Saw Gauges

12 January 2022

Contents

1 Disston and Atkins saw gauge sizes **2**
- 1.1 Starrett Thickness Gage No 188, English Standard Wire Gage . . . 3
- 1.2 Disston saw gauge sizes from DISSTON, Lumberman Handbook . . . 6
- 1.3 Atkins saw gauge sizes from Atkins Saws and Saw tools . . . 8
- 1.4 Gremshaw's thoughts on crosscut saws and saw plate gauges . . . 9
- 1.5 Wire Gauge Table — Imperial Sizes . . . 12
- 1.6 A table of 64th's generated by ExCel . . . 14

List of Figures

1 Starratt 188 Gauge . . . 3
2 Disston Gauge . . . 6
3 Stubbs Gauge #s plotted against their inch sizes . . . 11
4 American or Brown & Sharp gauge #s plotted against their inch sizes . . . 11

List of Tables

1 Disston Saw Gauges, Part 1 . . . 4
2 Disston Saw Gauges, Part 2 . . . 5
3 Stubbs, Birmingham, Disston, American, B&S and London saw gauge sizes . . . 7
4 Atkins saw gauges . . . 8
5 Stubs or Birmingham Wire Gauge, from Grimshaw . . . 10
6 Birmingham Wire Gauge, Expressed in "Carpenter's Measure", from Grimshaw . . . 10
7 Wire Gauge Table — Imperial Sizes, Part 1 . . . 12
8 Wire Gauge Table — Imperial Sizes, Part 2 . . . 13

[0]Gauges.tex 12 January 2022 10:36

1 Disston and Atkins saw gauge sizes

The Disston numbers are from "DISSTON, Lumberman Handbook page 25 and page 200 in the appendix. The Atkins numbers are from "Saws and Saw Tools" 1894 page 20. I have modified the values slightly. The original Disston table is in Section 1.2, page 6. The original Atkins table is in Section 1.3, page 8. I have been unable to find thickness data for Simmonds.

When I carefully looked at the numbers I found that the **exact** numbers were a little strange. (A full list of decimal equivalents of $\frac{1}{64}s$ is here in Section 1.6, page 14).

I have edited the tables to try and make some sense out of them. Hopefully I will be able to find out what "**full**" and "**scant**" values are. I was surprised when the various values of **full** and bf scant change as they are used. When I found the thickness numbers for Atkins, they did not have decimal equivalences. It seems as though in the 1800s and early 1900s exact values were not always used. I saw something that said using words like **full** and **scant** were easier for the men that had to use them instead of specifying a micrometer value.

The Δ column is how much Disston's value is off from an exact representation of the indicated fraction.

> For example: For gauge #0, 22/64 = **0.34375** which is **-0.00375** smaller than Disston's 22/64 SCANT value of **.340**.

The Starrett English Standard Wire Gauge numbers 188 and 189 match the Disston gauge widths/thicknesses. The 188 gauge (Figure 1, page 3) has gauges sizes from 1 to 36, while 189 covers 6 to 36. They are sometimes marked as "B.W.G.". The Disston wire gauges (Figure 2, page 6) that I have don't indicate decimal equivalences for the gauge numbers on their back.

1.1 Starrett Thickness Gage No 188, English Standard Wire Gage

This is the entry from the Starrett catalog about their Gage No 188. This gage covers the most likely to be used sizes of interest when determining the thickness of saws. (And a few more!)

> English Standard Wire Gage hardened (Birmingham or Stubs' Iron Wire Gage)
>
> No. 188 Nos. 1-36 (.300-.004)
>
> This gage is popular for gaging iron wire, hot and cold rolled sheet steel, and in some cases, sheet iron by the English Standard Wire system also known as Birmingham or Stubs.
>
> Gage has convenient decimal equivalents of each number on the reverse side. Satin finish. Carefully tested after hardening.
>
> Range of thicknesses measured 1-36 (.300-.004) for Catalog No. 188, English Standard Wire Gage.

