CHICAGO MINIATURE LAMP WORKS
4433 N. Ravenswood Ave.
Chicago 40, Illinois

Bulletin No. 1105

MINIATURE LAMP DATA

PARTS • NOMENCLATURE • LAMP STYLES
STANDARD LAMPS AVAILABLE
FROM EACH MANUFACTURER

This convenient booklet lists the many styles of standard miniature lamps, with brief description of each, and indicates the manufacturers from whom each style is available.

The basic information shown in the tables was compiled by the publishers of Radio Electronic Master and is published with their permission. Considerable additional data was included, and the various styles of lamps were regrouped for greater convenience. Attention is called to the very wide and complete range of lamp styles produced by Chicago Miniature Lamp Works.

This very complete line and the inherent quality of workmanship and lamp engineering found in all Chicago Miniature Lamps are two reasons why so many users insist on Chicago Miniature Lamps for their requirements.

Where additional data is needed, or your requirements call for a special lamp, your inquiries will receive prompt attention.

CHICAGO MINIATURE LAMP WORKS
4433 N. Ravenswood Ave.
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A HALF CENTURY OF PROGRESS

As this is being written, the 50th Anniversary of the Chicago Miniature Lamp Works is only a few short months away. This first half century of the company's history has seen enormous scientific and industrial progress in every field — the lamp industry being no exception. The fact that the first lamps made by this company still had carbon and tantalum filaments instead of the tungsten filament used so universally for many years, is an indication of the development that has taken place during this half century. This company has played no small part in this progress.

It was the first and is still the leading American manufacturer of sub-miniature lamps, widely used in missiles and in the electronic field for the conversion of visual signals, unseen by the human eye, to electrical impulses.

The first surgical instrument lamps were developed by this company, which is still a leading source for lamps of this type and the sole source for many widely used styles.

It developed and produced the first sub-miniature lamps for airplane cockpit lighting.

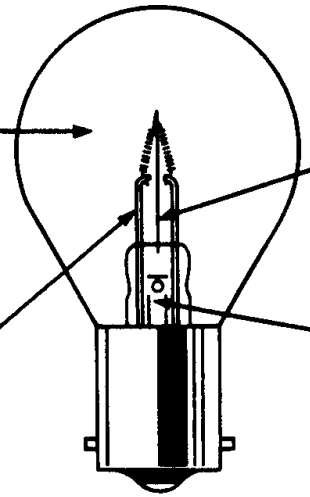
The first glass enclosed tungsten fuses and switches were developed and manufactured by this company.

It helped to bring on the "neon age" with the first miniature neon sign letters.

These are only a few of the significant developments introduced by the Chicago Miniature Lamp Works over its first half century. Today, this company is looking forward to a new half century of accelerated progress, as the unsurpassed quality of its products receives ever widening recognition and the ability and specialized experience of its engineers is called upon to meet the demands of designers in many fields.

MINIATURE LAMP PARTS AND NOMENCLATURE

OVERALL LENGTH
Over-all length is measured from top of bulb to bottom of base.



GAS
Used in many miniature lamps; prevents rapid evaporation of the filament and early blackening of bulb. Gas-filled lamps are indicated by the letter C, vacuum lamps by the letter B. Usual gas is argon, some lamps for special services may use nitrogen or krypton.

LEAD-IN WIRES
Conduct the current to and from the filament; dumet wire used for most Butt Seal lamps. Copper used from base to stem press and nickel from stem press to filament for most Flange Seal Lamps.

SUPPORT WIRES
Molybdenum or tungsten wires hold the filament in place; minimum number desirable to reduce heat losses.

EXHAUST TUBE
It is through this tube, projecting beyond the bulb during manufacture, that the air is exhausted and the bulb filled with inert gases. The tube is then sealed off short enough for the base to fit over it.

LIGHT CENTER LENGTH
Light Center length is measured from the center of the filament to (1) the bottom of the base of miniature screw base lamps; (2) to the top of the base pins for bayonet base; (3) to the top of the bosses on the flange in the miniature flanged base; (4) to the bottom of the indentations on the prefocusing collar of the prefocus base.

STEM PRESS (FLANGE SEAL)
The glass and lead-in wires have an air-tight seal here. To have substantially the same coefficient of expansion as the glass, the lead-in wire at this point is a combination of a nickel-iron alloy core and a copper sleeve (Dumet wire).

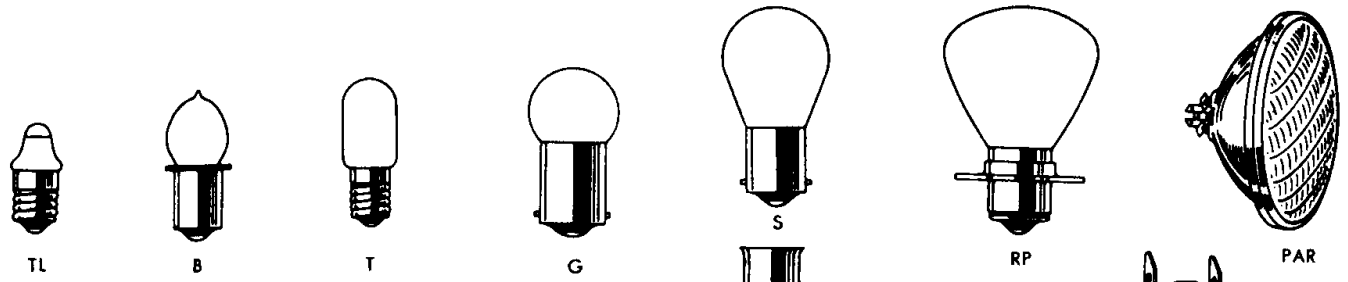
GLASS BEAD (BUTT SEAL)
Instead of a stem press to hold the lead-in wires apart, the Butt Seal lamp has an oblong glass bead fused around the wires.

