

HANDY WIRING TABLES.

BY "W. R."

In many shops and mills where the readers of this journal pass twelve out of the twenty-four hours of each day, six days in the week, says the Stationary Engineer, they have to attend a dynamo for three or more hours per day at this season of the year. Should another lamp be wanted in some closet or over some bench, the engineer, of course, is the one to put it in. Oftentimes he may be in doubt as to the size of wire to run by which he would be insured of getting the full candle power. The tables accompanying this will show the current required by lamps of different candle power and voltages and the size of wire for a given distance in feet for any number of lamps of the two principal voltages now in use, viz: 50 volt alternating and 110 volt direct. The tables are correct and conform to the rules of the board of fire underwriters, and are the same as are used by one of the largest construction companies in Massachusetts. The tables are of such convenience in running wire that the task of selecting the proper size becomes an easy matter, and engineers having electric light work to do should preserve them for future reference. Table No. 1 shows the current in amperes required by lamps of different candle power and designed for different voltages. Table No. 2 shows the size of wire required for any number of 16 c.p. 110 volt lamps with the average loss of 2% at any distance from 50 to 200 feet. Table 3 gives similar information regarding 16 c.p. 50 volt lamps.

TABLE I.

Amperes per Lamp at Different Voltages.

Voltage.	50	60	70	75	100	110	120
C. P.	Amperes.						
10	.80	.56	.50	.48	.46	.44	.43
16	1.0	.86	.76	.74	.60	.58	.56
20	1.5	1.15	1.11	1.10	.78	.76	.74
24	1.6	1.22	1.18	1.15	.80	.78	.76
32	2.40	1.70	1.50	1.45	1.20	1.18	1.16
50	3.50	2.30	2.25	2.20	1.72	1.68	1.60
75	4.20	3.50	3.45	3.40	2.42	2.36	2.30
100	6.80	4.60	4.40	4.35	3.25	3.20	3.15

Watts per lamp = E.M.F. × current.
Ex.:—50 volts × 1 ampere = 50 watts.

TABLE II.

16 c. p. 110 volt lamps.
Current per 16 c.p. lamp, 110 volt = .56 ampere. No. 16 wire is the smallest allowed to be used by the underwriters.

No. of lamps.	Distance in Feet.										
	50	60	70	80	90	100	120	140	160	180	200
Size of Wire, B & S Gauge, 2% loss.											
1	16	16	16	16	16	16	16	16	16	16	16
2	16	16	16	16	16	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	16	16	16
4	16	16	16	16	16	16	16	16	15	15	15
5	16	16	16	16	16	16	16	13	13	13	12
6	16	16	16	15	15	15	14	13	13	12	12
7	16	16	16	14	14	14	13	13	12	11	11
8	16	16	15	14	14	13	13	12	11	11	10
9	16	15	14	14	13	12	11	11	10	10	10
10	15	14	14	13	13	12	12	11	10	10	9
12	15	14	13	13	12	12	11	10	10	9	9
14	14	13	13	12	11	11	10	10	9	8	8
16	13	13	12	11	11	10	10	9	8	8	7
18	13	12	11	11	10	10	9	8	8	7	7
20	12	12	11	10	10	9	9	8	7	7	6
25	11	11	10	9	9	8	8	7	6	6	5
30	11	10	9	9	8	8	7	6	6	5	5
35	10	9	9	8	7	7	6	6	5	4	4
40	9	9	8	7	7	6	6	5	4	4	3
45	9	8	7	7	6	6	5	4	4	3	3
50	9	8	7	6	6	5	5	4	3	3	2
60	8	7	6	6	5	5	4	3	3	2	2
70	7	6	6	5	4	4	3	3	2	1	1
80	6	6	5	4	4	3	3	2	1	1	0
90	6	5	4	4	3	3	2	2	1	0	0
100	5	5	4	3	3	2	2	1	0	0	0

TABLE III.

Sixteen c. p. 50 volt lamps. Loss 2% both sides of circuit.
Current per 16 c.p. 50 volt lamp = 1 ampere. No. 16 wire is the smallest allowed to be used by the underwriters.

