



**WESTINGHOUSE  
INDUSTRIAL AND  
POWER TUBE  
TECHNICAL GUIDE**

50 CENTS

**CONTACT**

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This catalog contains essential characteristics of all Westinghouse Industrial and Power Tubes available through your authorized Westinghouse distributor.

To locate a specific type number simply refer to the Tube Type Index on pages 1 and 2. If you cannot locate the type number, simply refer to the Direct-Interchangeability List on pages 3 through 10. The equivalent Westinghouse replacement type can then be found in the Index.

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# DIRECT INTERCHANGEABILITY LIST



This Interchangeability Index has been prepared to assist you in finding exact replacement for electronic tubes in the Industrial, Transmitting and Special Purpose fields.

This listing is believed to be accurate to the date of issue. However, no responsibility is assumed by Westinghouse for its completeness or for its use, nor for any infringement of patents or other rights of third parties which may result from its use.

## KEY TO ABBREVIATIONS

- CR — Cathode Ray
- CS — Camera or Storage
- Glow — Glow Tube (Cold Cath.)
- GA — Vacuum Gauge
- Ig — Ignitron
- IR — Industrial Receiving
- MD — Microwave Device
- N — Neutron Detector
- Photo — Phototube
- Rect — Rectifier
- Thyr — Thyatron
- Trans. — Transmitting
- VR — Voltage Regulator or Reference
- HCCD — Hollow Cathode Discharge Device

## INDEX OF COMMONLY USED MANUFACTURERS PREFIXES

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>A Radio Corporation of America</li> <li>AH Marconi Wireless Telegraph Co.</li> <li>AX Amperex Electronic Corp.</li> <li>BL Bomac Laboratories</li> <li>BR Standard Telephone &amp; Cables Inc.</li> <li>BT British Thomson-Houston Co.</li> <li>CE Continental Electric Co.</li> <li>CK Raytheon Manufacturing Co.</li> <li>DET Marconi Wireless Telegraph Co.</li> <li>DR General Electronics Inc.</li> <li>EE Electronic Enterprises Inc.</li> <li>EL Electrons Inc.</li> <li>F International Telephone &amp; Telegraph</li> <li>FG General Electric Co.</li> <li>G General Motors Laboratories Inc.</li> <li>GL General Electric Co.</li> <li>HD C B S Hytron Co.</li> </ul> | <ul style="list-style-type: none"> <li>HV United Electronics Co.</li> <li>HV Japanese Manufacture</li> <li>HY C B S Hytron Co.</li> <li>KD Ferranti Ltd.</li> <li>KI Westinghouse Electric Corp.</li> <li>KU Westinghouse Electric Corp.</li> <li>KU Kuthe Laboratories Inc.</li> <li>KX Westinghouse Electric Corp.</li> <li>M Mullard Electric Products Ltd.</li> <li>ML Machlett Laboratories Inc.</li> <li>MT English Electric Valve Co.</li> <li>NL National Electronics Inc.</li> <li>NU National Union Electric Corp.</li> <li>PL Penta Laboratories Inc.</li> <li>PL N. V. Philips Gloeilampenfabrieken</li> <li>QK Raytheon Manufacturing Co.</li> <li>R Radio Corporation of America</li> </ul> | <ul style="list-style-type: none"> <li>RK Raytheon Manufacturing Co.</li> <li>SN Sylvania Electric Products Inc.</li> <li>T Taylor Tubes Inc.</li> <li>TT Taylor Tubes Inc.</li> <li>UE United Electronics Co.</li> <li>UX United Electronics Co.</li> <li>V Varian Associates Inc.</li> <li>VA Varian Associates Inc.</li> <li>WE Western Electric Co.</li> <li>WL Westinghouse Electric Corp.</li> <li>WT Weltronic Co.</li> <li>WTT Weltronic Co.</li> <li>WX Westinghouse Electric Corp.</li> <li>X Varian Associates Inc.</li> <li>XG Mullard Electric Products Ltd.</li> <li>Z General Electric Co.</li> <li>ZP General Electric Co.</li> </ul> |
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SAS