BULB SHAPES AND SIZES

The general shape of a lamp bulb is designated by a letter or letter combination. The meanings of these letters are:

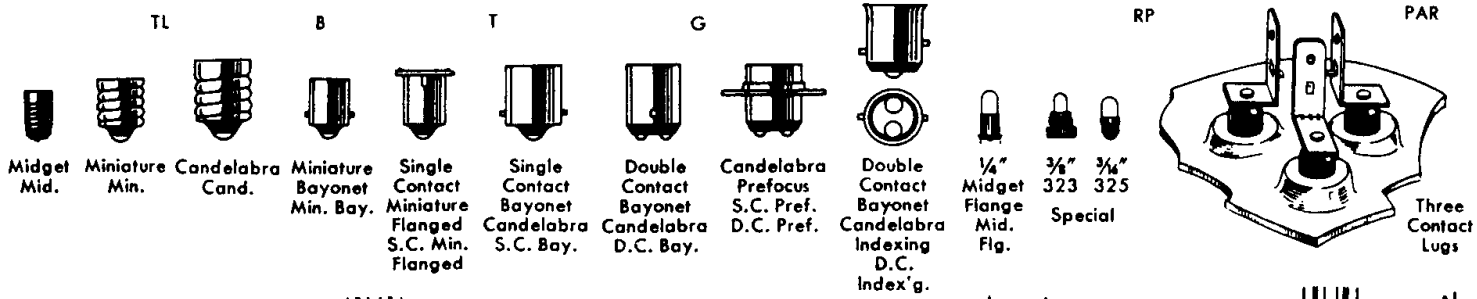
S.—Straight side
G.—Globe shape
T.—Tubular
T.L.—Lens end, Tubular
F.E.—Flat end
RP—Reflector, Pear Shape
PAR—Parabolic

Bulbs are measured through their greatest diameter, in eighths of an inch. Thus a G-5 bulb is globe shape, 5/8 of an inch in diameter.



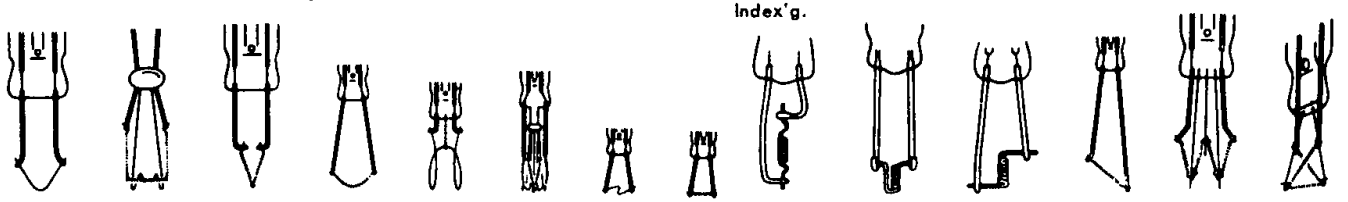
BASES

One lead-in wire is soldered to the rim of the base and the other to the center contacts. These parts are insulated from each other by a glass insulator which appears as a black ring around the center contact. Types of bases are shown at right.



FILAMENT

The almost universally used filament material is tungsten. The filament may be straight wire, a coil, or a coiled-coil (indicated respectively by the letters S, C and CC). Coiling the wire reduces gas losses, increases efficiency. Filament designations consist of a prefix letter to indicate whether the wire is straight or coiled, and a number to indicate the arrangements of the filament on the supports.



STANDARD MINIATURE LAMPS—EXPLANATION OF ABBREVIATIONS

a = amps
A = Amber
AR = Argon
B = Blue
Cand. Sc. = Candelabra Screw
C.P. = Candlepower
D.C. Bay. = Double Contact Bayonet
D.C. Pf. = Double Contact Prefocused
G = Green
GR = Group
H = High Intensity
I.F. = Inside Frosted
K = Candelabra Base
L = Extreme Long Life
M = Miniature Screw Base
MA = Milliampere
Mid. Sc. = Midget Screw
Min. Bay. = Miniature Bayonet
Min. Flge. = Miniature Flange
Min. Sc. = Miniature Screw
NR = Natural Ruby Glass
OF = Outside Frosted
PAR = Parabolic
PR = Prefocused
R = Red Coated
SB = Silver Bowl
S.C. Bay. = Single Contact Bayonet
S.C. Prefoc. = Single Contact Prefocused
Sc. Term. = Screw Terminals
W = Watts
X = Extra Anchor

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
PR 2	x	x	x	x	x		x	x	B-3½	Min. Flg.	2.4	.50	15	1¼	PR 2
PR 3	x	x	x	x	x		x	x	B-3½	Min. Flg.	3.6	.50	15	1¼	PR 3
PR 4	x	x	x	x			x	x	B-3½	Min. Flg.	2.3	.27	10	1¼	PR 4
PR 5	x								B-3½	Min. Flg.	2.35	.35	35	1¼	PR 5
PR 6	x	x	x	x	x		x	x	B-3½	Min. Flg.	2.5	.30	30	1¼	PR 6
PR 7	x	x	x	x			x	x	B-3½	Min. Flg.	3.8	.30	30	1¼	PR 7
PR 8	x						x	x	B-3½	Min. Flg.	1.9	.60	10	1¼	PR 8
PR 9	x	x		x				x	B-3½	Min. Flg.	2.7	.15	45	1¼	PR 9
PR 12	x	x		x			x	x	B-3½	Min. Flg.	6.0	.50	15	1¼	PR 12
PR 13	x	x		x				x	B-3½	Min. Flg.	4.75	.50	15	1¼	PR 13
PR 15	x						x		B-3½	Min. Flg.	4.8	.50	15	1¼	PR 15
6	x	x	x	x					S-8	D.C. Bay.	6.4	3.00	500	2″	6
6IF	x	x	x	x					S-8	D.C. Bay.	6.4	3.00	500	2″	6IF
8	x	x	x	x					S-8	D.C. Bay.	8.0	2.20	500	2″	8
8IF	x	x	x	x					S-8	D.C. Bay.	8.0	2.20	500	2″	8IF
10	x								G-3½	Bi. Pin.	2.5	.50	3000	15⁄16	10
12	x	x		x					G-3½	Bi. Pin.	6.3	.15	L	15⁄16	12
13	x	x	x	x	x		x	x	G-3½	Min. Sc.	3.8	.30	15	15⁄16	13
14	x	x	x	x	x		x	x	G-3½	Min. Sc.	2.5	.30	15	15⁄16	14
15	x								G-4½	Bi. Pin.	7.0	.40	500	1 1⁄16	15
19	x								G-3½	Bi. Pin.	14.4	.11	1000	15⁄16	19
27	x	x	x	x			x	x	G-4½	Min. Sc.	5	.30	30	1 1⁄16	27
31	x	x	x	x			x	x	G-4½	Min. Sc.	6.2	.30	15	1 1⁄16	31
35C	x			x					G-5½	Min. Sc.	2.4	.80	150	1¼	35C
39	x								T-3¼	Min. Bay	6.3	.37	5000	1⅛	39
40	x	x	x	x	x	x	x	x	T-3¼	Min. Sc.	6.8	.15	3000	13⁄16	40
41	x	x	x	x	x	x	x	x	T-3¼	Min. Sc.	2.5	.50	3000	13⁄16	41
42	x	x	x	x	x	x	x	x	T-3¼	Min. Sc.	3.2	.35	3000	13⁄16	42
43	x	x	x	x	x	x	x	x	T-3¼	Min. Bay.	2.5	.50	3000	13⁄16	43
44	x	x	x	x	x	x	x	x	T-3¼	Min. Bay.	6-8	.25	3000	13⁄16	44
45	x	x	x	x	x	x	x	x	T-3¼	Min. Bay.	3.2	.35	3000	13⁄16	45
46	x	x	x	x	x	x	x	x	T-3¼	Min. Sc.	6-8	.25	3000	13⁄16	46
47	x	x	x	x	x	x	x	x	T-3¼	Min. Bay.	6-8	.15	3000	13⁄16	47
48	x	x	x	x	x	x	x	x	T-3¼	Min. Sc.	2.0	.06	1000	13⁄16	48
49	x	x	x	x	x	x	x	x	T-3¼	Min. Bay.	2.0	.06	1000	13⁄16	49
50	x	x	x	x	x	x	x	x	G-3½	Min. Sc.	6-8	.20	500	15⁄16	50
51	x	x	x	x	x	x	x	x	G-3½	Min. Bay.	6-8	.20	1000	15⁄16	51
52	x	x	x	x			x	x	G-3½	Min. Sc.	12-16	1 C.P.	1000	15⁄16	52
53	x	x	x			x	x	x	G-3½	Min. Bay.	12	1 C.P.	1000	15⁄16	53
55	x	x	x	x	x	x	x	x	G-4½	Min. Bay.	6-8	.40	500	1 1⁄16	55
55R	x								G-4½	Min. Bay.	7.0	.41	500	1 1⁄16	55R
57	x	x	x	x		x	x	x	G-4½	Min. Bay.	12	2 C.P.	1000	1 1⁄16	57
57X	x	x		x			x	x	G-4½	Min. Bay.	12	2 C.P.	1000	1 1⁄16	57X
61	x							x	G-6	S.C. Bay.	3-4	2 C.P.	250	1 7⁄16	61
63	x	x	x	x			x	x	G-6	S.C. Bay.	6-8	.62	1000	1 7⁄16	63
63K	x								G-6	Cand. Sc.	7.0	.63	1000	1⅜	63K
63L	x								G-6	S.C. Bay.	6-8	.80	L	1 7⁄16	63L
63M	x								G-6	Min. Sc.	7.0	.63	1000	1 5⁄16	63M

