Table de conversions Jauges AWG / métrique

AWG	dia.(mm)	section(mm^2)	mohms/Km	courant(A)
0000	11,86	107,2	0,158	319
000	10,40	85,3	0,197	240
00	9,226	67,43	0,252	190
0	8,252	53,48	0,317	150
1	7,348	42,41	1,40	120
2	6,544	33,63	1,50	96
3	5,827	26,67	1,63	78
4	5,189	21,15	0,80	60
5	4,621	16,77	1,01	48
6	4,115	13,30	1,27	38
7	3,665	10,55	1,70	30
8	3,264	8,36	2,03	24
9	2,906	6,63	2,56	19
10	2,588	5,26	3,23	15
11	2,305	4,17	4,07	12
12	2,053	3,31	5,13	9,5
13	1,828	2,63	6,49	7,5
14	1,628	2,08	8,17	6,0
15	1,450	1,65	10,3	4,8
16	1,291	1,31	12,9	3,7
17	1,150	1,04	16,34	3,2
18	1,024	0,82	20,73	2,5
19	0,9116	0,65	26,15	2,0
20	0,8118	0,52	32,69	1,6
21	0,7230	0,41	41,46	1,2
22	0,6438	0,33	51,5	0,92
23	0,5733	0,26	56,4	0,73
24	0,5106	0,20	85,0	0,58
25	0,4547	0,16	106,2	0,46
26	0,4049	0,13	130,7	0,37
27	0,3606	0,10	170,0	0,29
28	0,3211	0,08	212,5	0,23
29	0,2859	0,064	265,6	0,18
30	0,2546	0,051	333,3	0,15
31	0,2268	0,040	425,0	0,11
32	0,2019	0,032	531,2	0,09
33	0,1798	0,0254	669,3	0,072
34	0,1601	0,0201	845,8	0,057
35	0,1426	0,0159	1069,0	0,045
36	0,1270	0,0127	1338,0	0,036
37	0,1131	00100	1700,0	0,028
38	0,1007	0,0079	2152,0	0,022
39	0,0897	0,0063	2696,0	0,017
40	0,0799	0,0050	3400,0	0,014
41	00711	0,0040	4250,0	0,011
42	0,0633	0,0032	5312,0	0,009
43	0,0564	0,0025	6800,0	0,007
44	0,0503	0,0020	8500,0	0,005

Vous êtes nombreux à nous demander par courrier les correspondances entre les jauges des diamètres et sections des fils utilisés en Amérique et nos millimètres. Nous vous proposons alors ce tableau de conversion qui vous permettra de vous affranchir de cette lacune. Le tableau inclue également la capacité du fil à laisser passer tel ou tel courant en fonction de son diamètre, voir aussi le dossier "installation en stations mobiles" du numéro 22. Vous pouvez lire également la résistance des fils au kilomètre.

Bibliographie : "Réussir ses récepteurs toutes fréquences[(c)]"
ETSF 1994 par Ph. Bajcik.

Résistivité d'un matériau conducteur

On définit la résistivité (rhô) d'un matériau comme étant la résistance d'un fil de longueur unité (1m) et de section unité ($1m^2$), réalisé avec ce matériau. Etant donnée l'énormité de la section unité ($1m^2$), la mesure de la résistivité d'un métal exprimée en ohm-mètre est très faible (de l'ordre de 10^{-8}).

La résistance d'un fil de cuivre par unité de longueur est déterminante dans la qualité des inductances

$$R = \rho \frac{l}{S}$$

Matériau	Résistivité x 10^{-8} Ω.m	Matériau	Résistivité x 10^{-8} Ω.m
argent	1,6	platine	10
cuivre	1,7	fer	10
or	2,4	silicium	10
aluminium	2,7	étain	18
magnésium	4,6	plomb	21
tungstène	5,6	germanium	46
zinc	6	constantan	49
nickel	7	mercure	96
laiton	7	nichrome	100
cadmium	7,6	carbone	3500