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
SBS	Ig	WL-5551A
SCS	Ig	WL-5552A
SDR	Ig	WL-5555
SDS	Ig	WL-5553B
TGRA	Rect	WL-575A
TGRB	Rect	WL-872A
TGRG	Thyr	WL-5563A
TVTA	Trans	WL-892
TVTB	Trans	WL-833A
TVTC	Trans	WL-889A
TVTG	Trans	WL-5606
TVTPT	Trans	WL-5771
WL-0A2	VR	WL-0A2
OA2	VR	WL-0A2
WL-0A3	VR	WL-0A3
OA3	VR	WL-0A3
OA3/VR75	VR	WL-0A3
WL-0B2	VR	WL-0B2
OB2	VR	WL-0B2
WL-0B3	VR	WL-0B3
OB3	VR	WL-0B3
WL-0C3	VR	WL-0C3
OC3	VR	WL-0C3
OC3/VR105	VR	WL-0C3
WL-0D3	VR	WL-0D3
OD3	VR	WL-0D3
OD3/VR150	VR	WL-0D3
OG3	VR	WL-5651
AC-1C	Rect	WL-3B22
CT1-2500	Thyr	WL-5559
EL-1C	Rect	WL-3B22
EL-C1B	Thyr	WL-5664
EL-C1BA	Thyr	WL-5664
EL-C1J	Thyr	WL-6014
GL-C1J	Thyr	WL-6014
EL-C1JA	Thyr	WL-6014
EL-C1K	Thyr	WL-6014
GXU1	Rect	WL-3B28
MXK-1	MD	WL-6781
TQ1-2	Thyr	WL-3C23
XR1-2500	Thyr	WL-5559
XR1-3200	Thyr	WL-22994
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1G50	Thyr	WL-2050
1P32	Photo	WL-927
GL-1P40	Photo	WL-1P40
WL-1P40	Photo	WL-1P40
1P40	Photo	WL-1P40
1R21	Ig	WL-5550
B2A	Thyr	WL-2050
BTL2-1	Trans	WL-5762
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DQ2	Rect	WL-866A
DX2	Rect	WL-3B28
H2-10	Rect	WL-2X2A
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M-2K-215	Rect	WL-7018
P2-12	Trans	WL-832A
P2-40	Trans	WL-829B
P2-40C	Trans	WL-829B
PC2/500	Trans	WL-803
QB2/250	Trans	WL-813
QQE02/5	Trans	WL-6939
QQV02/6	Trans	WL-6939
QY2-100	Trans	WL-813
TQ2	Thyr	WL-5557
TX2/3	Thyr	WL-22994
TX2/6	Thyr	WL-C6H-1
XGQ2-6400	Thyr	WL-105
2B4	Thyr	WL-885

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
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2B32	Trans	WL-832A
2B94	Trans	WL-5894
2C4	Thyr	WL-5696
ML-2C39	Trans	WL-2C39A
2C39	Trans	WL-2C39A
WL-2C39A	Trans	WL-2C39A
2C39A	Trans	WL-2C39A
GL-2C39B	Trans	WL-2C39B
ML-2C39B	Trans	WL-2C39B
WL-2C39B	Trans	WL-2C39B
2C39B	Trans	WL-2C39B
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PL-2D21	Thyr	WL-2D21
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2E26	Trans	WL-2E26
2G57	Thyr	WL-5557
2H28	Rect	WL-3B28
2H66	Rect	WL-866A
2V/400A	Rect	WL-866A
2XM600A	Rect	WL-866A
2X2/879	Rect	WL-2X2A
GL-2X2A	Rect	WL-2X2A
WL-2X2A	Rect	WL-2X2A
2X2A	Rect	WL-2X2A
EM-2.5	Rect	WL-7018
EL-C3J	Thyr	WL-5632
C3J	Thyr	WL-5632
C3J/5632	Thyr	WL-5632
EL-C3JA	Thyr	WL-7306A
EL-C3JAL	Thyr	WL-7556A
EL-3C	Rect	WL-7014
EL-3C/L	Rect	WL-7015
QB3/300	Trans	WL-4D21
QE03/10	Trans	WL-5763
QQE03/12	Trans	WL-6360
QQV03-10	Trans	WL-6360
QV03-12	Trans	WL-5763
QY3-125	Trans	WL-4D21
RG3-250A	Rect	WL-866A
RR3-250	Rect	WL-3B28
T-3C	Rect	WL-4B24
3-1000A4	Trans	WL-1000T
GL-3C23	Thyr	WL-3C23
WL-3C23	Thyr	WL-3C23
3C23	Thyr	WL-3C23
3C31	Thyr	WL-5664
3E21	Trans	WL-829B
3E29	Trans	WL-829B
3G15	Thyr	WL-5664
3G501A	Thyr	WL-C6H-1
3H150J	Trans	WL-2C39B
3V390A	Thyr	WL-5559
3X100A5	Trans	WL-2C39A
3X100A11	Trans	WL-2C39B
GL-3X2500A3	Trans	WL-3X2500A3
WL-3X2500A3	Trans	WL-3X2500A3
3X2500A3	Trans	WL-3X2500A3
WL-3X2500F3	Trans	WL-3X2500F3
3X2500F3	Trans	WL-3X2500F3
QB-3.5-750	Trans	WL-5D22
AX-4-125A	Trans	WL-4D21