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
64	x	x	x	x				x	G-6	D.C. Bay.	6-8	3 C.P.	1000	1 7/16	64
67X	x								G-6	S.C. Bay	13.5	.44	1000	1 7/16	67X
67X	x								G-6	S.C. Bay	12-16	3 C.P.	1000	1 7/16	67X
67K	x	x		x				x	G-6	Cand. Sc.	13.5	4 C.P.	1000	1 3/8	67K
67M	x								G-6	Min. Sc.	13	.36	1000	1 5/16	67M
68	x	x	x	x					G-6	D.C. Bay.	13.5	0.48	1000	1 7/16	68
71	x								G-6	S.C. Bay.	18-24	3 C.P.	200	1 7/16	71
71K	x	x		x				x	G-6	S.C. Cand.	22	3 C.P.	200	1 3/8	71K
71M	x								G-6	Min. Sc.	22	.20	200	1 5/16	71M
72	x	x		x				x	G-6	D.C. Bay.	18-24	3 C.P.	200	1 7/16	72
81	x	x	x	x				x	G-6	S.C. Bay.	6.5	5 C.P.	500	1 7/16	81
81K	x								G-6	Cand. Sc.	6.5	1.02	500	1 3/8	81K
81M	x								G-6	Min. Sc.	6.5	1.02	500	1 5/16	81M
810F	x								G-6	S.C. Bay.	6.5	1.02	500	1 7/16	810F
82	x	x	x	x				x	G-6	D.C. Bay.	6.5	1.02	500	1 7/16	82
87	x	x	x	x				x	S-8	S.C. Bay	6.75	2.20	300	2"	87
87K	x								S-8	Cand. Sc.	6.75	1.82	300	2"	87K
88	x	x	x	x				x	S-8	D.C. Bay.	6.75	1.82	300	2"	88
89	x	x	x	x				x	G-6	S.C. Bay.	13.0	0.63	750	1 7/16	89
89K	x	x		x				x	G-6	Cand. Sc.	13	.58	750	1 3/8	89K
90	x	x	x	x				x	G-6	D.C. Bay.	13.0	0.63	750	1 7/16	90
93	x	x	x	x				x	S-8	S.C. Bay.	12.8	1.20	500	2"	93
93L	x								S-8	S.C. Bay.	12.8	1.20	L	2"	93L
94	x	x	x	x				x	S-8	D.C. Bay.	12.8	1.20	500	2"	94
94IF	x								S-8	D.C. Bay.	12.8	1.20	500	2"	94IF
94L	x								S-8	D.C. Bay.	12.8	1.20	L	2"	94L
112	x	x	x	x	x		x	x	TL-3	Min. Screw	1.1	.22	5	15/16	112
113	x	x	x					x	TL-3	Min. Screw	1.30	.22	15	15/16	113
114	x	x	x				x	x	TL-2 3/4	Special	1.2	.20	5	7/8	114
123	x	x	x	x			x	x	G-3 1/2	Min. Sc.	1.2	.30	10	15/16	123
131	x	x	x	x				x	G-3 1/2	Min. Sc.	1.30	.10	50	15/16	131
136	x	x		x				x	G-4 1/2	Min. Sc.	1.25	.60	75	1 1/16	136
196	x	x						x	G-3 1/2	Min. Screw	1.9	.60	10	15/16	196
198	x								T-3 1/4	Min. Bay.	6.3	.37	L	1 3/16	198
209	x	x	x	x				x	B-6	S.C. Bay.	6.0	15 CP	100	1 3/4	209
210	x	x	x	x				x	B-6	D.C. Bay.	6.5	2.00	100	1 3/4	210
222	x	x	x	x	x		x	x	TL-3	Min. Sc.	2.2	.25	5	15/16	222
223		x		x			x	x	FE-3 1/4	Min. Sc.	2.2	.25	5	13/16	223
224	x	x	x				x	x	TL-2 3/4	Special	2.25	.25	5	7/8	224
233	x	x	x	x	x		x	x	G-3 1/2	Min. Sc.	2.3	.27	10	15/16	233
243		x		x				x	TL-3	Min. Sc.	2.33	.27	10	15/16	243
245		x		x					G-3 1/2	Min. Sc.	2.46	.50	15	15/16	245
248	x	x		x				x	G-5 1/2	Min. Sc.	2.5	.80	150	1 1/4	248
263		x		x				x	G-3 1/2	Min. Sc.	2.40	.35	45	15/16	263
263X		x		x				x	G-3 1/2	Min. Sc.	2.6	.30	30	15/16	263X
291	x				x	x	x		T-3 1/4	Min. Bay.	2.9	.17	200	1 3/16	291
292					x	x	x		T-3 1/4	Min. Sc.	2.9	.17	200	1 3/16	292
301	x	x		x				x	G-5	S.C. Bay.	28	3 CP	500	1 3/8	301