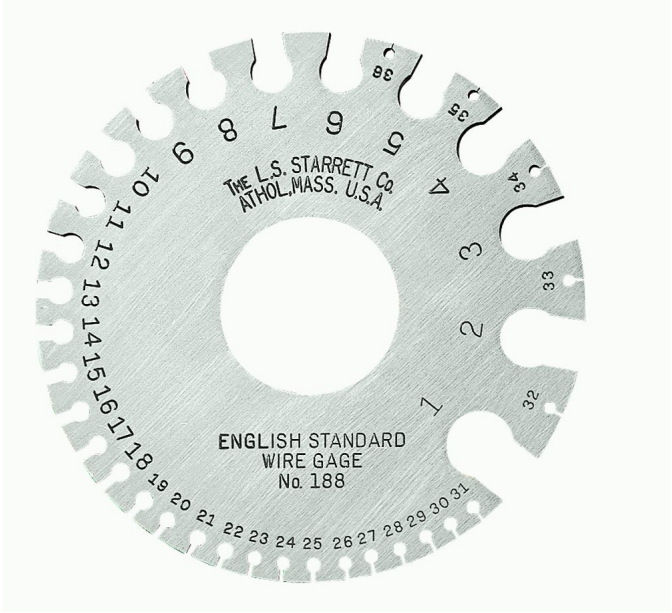

Figure 1: Starratt 188 Gauge

Line	Gauge	64ths	Fractional Part of Inch	Milli-meters	Stubbs, Birmingham or **Disston**	64ths	Correct Value	Δ
1	—	22/64				22	0.34375	
2	0		22/64 Scant		**.340**			-0.00375
3	—	21/64				21	0.32815	
4	—	20/64				20	0.3125	
5	1		19/64 Full	7.62	**.300**			+0.003125
6	—	19/64				19	0.296875	
7	—	18/64				18	0.28125	
8	2		9/32 Full	7.21	**.284**			-0.00275
9	—	17/64				17	0.265625	
10	3		17/64 Scant	6.57	**.259**			-0.006625
11	—	16/64				16	0.25	
12			1/4 Scant				Atkins	
13	4		15/64 Full	6.04	**.238**			+0.003625
14	—	15/64				15	0.234375	
15	5		7/32 Full	5.59	**.220**			+0.21875
16	—	14/64				14	0.21875	
17	—		7/32				Atkins	
18	—	13/64				13	0.203125	
19	6		13/64 Scant	5.18	**.203**			-0.000125
20	—		13/64				Atkins	
21	—	12/64				12	0.1875	
22	7		3/16 Scant	4.57	**.180**			-0.0075
23	—		3/16 Scant				Atkins	
24	—	11/64				11	0.171875	
25	8		11/64 Scant	4.19	**.165**			-0.006875
26	—		5/32 Scant				Atkins	
27	—	10/64				10	0.15625	
28	—		5/32 Full				Atkins	
29	9		9/64 Full	3.76	**.148**			+0.007375
30	—	9/64				9	0.140625	
31	—		1/8 Full				Atkins	
32	10		1/8 Full	3.40	**.134**			+0.014
33	—	8/64				8	0.125	
34	11		1/8 Scant	3.05	**.120**			-0.005
35	—		1/8 Scant				Atkins	