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
AX-4-125A/6155	Trans	WL-4D21
AX-4-250A	Trans	WL-5D22
AX-4-250A/6156	Trans	WL-5D22
BPM04	IR	WL-6669
DCG4-1000G	Rect	WL-866A
DCX4-1000	Rect	WL-3B28
DQ4	Rect	WL-872A
EL-C4H-1	Thyr	WL-6856
C4H-1	Thyr	WL-6856
EL-C4H-2	Thyr	WL-6857
C4H-2	Thyr	WL-6857
EL-C4J	Thyr	WL-6856
C4J	Thyr	WL-6856
EL-C4J/F	Thyr	WL-6857
C4J/F	Thyr	WL-6857
GL-KC4	Rect	WL-5575
PM04	I R	WL-6660
QBL4-800	Trans	WL-4X500A
QQE04/20	Trans	WL-832A
QQV04-20	Trans	WL-815
QY04-15	Trans	WL-832A
QY4-250	Trans	WL-5D22
TY4-350	Trans	WL-833A
QY4-500A	Trans	WL-4X500A
4-125A	Trans	WL-4D21
4-125A/4D21	Trans	WL-4D21
4-250A	Trans	WL-5D22
4-250A/5D22	Trans	WL-5D22
GL-4-400A	Trans	WL-400A
WL-4-400A	Trans	WL-400A
4-400A	Trans	WL-400A
GL-4-1000A	Trans	WL-4-1000A
WL-4-1000A	Trans	WL-4-1000A
4-1000A	Trans	WL-4-1000A
4B13	Trans	WL-813
4CX250B	Trans	WL-7203
4G23	Thyr	WL-3C23
4G63	Thyr	WL-5563A
4G/280K	Thyr	WL-5727
4H72	Rect	WL-872A
4H88	Rect	WL-8008
4T100	Trans	WL-813
4T250A1	Trans	WL-813
4X250B	Trans	WX-4CX250B
GL-4X500A	Trans	WL-4X500A
WL-4X500A	Trans	WL-4X500A
4X500A	Trans	WL-4X500A
4Y25	Trans	WL-807
BT5	Thyr	WL-5559
DCG5/5000GB	Rect	WL-872A
DCG5/5000GS	Rect	WL-8008
G5D	Rect	WL-872A
PM05	I R	WL-5654
QE05/40	Trans	WL-6146
QE05/40H	Trans	WL-6159
QV05/25	Trans	WL-807
XG5-500	Thyr	WL-5557
5-125B	Trans	WL-4E27A
5B/250A	Trans	WL-807
5CEP11	C R	5CEP11
5CEP16	C R	5CEP16
5C21	Thyr	WL-5C21
5C21	Thyr	WL-813
5CEP1	C R	5DEP1
5DEP2	C R	5DEP2
PL-5D22	Trans	WL-5D22
WL-5D22	Trans	WL-5D22
5D22	Trans	WL-5D22
5FP7	C R	5FP7A
5FP7A	C R	5FP7A