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
301NR	x								G-5	S.C. Bay.	28	3 CP	500	1 3/8	**301NR**
3010F	x								G-5	S.C. Bay.	28	3 CP	500	1 3/8	**3010F**
302	x	x		x				x	G-5	D.C. Bay.	28	3 CP	500	1 3/8	**302**
303	x	x		x				x	G-6	S.C. Bay.	28	6 CP	500	1 7/16	**303**
303NR	x								G-6	S.C. Bay.	28	6 CP	500	1 7/16	**303NR**
3030F	x								G-6	S.C. Bay.	28	6 CP	500	1 7/16	**3030F**
304	x	x		x				x	G-6	D.C. Bay.	28	6 CP	500	1 7/16	**304**
304NR	x								G-6	D.C. Bay.	28		500	1 7/16	**304NR**
305	x	x		x				x	S-8	S.C. Bay.	28	15 CP	300	2	**305**
305IF	x								S-8	S.C. Bay.	28	15 CP	300	2	**305IF**
305NR	x								S-8	S.C. Bay.	28		300	2	**305NR**
306	x								S-8	D.C. Bay.	28	15 CP	300	2	**306**
307	x	x		x				x	S-8	S.C. Bay.	28	21 CP	300	2	**307**
307IF	x	x		x				x	S-8	S.C. Bay.	28	21 CP	300	2	**307IF**
307NR	x								S-8	S.C. Bay.	28		300	2	**307NR**
307SB	x	x		x				x	S-8	S.C. Bay.	28		300	2	**307SB**
308	x	x		x				x	S-8	D.C. Bay.	28	21 CP	300	2	**308**
308IF	x								S-8	D.C. Bay.	28	21 CP	300	2	**308IF**
308NR	x								S-8	D.C. Bay.	28		300	2	**308NR**
309	x	x		x				x	S-11	S.C. Bay.	28	32 CP	300	2 3/8	**309**
309IF	x								S-11	S.C. Bay.	28	32 CP	300	2 3/8	**309IF**
309NR	x								S-11	S.C. Bay.	28		300	2 3/8	**309NR**
309SB	x	x		x				x	S-11	S.C. Bay.	28		300	2 3/8	**309SB**
310	x								S-11	D.C. Bay.	28	32 CP	300	2 3/8	**310**
311	x	x		x				x	S-11	S.C. Bay.	28	50 CP	300	2 3/8	**311**
311IF	x								S-11	S.C. Bay.	28	50 CP	300	2 3/8	**311IF**
311NR	x								S-11	S.C. Bay.	28		300	2 3/8	**311NR**
312	x								S-11	D.C. Bay.	28	50 CP	300	2 3/8	**312**
312NR	x								S-11	D.C. Bay.	28		300	2 3/8	**312NR**
313	x	x	x	x			x	x	T-3 1/4	Min. Bay.	28	.17	500	1 3/16	**313**
313NR	x								T-3 1/4	Min. Bay.	28	.17	500	1 3/16	**313NR**
313R	x	x		x				x	T-3 1/4	Min. Bay.	28	.17	500	1 3/16	**313R**
315	x								S-8	S.C. Bay.	28	32 CP	300	2	**315**
319	x	x		x					T-1 1/4	Special	3	.19	350	3/4	**319**
320	x	x		x					T-1 3/4	Special	28	.04	1000	3/4	**320**
321	x			x					T-1 3/4	Special	28	.04	1000	15/16	**321**
321GR	x	x							T-1 3/4	Special	28	.04	1000	15/16	**321GR**
323	x	x		x				x	T-1 1/4	Special	3	.19	350	35/64	**323**
323NR	x								T-1 1/4	Special	3	.19	350	35/64	**323NR**
323R	x	x		x				x	T-1 1/4	Special	3	.19	350	35/64	**323R**
324	x								T-1 1/4	Unbased	3	.19	350	7/16	**324**
325	x	x		x				x	T-1 1/4	Special	3	.19	350	35/64	**325**
327	x	x		x				x	T-1 3/4	Mid. Flngd.	28	.04	1000	5/8	**327**
327R	x								T-1 3/4	Mid. Flngd.	28	.04	1000	5/8	**327R**
327NR	x								T-1 3/4	Mid. Flngd.	28	.04	1000	5/8	**327NR**
328	x	x		x				x	T-1 3/4	Mid. Flngd.	6	.20	500	5/8	**328**
328L	x								T-1 3/4	Mid. Flngd.	6	.20	3000	5/8	**328L**
328NR	x								T-1 3/4	Mid. Flngd.	6	.20	500	5/8	**328NR**