Table 1: Disston Saw Gauges, Part 1

Line	Gauge	64ths	Fractional Part of Inch	Milli-meters	Stubbs, Birmingham or **Disston**	64ths	Correct Value	Δ
36	—		7/64				Atkins	
37	12	7/64		2.77	**.109**	7	0.109375	
38	—		3/32				Atkins	
39	13		3/32 Full	2.41	**.095**			+0.00125
40	—	6/64				6	0.09375	
41	—		5/64 Full				Atkins	
42	14		5/64 Full	2.10	**.083**			+0.004875
43	—	5/64				5	0.078125	
44	15		5/64 Scant	1.82	**.072**			-0.006125
45	—		5/64 Scant				Atkins	
46	—		1/16 Full				Atkins	
47	16		1/16 Full	1.65	**.065**			+0.0025
48	—	4/64				4	0.0625	
49	17		1/16 Scant	1.47	**.058**			-0.0045
50	18		3/64 Full	1.24	**.049**			+0.002125
51	—	3/64				3	0.046875	
52	19		3/64 Scant	1.06	**.042**			-0.004875
53	20		1/32 Full	0.89	**.035**			+0.00375
54	21			0.81	**.032**			—
55	—	2/64				2	0.03125	
56	22			0.71	**.028**			
57	—		1/32 Full				Atkins	
58	23			0.64	**.025**			
59	24			0.56	**.022**			
60	25			0.51	**.020**			
61	26			0.46	**.018**			
62	27	1/64		0.41	**.016**			+0.01875
63	—		1/64			1	.015195	
64	28			0.36	**.014**			
65	29			0.33	**.013**			
66	30			0.30	**.012**			
67	31				**.010**			
68	32				**.009**			
69	33				**.008**			
70	34				**.007**			
71	35				**.005**			
72	36				**.004**			

Table 2: Disston Saw Gauges, Part 2

1.2 Disston saw gauge sizes from DISSTON, Lumberman Handbook

These numbers are from "DISSTON, Lumberman Handbook, containing a treatise on the construction of saws and how to keep them in order, together with other information of kindred character." Dated 1907, or so. Page 25. It forms the basis of (Table 1, page 4 and Table 2, page 5).