Calibre AWG	Diam mm	Area mm^2	R ohm/km	I 3A/ mm^2
46	0,04	0,0013	13700	3,8 mA
44	0,05	0,0020	8750	6 mA
42	0,06	0,0028	6070	9 mA
41	0,07	0,0039	4460	12 mA
40	0,08	0,0050	3420	15 mA
39	0,09	0,0064	2700	19 mA
38	0,10	0,0078	2190	24 mA
37	0,11	0,0095	1810	28 mA
	0,12	0,011	1520	33 mA
36	0,13	0,013	1300	40 mA
35	0,14	0,015	1120	45 mA
	0,15	0,018	970	54 mA
34	0,16	0,020	844	60 mA
	0,17	0,023	757	68 mA
33	0,18	0,026	676	75 mA
	0,19	0,028	605	85 mA
32	0,20	0,031	547	93 mA
30	0,25	0,049	351	147 mA
29	0,30	0,071	243	212 mA
27	0,35	0,096	178	288 mA
26	0,40	0,13	137	378 mA
25	0,45	0,16	108	477 mA
24	0,50	0,20	87,5	588 mA
	0,55	0,24	72,3	715 mA
	0,60	0,28	60,7	850 mA
22	0,65	0,33	51,7	1,0 A
	0,70	0,39	44,6	1,16 A
	0,75	0,44	38,9	1,32 A
20	0,80	0,50	34,1	1,51 A
	0,85	0,57	30,2	1,70 A
19	0,90	0,64	26,9	1,91 A
	0,95	0,71	24,3	2,12 A
18	1,00	0,78	21,9	2,36 A
	1,10	0,95	18,1	2,85 A
	1,20	1,1	15,2	3,38 A
16	1,30	1,3	13,0	3,97 A
	1,40	1,5	11,2	4,60 A
	1,50	1,8	9,70	5,30 A
14	1,60	2,0	8,54	6,0 A
	1,70	2,3	7,57	6,7 A
13	1,80	2,6	6,76	7,6 A
	1,90	2,8	6,05	8,5 A
12	2,00	3,1	5,47	9,4 A
12	2,05	3,3	5,20	9,5 A
11	2,30	4,2	4,13	12 A
10	2,58	5,2	3,27	15 A
9	2,90	6,6	2,59	19 A
8	3,26	8,3	2,06	24 A
7	3,66	10,5	1,63	30 A
6	4,11	13,2	1,29	37 A
5	4,62	16,8	1,03	47 A
4	5,19	21,1	0,81	60 A
3	5,83	26,7	0,64	75 A
2	6,54	33,6	0,51	94 A
1	7,35	42.4	0,41	119 A
0	8,26	53,6	0,32	150 A
00	9,27	67,5	0,25	190 A
000	10,4	84,9	0,21	239 A
0000	11,7	107,5	0,16	302 A

You can put your enigma cypher machine back in the attic. VE3ERP has broken the code. With ease and alacrity you now can determine exactly what those wire gauges really mean.

Breaking The Secret A.W.G. Code!

BY GEORGE MURPHY*, VE3ERP

I would be the owner of the world's largest refrigerator if I had a free beer for every time I had to consult wire tables, the print sizes of which seem to vary inversely with my age. It has always bothered me that if I want some wire 0.0641 inch in diameter, I can't just order some 0.0641 inch wire. Instead I have to look up its A.W.G. (American Wire Gauge) code number, or someone quotes an A.W.G. number and I have to look it up before I know whether he is talking about lamp filaments or 500 amp power cable, or I find myself involved with B.S.W.G. (British Standard Wire Gauge), which has a different set of code numbers altogether. I much prefer the metric system where, oddly enough, wire 1.5 mm in diameter is referred to as 1.5 mm wire.

Goaded by frustration and by curiosity, I decided to compare A.W.G. and B.S.W.G. codes with the metric system to see if I could find out what these codes are trying to tell me. I did this by preparing a computer-generated graph (see fig. 1) using values which I looked up (as it turns out, for the last time![1]) in wire tables. The first thing I noticed on the graph was both systems appear to be chasing the same wild goose along closely adjacent paths. I have no idea where the goose is heading, but it is being closely followed by both systems.