Distance in Feet.

No. of lamps.	Size of Wire, B and S Gauge.															
	25	35	50	60	70	80	90	100	120	140	160	180	200			
1	16	16	16	16	16	16	16	16	16	15	15	14	14			
2	16	16	16	16	15	15	14	14	13	12	12	11	11			
3	16	16	15	14	13	13	12	12	11	10	10	9	9			
4	16	15	14	13	12	12	11	11	10	9	8	8	7			
5	16	14	13	12	11	11	10	10	9	8	7	7	6			
6	15	13	12	11	10	10	9	9	8	7	6	6	5			
7	14	13	11	10	10	9	8	8	7	6	6	5	4			
8	14	12	11	10	9	8	8	7	6	6	5	4	3			
9	13	12	10	9	9	8	8	7	6	6	5	4	3			
10	13	11	10	9	8	8	7	7	6	5	5	4	3			
12	12	10	9	8	7	7	6	6	5	4	4	3	2			
14	11	10	8	7	7	6	6	5	4	4	3	2	1			
16	11	9	8	7	6	6	5	5	4	3	3	2	1			
18	10	9	7	6	6	5	5	4	3	3	2	2	1			
20	10	8	7	6	5	5	4	4	3	2	2	1	1			
25	9	7	6	5	4	4	3	3	2	1	1	1	1			
30	8	6	5	4	3	3	2	2	1	0	0	0	0			
35	7	6	4	3	3	2	2	2	0	0	0	0	0			
40	7	5	4	3	2	2	1	1	0	0	0	0	0			
45	6	5	3	2	2	1	1	0	0	0	0	0	0			
50	6	4	3	2	1	1	0	0	0	0	0	0	0			
60	5	3	2	1	0	0	0	0	0	0	0	0	0			
70	4	3	1	0	0	0	0	0	0	0	0	0	0			
80	4	2	1	0	0	0	0	0	0	0	0	0	0			
90	3	2	0	0	0	0	0	0	0	0	0	0	0			
100	3	1	0	0	0	0	0	0	0	0	0	0	0			

BY THE WAY.

By the courtesy of Mr. E. B. Merrill, I have been privileged to glance over a letter received by him from a friend, who is a Lieutenant with the volunteer detachment of Electrical Engineers (R.E.) in South Africa. This detachment, consisting of fifty men and four officers, was organized early in the year, and their offered services were eagerly accepted by the War Office, who granted £5,000 for equipment and apparatus. This consists of two search light trains, each comprising a steam traction engine, and two 24-inch projections, the latter mounted on gun carriages. Each train consists of twenty-three men commanded by a Captain. Each dynamo is mounted on a bracket in front of the engine and arranged for link belt drive. While the apparatus was being manufactured, the detachment were given a "send off" dinner at the Princes' restaurant in London, at which Lord Kelvin presided, and were also entertained by the Mayor and Corporation of Chelmsford. On March 16th they sailed for Cape Town. I quote from the letter the following further particulars: "Our plant is of our own design and something completely new in the field. The navy had already improvised lights by taking theirs off their decks and screwing them onto railway trucks, but their use was only for signalling, and they are tied to the railway line, whereas ours are perfectly as movable as field guns, and we are to take them right into the firing line, one idea being to cover the advance of men at night with a screen of light, and of course we would also be used in connection with heavy artillery for siege purposes. We have also got some very neat field telephone gear, and we have arranged bikes to carry reels of 22 bare copper wire, which can be paid out on the veldt at the rate of ten miles an hour if necessary. It is astonishing how little insulation is required. At some experimental runs we buried the two experimental wires in mud 10 feet apart at a road crossing, and the talking was quite distinct. We have also got a very complete equipment of tools, so that it would be a queer job that we could not tackle. We can work the lights up to a distance of one mile from the generator, the cables being arranged on drums mounted on gun wheels. As one instance of our usefulness, we could have enabled the artillery to reduce Cronje's defence in a couple of days, because he could not have had a chance to entrench at night time."