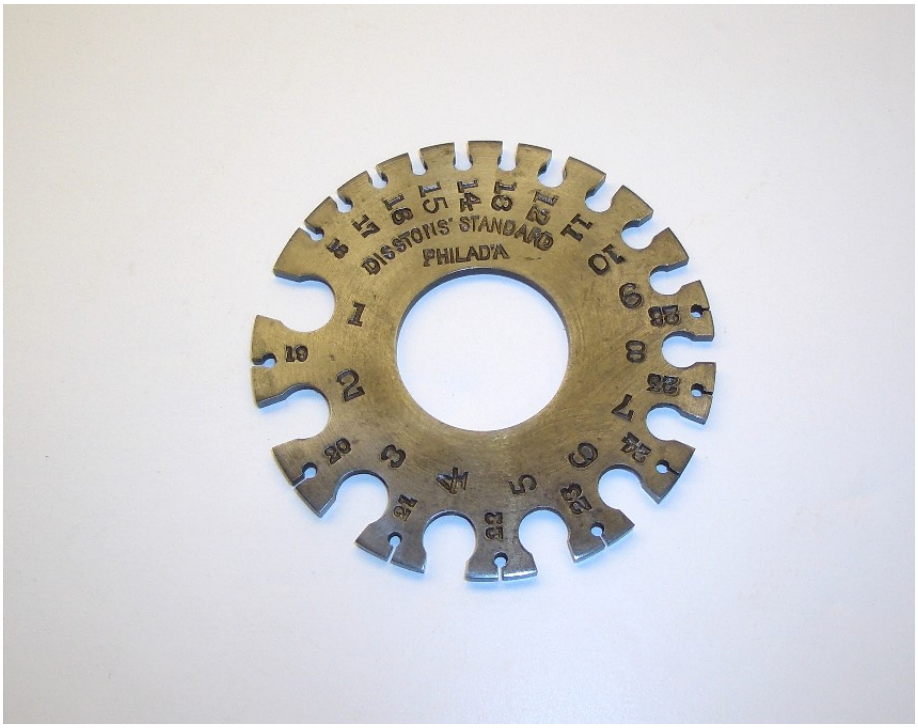

Figure 2: Disston Gauge

Disston's Gauge	Disston Fractional Part of Inch	Milli-meters	Stubbs, Birmingham or **Disston**	American or Brown & Sharp	London
0	22/64 Scant		**.340**	.32495	.340
1	19/64 Full	7.62	**.300**	.28930	.300
2	9/32 Full	7.21	**.284**	.25763	.284
3	17/64 Scant	6.57	**.259**	.22942	.259
4	15/64 Full	6.04	**.238**	.20431	.238
5	7/32 Full	5.59	**.220**	.18194	.220
6	13/64 Scant	5.18	**.203**	.16202	.203
7	3/16 Scant	4.57	**.180**	.14428	.180
8	11/64 Scant	4.19	**.165**	.12849	.165
9	9/64 Full	3.76	**.148**	.11443	.148
10	1/8 Full	3.40	**.134**	.10189	.134
11	1/8 Scant	3.05	**.120**	.09074	.120
12	7/64	2.77	**.109**	.08081	.109
13	3/32 Full	2.41	**.095**	.07196	.095
14	5/64 Full	2.10	**.083**	.06408	.083
15	5/64 Scant	1.82	**.072**	.05706	.072
16	1/16 Full	1.65	**.065**	.05082	.065
17	1/16 Scant	1.47	**.058**	.04525	.058
18	3/64 Full	1.24	**.049**	.04030	.049
19	3/64 Scant	1.06	**.042**	.03589	.040
20	1/32 Full	0.89	**.035**	.03196	.035
21		0.81	**.032**	.02846	.0315
22		0.71	**.028**	.025347	.0295
23		0.64	**.025**	.022571	.027
24		0.56	**.022**	.0201	.025
25		0.51	**.020**	.0179	.023
26		0.46	**.018**	.01594	.0205
27	1/64	0.41	**.016**	.015195	.01875
28		0.36	**.014**	.012641	.0165
29		0.33	**.013**	.011257	.0155
30		0.30	**.012**	.010025	.01375
31			**.010**	.008928	.01225
32			**.009**	.00795	.01125

Table 3: Stubbs, Birmingham, Disston, American, B&S and London saw gauge sizes

1.3 Atkins saw gauge sizes from Atkins Saws and Saw tools

These numbers are from Atkins' "Atkins Saws and Saw tools" with suggestions to Lumbermen and Sawyers. Dated 1891, page 20. This data has been incorporated into Table 1.1, page 3.

Unfortunately Atkins did not provide a decimal equivalence for their fractional sizes.

Line #	Gauge	Atkins Fractional Part of Inch
1	4	1/4 Scant
2	5	7/32
3	6	13/64
4	7	3/16 Scant
5	8	5/32 Full
6	9	5/32 Scant
7	10	1/8 Full
8	11	1/8 Scant
9	12	7/64
10	13	3/32
11	14	5/64 Full
12	15	5/64 Scant
13	16	1/16 Full
14	22	1/32 Full

Table 4: Atkins saw gauges

1.4 Gremshaw's thoughts on crosscut saws and saw plate gauges

These quotes are from Grimshaw SAWS The History, Development, Action, Classification, and Comparison of Saws of all kinds. 1882.

From Grimshaw page 201:

> **The Cosscut Saw** — The ordinary crosscut saw, among the most primitive and most generally used implements, is one of the advance couriers of civilization. It penetrates the forest almost with rifle and axe, and far in advance of the surveyor's chain, and once it enters a country it stays there. It remains a useful member of society, despite its crudity. It is its very simplicity that has caused it to be so tenacious of its position among needful implements. It requires no foundations, no motor, no special preparation. Where the axe leaves a tree, there the crosscut takes it; and from the newly fallen log upon the virgin shores, to the busy ship-yard that succeeds the primeval forest, the crosscut is never hung up. And yet it is an aggravating, fatiguing, slow-working affair. (Which explains why it is rarely used these days as a chain saw solves some of these complaints.)

From Grimshaw Page 142:

> The gauge employed for measuring thickness of saw plates is the so-call "Stubs," or Birmingham Wire Gauge (an arbitrary and senseless scale, almost matchless among trade stupidities), shown in part herewith in comparison with the inch and its divisions of the inch in the annexed table (Table 5, page 10 as usual the values in these tables do not match similar values in other tables.):

In Figure 3, page 11 these values are plotted. Note that the plot is not a nice smooth line but has some "ugly" bumps on it. In Figure 4, page 11 the Brown & Sharp values are plotted and have a nice smooth line.