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
330	x								T-1 3/4	Mid. Flngd.	14	.08	750	5/8	**330**
331	x								T-1 3/4	Mid. Flngd.	1.35	.06	500	5/8	**331**
332	x								T-1 3/4	Mid. Flngd.	6	.20	500	5/8	**332**
334	x	x		x				x	T-1 3/4	Mid. Grooved	28	.04	1000	5/8	**334**
335	x								T-1 3/4	Mid. Screw	28	.04	1000	11/16	**335**
336	x								T-1 3/4	Mid. Grooved	14	.08	750	5/8	**336**
337	x								T-1 3/4	Mid. Grooved	6	.20	500	5/8	**337**
338	x								T-1 3/4	Mid. Flngd.	2.7	.06	500	5/8	**338**
344	x								T-1 3/4	Min. Flngd.	10	.015	L	5/8	**344**
345	x								T-1 3/4	Mid. Flngd.	6	.04	1000	5/8	**345**
356	x							x	G-3 1/2	Min. Bay.	28	.17	500	15/16	**356**
363		x	x	x				x	G-3 1/2	Min. Bay.	14	.20	250	15/16	**363**
365	x	x		x				x	G-3 1/2	Min. Sc.	3.69	.50	15	15/16	**365**
407	x	x		x					G-4 1/2	Min. Sc.	4.9	.30	50	1 1/16	**407**
425	x	x		x				x	G-4 1/2	Min. Sc.	5.0	.50	15	1 1/16	**425**
428	x	x		x				x	G-4 1/2	Min. Sc.	12.5	.25	250	1 1/16	**428**
430	x	x	x	x				x	G-4 1/2	Min. Sc.	14	.25	250	1 1/16	**430**
431	x	x	x	x				x	G-4 1/2	Min. Bay.	14	.25	250	1 1/16	**431**
431R	x	x		x				x	G-4 1/2	Min. Bay.	14	.25	250	1 1/16	**431R**
432	x	x	x	x				x	G-4 1/2	Min. Sc.	18	.25	250	1 1/16	**432**
432G	x	x		x				x	G-4 1/2	Min. Sc.	18	.25	250	1 1/16	**432G**
432R	x	x		x				x	G-4 1/2	Min. Sc.	18	.25	250	1 1/16	**432R**
433	x	x	x	x				x	G-4 1/2	Min. Bay.	18	.25	250	1 1/16	**433**
452		x		x					X-4 1/4	Min. Sc.	14	.20	250	7/8	**452**
461		x		x				x	G-5	Min. Sc.	14	.33	250	1 1/8	**461**
502	x	x	x	x			x	x	G-4 1/2	Min. Sc.	5.0	.15	100	1 1/16	**502**
509	x								G-6	S.C. Bay.	24	.18	1000	1 7/16	**509**
509K	x	x		x				x	G-6	Cand. Sc.	24	.18	1000	1 3/8	**509K**
605	x	x	x	x			x	x	G-4 1/2	Min. Sc.	6.0	.50	15	1 1/16	**605**
623	x							x	G-6	S.C. Bay.	24	6	1000	1 7/16	**623**
715				x				x	FE-3 3/4	Min. Sc.	1.25	.30	10	13/16	**715**
958		x		x				x	G-16 1/2	D.C. Bay.	5.5	2.00	50	3	**958**
965	x	x		x			x	x	T-4 1/2	Min. Sc.	9.84	.50	15	1 3/8	**965**
993								x	G-4 1/2	Min. Sc.	9.9	.30	15	1 1/16	**993**
1000	x								RP-11	D.C. Bay.	6.2	3.87	125	2 1/4	**1000**
1003	x	x	x	x				x	B-6	S.C. Bay.	12.8	1.05	100	1 3/4	**1003**
1004	x	x	x	x				x	B-6	D.C. Bay.	12.8	1.05	100	1 3/4	**1004**
1011	x								RP-11	S.C. Prefoc.	12.75	2.33	300	2 1/4	**1011**
1016	x	x	x	x				x	S-8	D.C. Index	14.0	0.64	200	2	**1016**
1021	x	x		x				x	RP-11	S.C. Pref.	4.5	1.25	75	2 1/4	**1021**
1034	x	x	x	x				x	S-8	D.C. Index	14.0	0.58	200	2	**1034**
1047	x	x		x				x	RP-11	D.C. Bay.	26.0	2.7	25	2 1/4	**1047**
1073	x	x	x	x				x	S-8	S.C. Bay.	12.8	2.05	200	2	**1073**
1124	x								RP-11	D.C. Bay.	12	32-32CP	300	2 1/4	**1124**
1129	x	x	x	x				x	S-8	S.C. Bay.	6.4	2.91	200	2"	**1129**
1130	x	x	x	x				x	S-8	D.C. Bay.	6.4	2.91	200	2"	**1130**
1133	x	x	x	x				x	RP-11	S.C. Bay.	6.2	4.35	200	2 1/4	**1133**
1134	x		x						RP-11	D.C. Bay.	6.2	4.35	200	2 1/4	**1134**

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
1141	x	x	x	x				x	S-8	S.C. Bay.	12.8	1.50	500	2"	1141
1142	x	x	x	x				x	S-8	D.C. Bay.	12.8	1.50	500	2	1142
1143	x	x	x	x				x	RP-11	S.C. Bay.	12.5	2.30	400	2 1/4	1143
1144	x								RP-11	D.C. Bay.	12.5	1.92	400	2	1144
1154	x	x	x	x				x	S-8	D.C. Index	6.4	2.97	200	2	1154
1158	x	x	x	x				x	S-8	D.C. Bay.	6.4	2.97	200	2	1158
1176	x	x	x	x				x	S-8	D.C. Bay.	12.8	1.45	200	2	1176
1183	x	x	x	x				x	RP-11	S.C. Bay.	5.9	7.50	100	2 1/4	1183
1184	x	x		x				x	RP-11	D.C. Bay.	6	50 CP	100	2 1/4	1184
1195	x							x	RP-11	S.C. Bay.	12	50 CP	300	2 1/4	1195
1209	x								RP-11	S.C. Preofc.	6.1	32 CP	125	2 1/4	1209
1224	x	x		x				x	G-6	D.C. Bay.	32	.18	200	1 7/16	1224
1224K	x	x		x				x	G-6	Cand. Sc.	32	3 C.P.	200	1 3/8	1224K
1238		x		x				x	G-16 1/2	D.C. Bay.	32	3.5	50	3	1238
1251	x	x		x				x	G-6	S.C. Bay.	28	3 C.P.	1000	1 7/16	1251
1323	x	x		x				x	RP-11	S.C. Prefoc.	6.2	4.23	200	2 1/4	1323
1327	x	x		x				x	RP-11	S.C. Bay.	12.75	2.08	300	2 1/4	1327
1385		x		x				x	R-12	S.C. Bay.	28	20 watts	300	2 5/8	1385
1402		x		x					P-2 1/2	Mid. Sc.	14	.20	500	21/32	1402
1445	x	x	x	x				x	G-3 1/2	Min. Bay.	18.0	.15	250	15/16	1445
1446	x	x		x			x	x	G-3 1/2	Min. Sc.	12	.20	250	15/16	1446
1447	x	x	x	x			x	x	G-3 1/2	Min. Sc.	18.0	.15	250	15/16	1447