The B.S.W.G. "curve" is actually a series of straight lines connected at the points indicated by dots, whereas the A.W.G. line is a true curve.[2] The B.S.W.G. "curve" appears to favor the philosophy of proceeding in a straight line until something isn't quite right, then changing direction a bit until things seem a little better and we can get back to our Tea.[3] On the other hand, a more reason-oriented philosophy seems to govern the A.W.G. curve; it exhibits a definite Newtonian flair, which indicates a modicum of logic in its creation.

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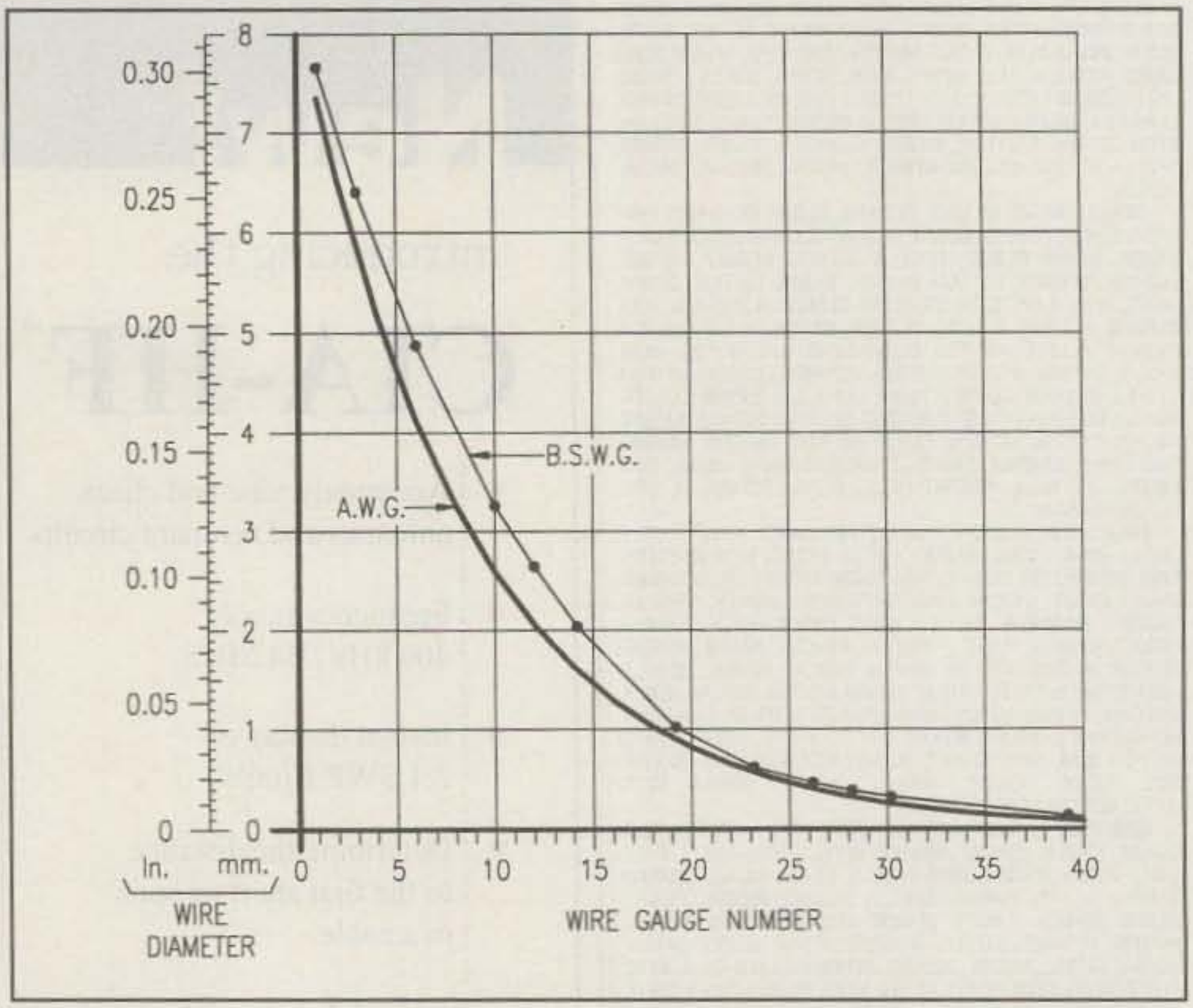

Fig. 1– A comparison of the American Wire Gauge and the British Standard Wire Gauge systems.