From Grimshaw Page 265:

> **A Decimal Gauge for Sheet Metal and Wire.** — Gauges, or notched plates for measuring thicknesses of metal sheets and wire, were at first of local origin and innumerable variety. One of the Birmingham gauges (the Stubs) has been most carefully perpetuated. In America one was introduced by Brown & Sharpe, to correct some discrepant proportions in the last, by establishing a regular proportion of the 39 successive steps between 0000 and 36. Staring at 0.46 inch for 0000, each gauge is 10.9478 per cent less than the preceding one; giving 0.005 inch for No. 36, which is 35 of the Birmingham.
>
> The great use of the gauge to-day is for purposes of estimate — calculating the value of given superficies or length in weight of material, or *vise versa*; and any notation or division of parts facilitating this would be an advantage. The proposed Decimal Gauge, which we owe to the eminent engineer, Mr. Robert Biggs, is based on the successive reduction of an assumed unit of dimension, by $\frac{1}{10}$; or, what is the same, successive increase by $\frac{1}{9}$. The centimetre = 0.3937079 inch, is zero.

Gauge	inch	Gauge	inch	Gauge	inch
1	.300	10	.134	19	.042
2	.284	11	.120	20	.035
3	.259	12	.109	21	.032
4	.238	13	.095	22	.028
5	.220	14	.083	23	.025
6	.203	15	.072	24	.022
7	.180	16	.065	25	.020
8	.165	17	.058	26	.018
9	.148	18	.049		

Table 5: Stubs or Birmingham Wire Gauge, from Grimshaw

4	1/4 scant	9	5/32 scant
5	7/32	10	1/8 full
6	3/16 full	11	1/8
7	3/16 scant	12	1/8 scant
8	5/32	13	3/32

Table 6: Birmingham Wire Gauge, Expressed in "Carpenter's Measure", from Grimshaw

