND CABLE ENGINEERING GUIDE*

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Areas and diameters of solid and concentric stranded conductors

Conductor Size (AWG or kcmil)	Solid Wire				Class B Strand (Concentric)					Class C Strand	
	Area (cma)	Diameter (mils)	Approximate weight (lbs/1000 ft)		Number of wires	Diameter of each wire (mils)	Approximate Outside Diameter (inches)	Approximate weight (lbs/1000 ft)		Number of wires	Diameter of each wire (mils)
			Cu	Al				Cu	Al		
22	640	25.3	1.94	---	7	9.6	0.029	1.98	---	---	---
20	1020	32.0	3.10	0.942	7	12.1	0.036	3.15	---	---	---
19	1290	35.9	3.90	1.19	7	13.6	0.041	3.98	---	---	---
18	1620	40.3	4.92	1.49	7	15.2	0.046	5.01	---	---	---
16	2580	50.8	7.81	2.38	7	19.2	0.058	7.97	---	---	---
14	4110	64.1	12.44	3.78	7	24.2	0.073	12.68	---	19	14.7
12	6530	80.8	19.77	6.01	7	30.5	0.092	20.16	6.13	19	18.5
10	10380	101.9	31.43	9.56	7	38.5	0.116	32.06	9.75	19	23.4
9	13090	114.4	39.62	12.04	7	43.2	0.130	40.42	12.3	19	26.2
8	16510	128.5	49.98	15.20	7	48.6	0.146	51.0	15.5	19	29.5
7	20820	144.3	63.03	19.16	7	54.5	0.164	64.2	19.5	19	33.1
6	26240	162.0	79.44	24.15	7	61.2	0.184	80.9	24.6	19	37.2
5	33090	181.9	100.2	30.45	7	68.8	0.206	102	31.1	19	41.7
4	41740	204.3	126.3	38.41	7	77.2	0.232	129	39.2	19	46.9
3	52620	229.4	159.3	48.43	7	86.7	0.260	162	49.4	19	52.6
2	66360	257.6	200.9	61.07	7	97.4	0.292	205	62.3	19	59.1
1	83690	289.3	253.3	77.00	19	66.4	0.332	259	78.6	37	47.6
1/0	105600	324.9	319.5	97.13	19	74.5	0.373	326	99.1	37	53.4

Areas and diameters of solid and concentric stranded conductors (CONTINUED)

Conductor Size (AWG or kcmil)	Solid Wire				Class B Strand (Concentric)					Class C Strand	
	Area (cma)	Diameter (mils)	Approximate weight (lbs/1000 ft)		Number of wires	Diameter of each wire (mils)	Approximate Outside Diameter (inches)	Approximate weight (lbs/1000 ft)		Number of wires	Diameter of each wire (mils)
			Cu	Al				Cu	Al		
2/0	133100	364.8	402.8	122.5	19	83.7	0.419	411	125	37	60.0
3/0	167800	409.6	507.8	154.4	19	94.0	.470	518	157	37	67.3
4/0	211600	460.0	640.5	194.7	19	105.5	.528	653	199	37	75.6
250	---	---	---	---	37	82.2	0.575	772	235	61	64.0
300	---	---	---	---	37	90.0	0.630	925	282	61	70.1
350	---	---	---	---	37	97.3	0.681	1080	329	61	75.7
400	---	---	---	---	37	104.0	0.728	1236	376	61	81.0
500	---	---	---	---	37	116.2	0.813	1542	469	61	90.5
600	---	---	---	---	61	99.2	0.893	1850	563	91	81.2
700	---	---	---	---	61	107.1	0.964	2160	657	91	87.7
750	---	---	---	---	61	110.9	0.998	2316	704	91	90.8
800	---	---	---	---	61	114.5	1.031	2469	751	91	93.5
900	---	---	---	---	61	121.5	1.094	2780	845	91	99.4
1000	---	---	---	---	61	128.0	1.152	3086	939	91	104.8
1250	---	---	---	---	91	117.2	1.289	3859	1173	127	99.2
1500	---	---	---	---	91	128.4	1.412	4632	1408	127	108.7
1750	---	---	---	---	127	117.4	1.526	5403	1643	169	101.8
2000	---	---	---	---	127	125.5	1.632	6176	1877	169	108.8

NOTE 1: Circular mil area of conductor = (diameter of conductor)^2

Segmental Conductors (Four-segment conductors)