1449	x	x	x	x				x	G-3 1/2	Min. Sc.	14.0	.20	250	15/16	1449
1449R		x		x				x	G-3 1/2	Min. Sc.	14	.20	250	15/16	1449R
1452B	x								G-5	Min. Bay.	8	.25	250	1 3/16	1452B
1455	x								G-5	Min. Sc.	18	.25	250	1 3/16	1455
1456	x								G-5	Min. Bay.	18	.25	250	1 3/16	1456
1457	x								G-5	Min. Sc.	20	.25	250	1 3/16	1457
1458	x	x	x	x			x	x	G-5	Min. Bay.	20	.25	250	1 3/16	1458
1460	x								G-5	Min. Bay.	22	.28	250	1 3/16	1460
1471	x	x		x				x	G-6	Canda. Sc.	12	.26	250	1 3/8	1471
1473	x								T-3	Min. Screw	12	.17	250	1 1/4	1473
1474	x	x		x				x	T-3	Min. Sc.	14	.17	250	1 1/4	1474
1476	x	x		x				x	T-3	Min. Sc.	18	.17	250	1 1/4	1476
1477	x	x		x				x	T-3	Min. Sc.	24	.17	250	1 1/4	1477
1481	x						x		T-3 1/4	Min. Sc.	14	.15	200	1 3/16	1481
1482	x	x		x				x	G-4 1/2	Min. Sc.	6.0	.45	100	1 1/16	1482
1483		x		x					G-4 1/2	Min. Sc.	6.0	.04	250	1 1/16	1483
1487	x	x		x				x	T-3 1/4	Min. Sc.	14	.20	3000	1 3/16	1487
1488	x	x		x				x	T-3 1/4	Min. Bay.	14	.15	200	1 3/16	1488
1489	x	x		x				x	T-5	S.C. Bay.	6.5	2.75	125	1 3/4	1489
1490	x	x	x	x	x	x	x	x	T-3 1/4	Min. Bay.	3.2	.16	3000	1 3/16	1490
1491	x	x		x			x	x	G-8	D.C. Bay.	2.4	.80	75	1 3/4	1491
1493	x	x		x				x	S-8	D.C. Bay.	6.5	2.75	100	2"	1493
1503	x								RP-11	S.C. Prefoc.	5.9	7.13	200	2 1/4	1503
1507	x								RP-11	S.C. Prefoc.	12.5	3.46	300	2 1/4	1507
1606	x	x		x				x	S-8	D.C. Index	6.4	2.69	200	2"	1606
1616	x								S-8	D.C. Bay.	6.5	2.70	20	2"	1616

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
1618	x								S-8	D.C. Bay.	6.4	21 CP	200	2″	1618
1618IF	x								S-8	D.C. Bay.	6.4	21 CP	200	2″	1618F
1630	x	x		x				x	S-8	D.C. Prefoc.	6.5	2.75	100	2″	1630
1642	x								S-8	D.C. Bay.	8	15 CP	500	2″	1642
1648	x								S-8	D.C. Bay.	8	21 CP	200	2″	1648
1648IF	x								S-8	D.C. Bay.	8	21 CP	200	2″	1648IF
1651	x								S-8	S.C. Bay.	5.0	.60	20	2	1651
1705	x							x	T-1¾	Unbased	14	.08	750	½	1705
1763	x	x		x				x	S-11	S.C. Prefoc.	6.1	4.10	125	2⅜	1763
1767	x	x		x				x	T-1¾	Mid. Sc.	2.5	.20	500	17/32	1767
1768	x	x		x				x	T-1¾	Mid. Sc.	6	.20	500	17/32	1768
1769	x								T-1¾	Mid. Screw	2.5	.20	500	11/16	1769
1775	x							x	T-1¾	Mid. Sc.	6.3	.075	1000	11/16	1775
1784	x								T-1¾	Unbased	6	.20	500	½	1784
1794	x								T-3	Min. Bay.	14	.17	500	1 1/16	1794
1796	x								T-3	Mid. Screw	30	.17	250	1¼	1796
1810	x								T-3¼	Min. Bay.	6.3	.40	3000	1⅛	1810
1811	x								T-3¼	Min. Bay.	6.5	.40	1000	1 3/16	1811
1813	x						x		T-3¼	Min. Bay.	12	.10	1000	1 3/16	1813
1814							x		T-3¼	Min. Screw	12	.10	1000	1 3/16	1814
1815	x	x		x			x	x	T-3¾	Min. Bay.	14	.20	3000	1 3/16	1815
1816	x	x	x	x				x	T-3¼	Min. Bay.	13	.33	1000	1 3/16	1816

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
1817	x								T-3¼	Min. Bay.	13	.40	50	1 3/16	1817
1818	x								T-3¼	Min. Bay.	24	.17	250	1 3/16	1818
1819	x	x		x				x	T-3¼	Min. Bay.	28	.035	1000	1 3/16	1819
1820	x	x		x				x	T-3¼	Min. Bay.	28	.10	1000	1 3/16	1820
1822	x							x	T-3¼	Min. Bay.	36	.10	1000	1 3/16	1822
1829	x	x		x				x	T-3¼	Min. Bay.	28	.07	1000	1 3/16	1829
1847	x	x		x				x	T-3¼	Min. Bay.	6	.15	L	1 3/16	1847
1855	x								T-4½	Min. Bay.	6.3	.80	3000	1⅜	1855
1891	x	x	x	x	x		x	x	T-3¼	Min. Bay.	12-16	2 C.P.	500	1 3/16	1891
1892	x				x		x		T-3¼	Sc. Bay.	14	1 C.P.	L	1 3/16	1892
2320	x								RP-11	D.C. Prefoc.	6.2-6.4	4.52-3.3	200	2¼	2320
2326	x								RP-11	D.C. Prefoc.	12.5-12.8	2.5-1.66	300	2¼	2326
2330	x	x		x				x	RP-11	D.C. Prefoc.	6.2	4.23	200	2¼	2330
2331	x	x		x				x	RP-11	D.C. Prefoc.	5.9-6.2	4.66-4.49	400	2¼	2331
2336	x								RP-11	D.C. Prefoc.	12.5	2.23-2.80	300	2¼	2336
2536	x								RP-11	D.C. Prefoc.	12.2-12.5	3.7-2.28	300	2¼	2536
4001	x							x	PAR 46	2 Cont. Lugs	12.8	37.5W	300	4	4001
4002	x							x	PAR 46	3 Cont. Lugs	12.8	37.5-50W	300-500	4	4002
4010	x							x	PAR 46	Screw Term.	6.2	30W	300	4	4010
4011	x								PAR 46	Screw Term.	6.2	35W	300	4⅛	4011
4012	x							x	PAR 46	Screw Term.	6.2	35W	300	4	4012
4012A	x							x	PAR 46	Screw Term.	6.2	35W	300	4	4012A
4013	x							x	PAR 46	Screw Term.	6.4	25W	300	4	4013
4014	x								PAR 36	Screw Term.	6.4	18W	200	2¾	4014
4014A	x								PAR 36	Screw Term.	6.4	18W	200	2¾	4014A
4014R	x								PAR 36	Screw Term.	6.4	18W	200	2¾	4014R