I could find nothing in my limited reference library about the origin of the American Wire Gauge system,[4] but it appears someone at some time decreed it would consist of 40 wire sizes ranging from 0.460 inch to 0.005 inch in diameter in an orderly mathematical progression from the largest to the smallest. The numbering system is a little strange, with the four largest sizes called #0000, #000, #00, and #0, then proceeding in arithmetic progression from #1 to #36 in incremental steps of 1. At some later date the range of sizes was apparently extended to AWG# 50.

With only this to go on, I devised the equations shown in Table I. The first thing I did was replace the multiple zero codes with values that can be used in an equation. In keeping with the progression of the rest of the code numbers, these values became –3, –2, and –1, respectively, resulting in an Equivalent Value progression of 40 numbers from –3 to +36. Since negative numbers are a nuisance to casual mathematicians like me, absolute numbers were assigned by adding 3 to each value in the Equivalent Value progression. This results in a 40 number Absolute Value progression from 0 to 39, which computers and calculators can munch with ease. From there on it only took a bit of high school math to concoct the equations shown in the table for calculating the

AMERICAN WIRE GAUGE EQUATIONS

Geometrical progression of 40 wire sizes from #0000 to #36 AWG. where:

#0000 = 0.460 in. (11.684 mm) diameter
#36 = 0.005 in. (0.127 mm) diameter

Arbitrary Code Numbers
#n = #0000, #000, #00, #0, #1, #2, . . .#36

Equivalent Values
n = –3, –2, –1, 0, +1, +2, . . .+36

Absolute Values
(n+3) = 0, 1, 2, 3, 4, 5, . . . 39

$$K = \frac{.46^{\frac{1}{39}}}{.005} = 1.122932$$

$$D_M = \frac{11.684}{K^{(n+3)}} \qquad D_I = \frac{.46}{K^{(n+3)}}$$

$$n_M = \frac{\log \frac{11.684}{D_M}}{\log K} - 3 \qquad n_I = \frac{\log \frac{.46}{D_I}}{\log K} - 3$$

where:

K = increment constant
D_M = wire diameter in millimeters
D_I = wire diameter in inches
n = A.W.G. code number
n_M = A.W.G. code of a wire sized in millimeters
n_I = A.W.G. code of a wire sized in inches

Table I– If you want to figure it out the hard way, use this system of equations. If not, it can be done simply on your computer.

diameter of a wire from its A.W.G. code, or to find the A.W.G. code of any diameter wire.

If you have a computer and *HAMCALC* software[5] (version 38 or later), you can let *HAMCALC*'s "Copper Wire Programs" option do all this math for you, plus a bunch of other neat stuff. For instance, did you know that B.S.W.G.#32 is actually A.W.G.#29.36589? Or that A.W.G.#70 wire, if it existed, would be 0.0001 inch diameter? You didn't? Shame on you!

Footnotes

1. I now use my computer to generate my own "Wire Tables" and do all the looking up and cross referencing between the three systems. More about this later.

2. The A.W.G. curve looks like something lovingly traced from *Playboy* magazine. The B.S.W.G. curve looks like something from the centerfold of *Popular Mechanics*.