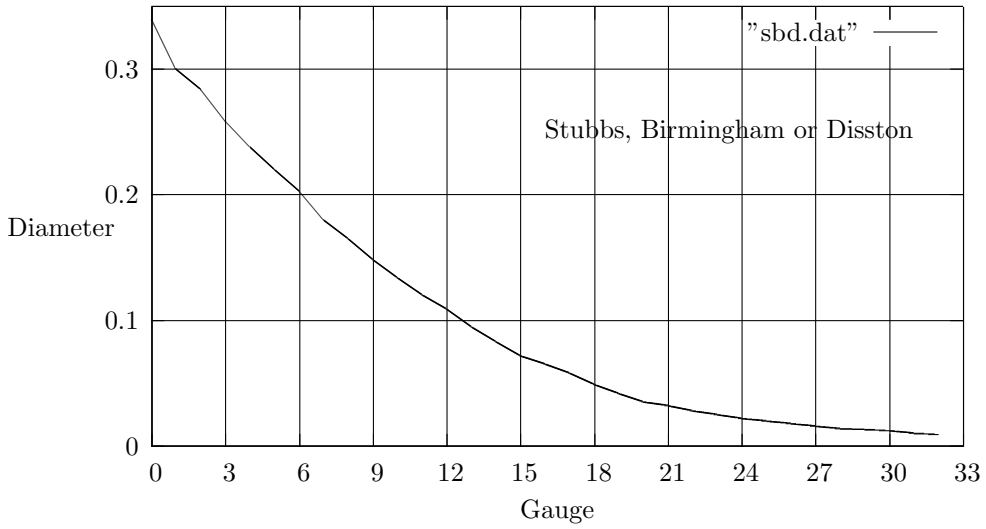

Figure 3: Stubbs Gauge #s plotted against their inch sizes

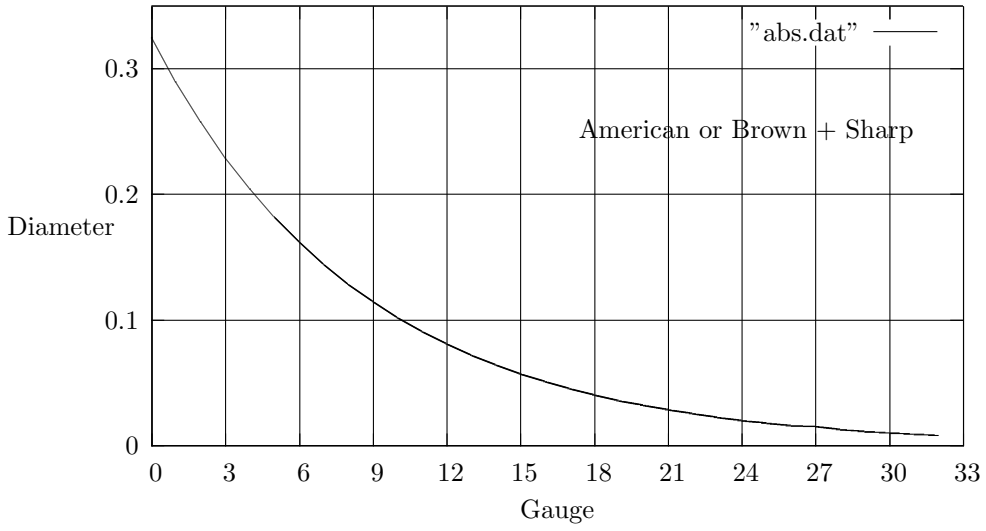

Figure 4: American or Brown & Sharp gauge #s plotted against their inch sizes

1.5 Wire Gauge Table — Imperial Sizes

Wire Gauge Table — Imperial Sizes,

The first column gives the Gauge Number and the other columns give the exact size in inches for the particular standard.

Note that 4/0 (pronounced "four aught") is an abbreviation for 0000, 2/0 for 00, and so on.

Gauge No	SWG	AWG	Stubbs	Birmingham Sheet Metal	Washburn & Meon	US Sheet	S & W Music Wire	Birmingham Stubbs Iron
7/0	.500			.6666	.4900			
6/0	.464			.6250	.4615	.4687	.004	
5/0	.432			.5883	.4305	.4375	.005	
4/0	.400	.4600		.5416	.3938	.4062	.006	**.464**
3/0	.372	.4096		.5000	.3625	.3750	.007	**.425**
2/0	.348	.3648		.4452	.3310	.3437	.008	**.380**
0	.324	.3249		.3964	.3065	.3125	.009	**.340**
1	.300	.2893	.227	.3532	.2830	.2815	.010	**.300**
2	.276	.2576	.219	.3147	.2625	.2656	.011	**.284**
3	.252	.2294	.212	.2804	.2437	.2500	.012	**.259**
4	.232	.2043	.207	.2500	.2253	.2344	.013	**.238**
5	.212	.1819	.204	.2225	.2070	.2187	.014	**.220**
6	.192	.1620	.201	.1981	.1920	.2031	.016	**.203**
7	.176	.1443	.199	.1764	.1770	.1875	.018	**.180**
8	.160	.1285	.197	.1570	.1620	.1719	.020	**.165**
9	.144	.1164	.194	.1398	.1483	.1562	.022	**.148**
10	.128	.1019	.191	.1250	.1350	.1406	.024	**.134**
11	.116	.0907	.188	.1113	.1205	.1250	.026	**.120**
12	.104	.0808	.185	.0991	.1055	.1094	.029	**.109**
13	.092	.0720	.182	.0882	.0915	.0937	.031	**.095**
14	.080	.0641	.180	.0785	.0800	.0781	.033	**.083**
15	.072	.0571	.178	.0699	.0720	.0703	.035	**.072**
16	.064	.0508	.175	.0625	.0625	.0625	.037	**.065**
17	.056	.0453	.172	.0556	.0540	.0562	.039	**.058**
18	.048	.0403	.168	.0495	.0475	.0500	.041	**.049**
19	.040	.0359	.164	.0440	.0410	.0437	.043	**.042**
20	.036	.0320	.161	.0392	.0348	.0375	.045	**.035**