Lamp Number	Chicago Miniature	General Electric	Hudson (Oxford)	National Carbon (Ever'dy)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	*Volts	*Amps.	Life in Hours	M.O.L.	Lamp Number
4015	x							x	PAR 36	Screw Term.	6.2	35W	300	2¾	**4015**
4015A	x							x	PAR 36	Screw Term.	6.2	35W	300	2¾	**4015A**
4405	x							x	PAR 36	Screw Term.	12.8	30W	100	2¾	**4405**
4412	x							x	PAR 46	Screw Term.	12.8	35W	300	4	**4412**
4412A	x							x	PAR 46	Screw Term.	12.8	35W	300	4	**4412A**
4413	x							x	PAR 46	Screw Term.	12.8	35W	300	4⅛	**4413**
4413R	x								PAR 46	Screw Term.	12.8	35W	300	4⅛	**4413R**
4414	x								PAR 36	Screw Term.	12.8	18W	300	2¾	**4414**
4414A	x								PAR 36	Screw Term.	12.8	18W	300	2¾	**4414A**
4414R	x								PAR 36	Screw Term.	12.8	18W	300	2¾	**4414R**
4415	x							x	PAR 36	Screw Term.	12.8	35W	300	2¾	**4415**
4415A	x							x	PAR 36	Screw Term.	12.8	35W	300	2¾	**4415A**
4416	x							x	PAR 36	Screw Term.	12.8	30W	100	2¾	**4416**
4435	x							x	PAR 46	Screw Term.	12.8	30W	100	4	**4435**
4435R	x								PAR 46	Screw Term.	12.8	30W	100	4	**4435R**
4502	x							x	PAR 36	Screw Term.	28	50W	400	2¾	**4502**
4503	x								PAR 36	Screw Term.	14	40W	400	2¾	**4503**
4506	x							x	PAR 36	Screw Term.	4.7	.47	30	2¾	**4506**
4509	x							x	PAR 36	Screw Term.	1.3	100W	25	2¾	**4509**
4510	x							x	PAR 36	Screw Term.	6.4	25W	300	2¾	**4510**
4510R	x							x	PAR 36	Screw Term.	6.4	25W	300	2¾	**4510R**
4512	x	x		x				x	PAR 36	Screw Term.	4.7	.50	100	2¾	**4512**
4515	x							x	PAR 36	Screw Term.	6.4	30W	100	2¾	**4515**
4516	x							x	PAR 36	Screw Term.	6.2	30W	100	2¾	**4516**
4516R								x	PAR 36	Screw Term.	6.2	30W	100	2¾	**4516R**
4518								x	PAR 36	Screw Term.	3.7	.60	50	2¾	**4518**
4524	x								PAR 46	Screw Term.	6.2	4.75	400	4⅛	**4524**
4525								x	PAR 46	Screw Term.	3.7	.60	200	4	**4525**
4535	x							x	PAR 46	Screw Term.	6.4	30W	100	4	**4535**
4537								x	PAR 46	Screw Term.	13	100W	25	4⅛	**4537**
4546	x	x		x				x	PAR 36	Screw Term.	4.7	.50	100	2¾	**4546**
4559								x	PAR 64	Screw Term.	28	600W	25	4	**4559**
4570								x	PAR 46	Screw Term.	28	150W	300	4⅛	**4570**
4594								x	PAR 36	Screw Term.	28	100W	300	2¾	**4594**
5040S	x							x	PAR 56	3 Cont. Lugs	6.1-6.2	50-40W	300-500	5¼	**5040S**
5400S	x							x	PAR 56	3 Cont. Lugs	12.8	50-40W	300-500	5¼	**5400S**
5440S	x							x	PAR 56	3 Cont. Lugs	12.8	50-40W	375-600	5¼	**5440S**

GLOW LAMPS

Lamp No.	Chicago Miniature	General Electric	Hudson (Oxford)	Nat'l. Carbon (Eveready)	R.C.A.	Raytheon	Tung-Sol	Westinghouse	Bulb	Base	Starting Volts or Circuit Volts	Series Resistor Ohms	Life Average Useful Hours	Watts or Design Amps.	M.O.L.	Lamp No.
AR 1		x							S-14	Med. Screw	110-125	3500	3000	2	3½	**AR 1**
AR 3		x							T-4½	Cand. Sc.	110-125	15000	1000	1/4	1 17/32	**AR 3**
AR 4		x							T-4½	D.C. Bay.	110-125	15000	1000	1/4	1½	**AR 4**
AR 9		x							T-2	Unbased	110-125	200000	200	1/25	1 1/16	**AR 9**
NE-2	x	x	x				x		T-2	Unbased	110-125	200000	25000	1/25	1 1/16	**NE-2**
NE-2A	x	x					x		T-2	Unbased	110-125	200000	25000	1/25	27/32	**NE-2A**
NE-2AR6	x	x					x		T-2	Unbased	110-125	62000	1500	1/10	27/32	**NE-2AR6**
NE-2AR10	x	x					x		T-2	Unbased	110-125	100000	7500	1/15	27/32	**NE-2AR10**
NE-2AR20	x	x					x		T-2	Unbased	110-125	200000	25000	1/25	27/32	**NE-2AR20**
NE-2AS	x	x							T-2	Unbased	55-90		2500	.3 ma.	27/32	**NE-2AS**
NE-2B		x					x		T-2	Unbased	110-125	200000	25000	1/25	¾	**NE-2B**
NE-2BR6	x	x					x		T-2	Unbased	110-125	62000	1500	1/10	¾	**NE-2BR6**
NE-2BR10	x	x					x		T-2	Unbased	110-125	100000	7500	1/15	¾	**NE-2BR10**
NE-2E	x								T-2	Unbased	110-125	62000	5000	1/10	¾	**NE-2E**
NE-2H	x								T-2	Unbased	110-125	25000	5000	1/4	¾	**NE-2H**
NE-2R6	x	x					x		T-2	Unbased	110-125	62000	1500	1/10	1 1/16	**NE-2R6**
NE-3	x	x							T-2	Tele. Slide	55-90		15000	.3 ma	1 11/16	**NE-3**
NE-4	x	x							T-2	Tele. Slide	70		6000	.3 ma	1¾	**NE-4**
NE-7	x								T-4½	Unbased	110-125	30000	7500	1/4	1 3/16	**NE-7**