3. Don't knock this philosophy. For centuries it got the British Royal Navy wherever it wanted to go.

4. I would appreciate hearing from anyone who knows the history of the A.W.G. system and how it originated.

5. *HAMCALC*, "Painless Math for Radio Amateurs" is *free* software containing more than 200 application and design programs. Written in GWBASIC, it requires a GWBASIC.EXE file in your computer, and runs in both MS-DOS and Windows. For a free 3 1/2 inch *HAMCALC* disc send US$5.00 (US$6.00 if you want a GWBASIC.EXE disc included) to the author at the address shown at the beginning of this article, to cover cost of production, packaging, and airmail postage anywhere in the world. ■

S.W.G. Metric (MM)	S.W.G. (Inches)	Wire Number (Gauge)	A.W.G. or B&S (Inches)	A.W.G. Metric (MM)
12.700	0.5	0000000 (7/0)	.....	.....
11.786	0.464	000000 (6/0)	0.58	.....
10.973	0.432	00000 (5/0)	0.5165	.....
10.160	0.4	0000 (4/0)	0.46	11.684
9.449	0.372	000 (3/0)	0.409642	10.404
8.839	0.348	00 (2/0)	0.364796	9.266
8.230	0.324	0 (1/0)	0.324861	8.252
7.620	0.3	1	0.289297	7.348
7.010	0.276	2	0.257627	6.543
6.401	0.252	3	0.229423	5.827
5.893	0.232	4	0.2043	5.189
5.385	0.212	5	0.1819	4.621
4.877	0.192	6	0.162	4.115
4.470	0.176	7	0.1443	3.665
4.064	0.16	8	0.1285	3.264
3.658	0.144	9	0.1144	2.906
3.251	0.128	10	0.1019	2.588
2.946	0.116	11	0.0907	2.304
2.642	0.104	12	0.0808	2.052
2.337	0.092	13	0.072	1.829
2.032	0.08	14	0.0641	1.628
1.829	0.072	15	0.0571	1.450
1.626	0.064	16	0.0508	1.291
1.422	0.056	17	0.0453	1.150
1.219	0.048	18	0.0403	1.024
1.016	0.04	19	0.0359	0.912
0.914	0.036	20	0.032	0.813
0.813	0.032	21	0.0285	0.724
0.711	0.028	22	0.0253	0.643
0.610	0.024	23	0.0226	0.574
0.559	0.022	24	0.0201	0.511
0.508	0.02	25	0.0179	0.455

S.W.G. Metric (MM)	S.W.G. (Inches)	Wire Number (Gauge)	A.W.G. or B&S (Inches)	A.W.G. Metric (MM)
0.457	0.018	26	0.0159	0.404
0.417	0.0164	27	0.0142	0.361
0.376	0.0148	28	0.0126	0.320
0.345	0.0136	29	0.0113	0.287
0.315	0.0124	30	0.01	0.254
0.295	0.0116	31	0.0089	0.226
0.274	0.0108	32	0.008	0.203
0.254	0.01	33	0.0071	0.180
0.234	0.0092	34	0.0063	0.160
0.213	0.0084	35	0.0056	0.142
0.193	0.0076	36	0.005	0.127
0.173	0.0068	37	0.0045	0.114
0.152	0.006	38	0.004	0.102
0.132	0.0052	39	0.0035	0.089
0.122	0.0048	40	0.0031	0.079
0.112	0.0044	41	0.0028	0.071
0.102	0.004	42	0.0025	0.064
0.091	0.0036	43	0.0022	0.056
0.081	0.0032	44	0.002	0.051
0.071	0.0028	45	0.0018	0.046
0.061	0.0024	46	0.0016	0.041
0.051	0.002	47	0.0014	0.035
0.041	0.0016	48	0.0012	0.031
0.030	0.0012	49	0.0011	0.028
0.025	0.001	50	0.001	0.025
.....	.....	51	0.00088	0.022
.....	.....	52	0.00078	0.020
.....	.....	53	0.0007	0.018
.....	.....	54	0.00062	0.016
.....	.....	55	0.00055	0.014
.....	.....	56	0.00049	0.012
.....	.....	.....	.....	.....

AWG - American Wire Gauge
B&S - Brown & Sharpe
SWG - Imperial Standard Wire Gauge - (British Legal Standard)

When selecting metric wire sizes to match wire number choose closest available size
i.e. for 22 AWG choose 0.63mm wire.