Table 7: Wire Gauge Table — Imperial Sizes, Part 1

Gauge No	SWG	AWG	Stubbs	Birmingham Sheet Metal	Washburn & Meon	US Sheet	S & W Music Wire	Birmingham Stubbs Iron
21	.032	.0285	.157	.0349	.0317	.0344	.047	**.032**
22	.028	.0253	.155	.0312	.0286	.0312	.049	**.028**
23	.024	.0226	.153	.0278	.0258	.0281	.051	**.025**
24	.022	.0201	.151	.0248	.0230	.0250	.055	**.022**
25	.020	.0179	.148	.0220	.0204	.0219	.059	**.020**
26	.018	.0159	.146	.0196	.0181	.0187	.063	**.018**
27	.0164	.0142	.143	.0174	.0173	.0172	.067	**.016**
28	.0148	.0126	.139	.0156	.0162	.0156	.071	**.014**
29	.0136	.0113	.134	.0139	.0150	.0141	.075	**.013**
30	.0124	.0100	.127	.0123	.0140	.0125	.080	**.012**
31	.0116	.0089	.120	.0110	.0132	.0109	.085	**.010**
32	.0108	.0079	.115	.0098	.0128	.0102	.090	**.009**
33	.0100	.0071	.112	.0087	.0118	.0094	.095	**.008**
34	.0092	.0063	.110	.0077	.0104	.0086	.100	**.007**
35	.0084	.0056	.109	.0069	.0095	.0078	.106	**.006**
36	.0076	.0050	.106	.0061	.0090	.0070	.112	**.004**
37	.0068	.0045	.103	.0054	.0085	.0066	.118	
38	.0060	.0040	.101	.0048	.0080	.0062	.124	
39	.0052	.0035	.099	.0043	.0075		.130	
40	.0048	.0031	.097	.0039	.0070		.038	
41	.0044		.095	.0034			.146	
42	.0040		.092	.0031			.154	
43	.0036		.088	.0027			.162	
44	.0032		.085	.0024			.170	
45	.0028		.081	.0021			.180	
46	.0024		.079	.0019				
47	.0020		.077	.0017				
48	.0016		.075	.0015				
49	.0012		.072	.0013				
50	.0010		.069	.0012				

Table 8: Wire Gauge Table — Imperial Sizes, Part 2

1.6 A table of 64th's generated by ExCel

Inch	64ths	32nds	16ths	8ths	4ths	Inch	64ths	32nds	16ths	8ths	4ths
0.015625	1					0.515625	33				
0.03125	2	1				0.53125	34	17			
0.046875	3					0.546875	35				
0.0625	4	2	1			0.5625	36	18	9		
0.078125	5					0.578125	37				
0.09375	6	3				0.59375	38	19			
0.109375	7					0.609375	39				
0.125	8	4	2	1		0.625	40	20	10	5	
0.140625	9					0.640625	41				
0.15625	10	5				0.65625	42	21			
0.171875	11					0.671875	43				
0.1875	12	6	3			0.6875	44	22	11		
0.203125	13					0.703125	45				
0.21875	14	7				0.71875	46	23			
0.234375	15					0.734375	47				
0.25	16	8	4	2	1	0.75	48	24	12	6	3
0.265625	17					0.765625	49				
0.28125	18	9				0.78125	50	25			
0.296875	19					0.796875	51				
0.3125	20	10	5			0.8125	52	26	13		
0.328125	21					0.828125	53				
0.34375	22	11				0.84375	54	27			
0.359375	23					0.859375	55				
0.375	24	12	6	3		0.875	56	28	14	7	
0.390625	25					0.890625	57				
0.40625	26	13				0.90625	58	29			
0.421875	27					0.921875	59				
0.4375	28	14	7			0.9375	60	30	15		
0.453125	29					0.953125	61				
0.46875	30	15				0.96875	62	31			
0.484375	31					0.984375	63				
0.5	32	16	8	4	2	1.000	64	32	16	8	4