NE-16	x	x							T-4½	D.C. Bay.	90			1.5 ma	1½	**NE-16**
NE-17	x	x	x						T-4½	D.C. Bay.	110-125	30000	5000	1/4	1½	**NE-17**
NE-21	x								T-4½	S.C. Bay.	110-125	30000	7500	1/4	1 3/8	**NE-21**
NE-30	x	x							S-11	Med. Screw	110-125	7500	10000	1	2¼	**NE-30**
NE-31	x								G-10	Cand. St.	110-125	7500	10000		2 5/16	**NE-31**
NE-32	x	x							G-10	D.C. Bay.	110-125	7500	10000	1	2⅛	**NE-32**
NE-34	x								S-14	Med. Screw	110-125	3500	8000	2	3½	**NE-34**
NE-36	x								S-14	D.C. Bay.	110-125	3500	10000	2	3 5/8	**NE-36**
NE-40	x	x							S-14	Med. Screw	110-125	2200	8000	3	3½	**NE-40**
NE-42	x								S-14	D.C. Bay.	110-125	2200	10000	3	3¾	**NE-42**
NE-45	x	x	x						T-4½	Cand. Sc.	105-115	30000	7500	1/4	1 17/32	**NE-45**
NE-48	x	x	x						T-4½	D.C. Bay.	105-115	30000	7500	1/4	1½	**NE-48**
NE-51	x	x	x				x		T-3¼	Min. Bay.	105-115	200000	15000	1/25	1 3/16	**NE-51**
NE-51H	x	x							T-3¼	Min. Bay.	110-125	25000	5000	1/4	1 3/16	**NE-51H**
NE-56	x	x							S-11	Med. Screw	220-250	33000	10000	1	2¼	**NE-56**
NE-57	x	x	x						T-4½	Cand. Sc.	105-115	30000	5000	1/4	1 17/32	**NE-57**
NE-58	x	x	x						T-4½	Cand. Sc.	230-250	100000	7500	1/2	1 17/32	**NE-58**
NE-67	x	x							T-3¼	Min. Bay.	67		1000	.2 ma	1 3/16	**NE-67**
NE-68	x	x							T-2	Unbased	75 ± 15		6000	.3 ma	1 1/16	**NE-68**
NE-75	x	x							T-2	Unbased	55-90		10000	.4 ma	1 1/16	**NE-75**
NE-76	x	x							T-2	Unbased	72 ± 4		1000	.4 ma	1 1/16	**NE-76**
NE-81	x								T-2	Unbased	72 ± 8		6000	.3 ma	1 1/16	**NE-81**
NE-96	x	x							T-2	Unbased	135 ± 15		1500	.5 ma	1 1/16	**NE-96**

STANDARD VOLTAGE LAMPS

Watts	Bulb	Base	Volts	Approximate Lumens	Hours	M.O.L.
3	S6	Cand. Sc.	115-125	12	3000	1 7/8
3	S6	D.C. Bay.	115-125	12	3000	1 13/16
6	S6	Cand. Sc.	115-125	41	1500	1 7/8
6	S6	D.C. Bay.	115-125	40	1500	1 13/16
7	C7	Cand. Sc.	115-125	45	3000	2 1/8
10	C7	Cand. Sc.	115-125	40	L	2 1/8
10	C7	D.C. Bay	115-125	39	L	2 3/16
3	T 4½	Cand. Sc.	115-125	12	3000	1 7/8
6	T 4½	Cand. Sc.	115-125	40	1500	1 7/8
10	S6	Cand. Sc.	230-250	66	1500	1 7/8
10	S6	D.C. Bay.	230-250	64	1500	1 15/16

THE CORRECT LAMP FOR THE JOB

Historically, the term "miniature" as used in the lamp industry, has no relation to size but indicates a lamp operating at less than 60 volts. However, Chicago Miniature can supply most small sized lamps, including neons, for operation up to 250 volts.

Selection of the proper lamp can be relatively easy if the nomenclature of the lamp industry is understood, and several factors, outlined briefly here, are kept in mind. First, all miniature lamps are designated by lamp numbers that are uniform throughout the American lamp industry. When the number of a lamp is known, it may safely be ordered by number only.

SELECTING LAMPS FOR NEW DESIGNS

First analyze the exact nature of the job to be performed, and secondly, the limiting factors such as power supply, light output, space occupied, required life, difficulty of replacement. Your lighting problem should receive consideration before "freezing" hardware so that full advantage may be taken of the wide range of available standard lamps, and that maximum efficiency may be obtained from the lamp selected. Chicago Miniature offers its facilities for your assistance in the selection of the correct lamp for your specific application.

Specifications of miniature lamps manufactured today usually fall within the following ranges.

Voltage: 1 volt to 60 volts.

Current: 15 ma. to 25 amps.

Candlepower: .01 cp to 100 cp (mean spherical)

Size: Outside Diameter — .060" to 8"

Overall Length — .2" to 5"

Life: 5 seconds to infinity.

Since there is an interrelationship of all these factors, due consideration should be given to the relative importance of each.

CANDLEPOWER

Light output may be concentrated in a given direction (beam candlepower) or distributed in all directions (mean spherical candlepower). Built-in reflectors, e.g. sealed beam lamps, and top lens bulbs, where a lens is molded into the bulb itself, both increase beam candlepower. Maximum candlepower demands a relatively large bulb to dissipate the required energy without shortening life or prematurely darkening of the bulb with evaporated tungsten from the filament. Also, the brighter and hotter the filament, the faster the rate of evaporation, hence there is a definite relationship between light output and life.

SIZE

Miniature incandescent lamps may be as small as .060" O.D. as indicated previously. However, in lamps this small, operating voltage and current drain become very important. Generally, due to the space requirements of the filament, lamps below 5/32" O.D. usually operate at 10 volts or less; lamps under 1/10" at 5 volts or less. Reduction in bulb size emphasizes the inter-relationship of life, candlepower and wattage, e.g. No. CM8-680 lamp, operated at 5 volts, has an infinite life (perhaps a billion years!) and is only 1/8" O.D. It operates at 60 ma. (.3 watts) and .03 candlepower.

In contrast, surgical instrument lamps of the same size, where maximum brilliance is required, operate at 1½ watts and produce 1 candlepower but have a life expectancy of only 5 hours. In these critical areas, where lamp design and performance must be outstanding, Chicago Miniature has led its field for many years.

LIFE

In view of the inverse relationship between filament temperature (candlepower) and lamp life, consider whether maximum light output is worth the cost and bother of frequent lamp replacement.

Where lamp replacement is difficult, light output should be sacrificed for longer life. By the reduction of the applied voltage the life of a tungsten filament lamp can be greatly increased since lamp life normally varies inversely to the twelfth power of this applied voltage. Candlepower of a given lamp may be increased at the expense of life since it varies directly with the applied voltage raised to the 3.5 power.

Since the intensity of light on a given surface varies with the square of the distance from the light source it is frequently possible to utilize a small, low intensity lamp with longer life when it can be located in close proximity to the surface to be illuminated.

All the foregoing factors should be considered in the selection of a miniature lamp for a specific job. If you fail to find listed in this booklet a lamp that suits your requirements, write for our data sheet which will aid you in describing the desired characteristics, and which, when returned to us, will enable us to recommend the best lamp for your application or design a lamp to suit your specific purpose.