Size, MCM*	Number of Strands	Approximate OD, inches	Copper			Aluminum	
			DC Resistance, Ω/1000 ft. per conductor		Skin Effect Ratio 60 cycles	DC Resistance, Ω/1000 ft. per conductor	
			25°C	65°C	65°C	25°C	65°C
1,000	148	1.152	0.0108	0.0125	1.013	0.0177	0.0205
1,250	148	1.289	0.00867	0.0100	1.021	0.0142	0.0165
1,500	148	1.412	0.00723	0.00834	1.03	0.0119	0.0137
1,750	244	1.526	0.00619	0.00714	1.04	0.0102	0.0118
2,000	244	1.632	0.00542	0.00626	1.052	0.00889	0.0103
2,500	244	1.824	0.00434	0.00501	1.078	0.00712	0.00825
3,000	364	1.998	0.00361	0.00417	1.109	0.00592	0.00686
3,500	364	2.159	0.0031	0.00358	1.141	0.00509	0.00589
4,000	364	2.309	0.00271	0.00313	1.178	0.00445	0.00515

Nominal Diameters of Class B Compressed and Compact Stranded Conductors

Conductor Size (AWG or kcmil)	Compressed (inches)	Compact (inches)
8	0.141	0.134
7	0.158	---
6	0.178	0.169
5	0.200	---
4	0.225	0.213
3	0.252	----
2	0.283	0.268
1	0.322	---
1/0	0.361	0.336
2/0	0.406	0.376
3/0	0.456	0.423
4/0	0.512	0.475
250	0.558	0.520
300	0.611	0.570
350	0.661	0.616
400	0.706	0.659
500	0.789	0.736
600	0.866	0.813
700	0.935	0.877
750	0.968	0.908
800	1.000	0.938
1000	1.117	1.060
1250	1.251	---
1500	1.370	---
1750	1.480	---
2000	1.583	---

Nominal Weights* of Typical Copper and Aluminum Conductors

(Pounds/1000 ft)

Conductor Size (AWG or kcm)	Copper	Aluminum
4	126	38
3	159	48
2	201	61
1	253	77
1/0	321	98
2/0	404	123
3/0	510	155
4/0	643	196
250	760	232
350	1064	326
500	1520	465
750	2289	700
1000	3056	934

*Weights are nominal and will vary with the lay length of the conductor.

Diameters of 19-wire strand for 600-Volt cables

	Compressed Unilay (ASTM B8, B231, B801)			Combination Unilay (ASTM B787, B786)		
Conductor Size (AWG)	Approximate Outside Diameter (Inches)	Approximate weight (lbs/1000 ft) Cu	Al	Approximate Outside Diameter (Inches)	Approximate weight (lbs/1000 ft) Cu	Al
1	0.313	257.8	77.7	0.321	258.4	77.7
1/0	0.352	325.4	98.0	0.360	326.7	98.0
2/0	0.395	410.0	123.6	0.404	412.0	123.6
3/0	0.443	517.4	155.8	0.454	518.9	155.8
4/0	0.498	651.9	196.4	0.510	654.8	196.4

Maximum Direct Current Resistance per Unit Length of Completed Cable

Non-Portable Cables	
Cable Type	**Maximum DC Resistance**
Single Conductor Cable Flat Parallel Cable	Nominal Direct Current Resistance Value[1] Plus 2% (R_{max} = R x 1.02)
Multi Conductor Cables Twisted Assemblies of Single Conductor Cables	Nominal Direct Current Resistance Value[1] Plus 2% Plus One of the Following: 2% - One Layer of Conductors (R_{max} = R x 1.02 x 1.02) 3% - More than One Layer of Conductors (R_{max} = R x 1.02 x 1.03) 4% - Pairs or other Precabled Units (R_{max} = R x 1.02 x 1.04)

[1] Values obtained from the following two tables.

Nominal Direct Current Resistance of Solid Conductor (Ω/1000 feet @ 25°C)

Conductor Size (AWG or kcmil)	Aluminum	Copper	
		Uncoated	Coated
24	--	26.2	27.3
22	27.1	16.5	17.2
20	16.9	10.3	10.7
19	13.5	8.20	8.52
18	10.7	6.51	6.76
17	8.45	5.15	5.35
16	6.72	4.10	4.26
15	5.32	3.24	3.37
14	4.22	2.57	2.67
13	3.34	2.04	2.12
12	2.66	1.62	1.68
11	2.11	1.29	1.34
10	1.67	1.02	1.06
9	1.32	0.808	0.831
8	1.05	0.640	0.659
7	0.833	0.508	0.522
6	0.661	0.403	0.414
5	0.524	0.319	0.329
4	0.415	0.253	0.261
3	0.329	0.201	0.207
2	0.261	0.159	0.164
1	0.207	0.126	0.130
1/0	0.164	0.100	0.102
2/0	0.130	0.0794	0.0813
3/0	0.103	0.0630	0.0645
4/0	0.0819	0.0500	0.0511

Note 1:
Resistance values in mΩ per meter can be obtained by multiplying the above values by 3.28.

Note 2:
To convert the above values in “Ω/1000 feet” to “μΩ/ft” multiply by 1000.

Nominal Direct Current Resistance of Concentric-Lay-Stranded Conductor (Ω/1000 feet @ 25°C)

Conductor Size (AWG or kcmil)	Aluminum (Class B, C)	Copper	
		Uncoated (Class B, C)	Coated (Class B)
18	10.9	6.67	7.07
17	8.54	5.21	5.52
16	6.85	4.18	4.43
15	5.41	3.3	3.43
14	4.31	2.63	2.73
13	3.41	2.08	2.16
12	2.72	1.66	1.72
11	2.15	1.31	1.36
10	1.7	1.04	1.08
9	1.35	0.825	0.856
8	1.07	0.652	0.678
7	0.851	0.519	0.538
6	0.675	0.411	0.427
5	0.534	0.325	0.338
4	0.424	0.258	0.269
3	0.336	0.205	0.213
2	0.266	0.162	0.169
1	0.211	0.129	0.134
1/0	0.168	0.102	0.106
2/0	0.133	0.081	0.0842
3/0	0.105	0.0642	0.0667
4/0	0.0836	0.051	0.0524
250	0.0707	0.0431	0.0448
300	0.059	0.036	0.0374
350	0.0505	0.0308	0.032
400	0.0442	0.0269	0.0277

Note 1:
Resistance values in mΩ per meter can be obtained by multiplying the above values by 3.28.

Note 2:
To convert the above values in “Ω/1000 feet” to “μΩ/ft” multiply by 1000.

Note 3:
Concentric lay stranded includes compressed and compact conductors.

Nominal Direct Current Resistance of Concentric-Lay-Stranded Conductor
(Ω/1000 feet @ 25°C)

Conductor Size (AWG or kcmil)	Aluminum (Class B, C)	Copper	
		Uncoated (Class B, C)	Coated (Class B)
450	0.0393	0.0240	0.0246
500	0.0354	0.0216	0.0222
550	0.0321	0.0196	0.0204
600	0.0295	0.0180	0.0187
650	0.0272	0.0166	0.0171
700	0.0253	0.0154	0.0159
750	0.0236	0.0144	0.0148
800	0.0221	0.0135	0.0139
900	0.0196	0.0120	0.0123
1000	0.0177	0.0108	0.0111
1100	0.0161	0.00981	0.0101
1200	0.0147	0.00899	0.00925
1250	0.0141	0.00863	0.00888
1300	0.0136	0.00830	0.00854
1400	0.0126	0.00771	0.00793
1500	0.0118	0.00719	0.00740
1600	0.0111	0.00674	0.00694
1700	0.0104	0.00634	0.00653
1750	0.0101	0.00616	0.00634
1800	0.00982	0.00599	0.00616
1900	0.00931	0.00568	0.00584
2000	0.00885	0.00539	0.00555
2500	0.00715	0.00436	0.00448
3000	0.00596	0.00363	0.00374
3500	0.00515	0.00314	0.00323
4000	0.00451	0.00275	0.00283
4500	0.00405	0.00247	0.00254
5000	0.00364	0.00222	0.00229

Note 1:
Resistance values in mΩ per meter can be obtained by multiplying the above values by 3.28.

Note 2:
Concentric lay stranded includes compressed and compact conductors.

Temperature Correction Factors for Resistance of Copper & Aluminum Conductors

Copper (°C)	Multiplying Factors for Conversion to	
	20°C	25°C
0	1.085	1.107
5	1.063	1.084
10	1.041	1.061
15	1.02	1.04
20	1	1.02
25	0.981	1
30	0.962	0.981
35	0.944	0.963
40	0.927	0.945
45	0.911	0.928
50	0.895	0.912
55	0.879	0.896
60	0.864	0.881
65	0.85	0.866
70	0.836	0.852
75	0.822	0.838
80	0.809	0.825
85	0.797	0.812
90	0.784	0.8

The correction factors given in this table are satisfactory for most applications. They are based upon copper having a 100 percent conductivity and derived from the following formula:

$$R_1 = R_2 \frac{234.5 + 20}{234.5 + T_2}$$

$$R_3 = R_2 \frac{234.5 + 25}{234.5 + T_2}$$

Aluminum (°C)	Multiplying Factors for Conversion to	
	20°C	25°C
0	1.085	1.107
5	1.063	1.084
10	1.041	1.061
15	1.02	1.04
20	1	1.02
25	0.981	1
30	0.962	0.981
35	0.944	0.963
40	0.927	0.945
45	0.911	0.928
50	0.895	0.912
55	0.879	0.896
60	0.864	0.881
65	0.85	0.866
70	0.836	0.852
75	0.822	0.838
80	0.809	0.825
85	0.797	0.812
90	0.784	0.8

The correction factors given in this table are satisfactory for most applications. They are based upon copper having a 61 percent conductivity and derived from the following formula:

$$R_1 = R_2 \frac{228.1 + 20}{228.1 + T_2}$$

$$R_3 = R_2 \frac{228.1 + 25}{228.1 + T_2}$$

Where: R_1 = resistance at reference temperature, 20°C
R_2 = measured resistance at temperature, T_2
R_3 = resistance at reference temperature, 25°C
T_2 = conductor temperature R_2 measured at

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