# Direct Interchangeability List

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TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
5FP7B	C R	5FP7B
5FP11	C R	5FP11
5FP11A	C R	5FP11A
5F22A	Trans	WL-5D22
5H69A	Rect	WL-869B
5R4-GY	Rect	WL-5R4-GYB
5R4-GYA	Rect	WL-5R4-GYB
5R4-GYB	Rect	WL-5R4-GYB
5S1	Trans	WL-807
5T33	Trans	WL-833A
5UP1	C R	5UP1
5WP11	C R	5WP11
5ZP16	C R	5ZP16
EL-C6J	C R	WL-5C21
C6J	Thyr	WL-5C21
C6J/5C21	Thyr	WL-5C21
EL-C6J/A	Thyr	WL-C6H-1
C6J/A	Thyr	WL-C6H-1
C6J/A/5685	Thyr	WL-C6H-1
EL-C6J/F	Thyr	WL-C6H-2
C6J/F	Thyr	WL-C6H-2
EL-C6J/K	Thyr	WL-C6H-1
C6J/K	Thyr	WL-C6H-1
EL-C6J/KF	Thyr	WL-C6H-2
C6J/KF	Thyr	WL-C6H-2
EL-C6J/KL	Thyr	WL-C6H-3
C6J/KL	Thyr	WL-C6H-3
EL-C6J/L	Thyr	WL-7321
C6J/L	Thyr	WL-7321
EL-C6H-1	Thyr	WL-C6H-1
WL-C6H-1	Thyr	WL-C6H-1
C6H-1	Thyr	WL-C6H-1
EL-C6H-2	Thyr	WL-C6H-2
WL-C6H-2	Thyr	WL-C6H-2
C6H-2	Thyr	WL-C6H-2
EL-C6H-3	Thyr	WL-C6H-3
WL-C6H-3	Thyr	WL-C6H-3
C6H-3	Thyr	WL-C6H-3
DD6	Thyr	WL-6663
DD6G	I R	WL-6663
DQ6	I R	WL-859B
EL-6C	Rect	WL-670
EL-6C/L	Rect	WL-7017
T-6C	Rect	WL-670
QE06/50	Rect	WL-807
QQE06/40	Trans	WL-5894
QQV06/40	Trans	WL-5894
QQV06/40A	Trans	WL-5894
QQV06/20	Trans	WL-6146
6AB4	I R	WL-6664
6AK5	I R	WL-5654
6AK5W	I R	WL-5654
6AK5W/5654	I R	WL-5654
6AL5	I R	WL-6663
6AQ5	I R	WL-6669
6AS6	I R	WL-6AS6
6AS7G	I R	WL-6AS7GA
6AS7GA	I R	WL-6AS7GA
6AU6	I R	WL-6136
6AU6W	I R	WL-6136
6AU6WA	I R	WL-6136
6B32	I R	WL-6663
6BA6	I R	WL-6660
6BH6	I R	WL-6661
6BJ6	I R	WL-6662
6C31	I R	WL-6J4
6CB6	I R	WL-7732
6CB6A	I R	WL-7732
6CL6	I R	WL-6677
6D2	I R	WL-6663
6DB6	I R	WL-6954
6F31	I R	WL-6660
6F33	I R	WL-6AS6
6F50R	Trans	WL-4X500A
6G10	Thyr	WL-105
6G45	Thyr	WL-C6H-1
6K4	I R	WL-5718
6L6	I R	WL-5881
6L6G	I R	WL-5881
6L6GA	I R	WL-5881
6L6GB	I R	WL-5881
6L6GC	I R	WL-5881
6L6W	I R	WL-5881
6L6WA	I R	WL-5881
6L6WB	I R	WL-5881
6L13	I R	WL-7729
6L41	Trans	WL-5763
6SJ7	I R	WL-5693
6SL7-GT	I R	WL-5691
6SL7-WGT	I R	WL-5691
6SN7-GT	I R	WL-5692
6SN7-GTA	I R	WL-5692
6U8	I R	WL-6678
6U8A	I R	WL-6678
QQV07-40	Trans	WL-829B
7ABP7	C R	7ABP7A
7ABP7A	C R	7ABP7A
7AUP4	C R	7AUP4
7BP7	C R	7BP7A
7BP7A	C R	7BP7A
7BP7B	C R	7BP7B
7C24	Trans	WL-5762
7F25A	Trans	WL-4-1000A

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
7H57	Rect	WL-857B
7MP7	C R	7MP7
7TP4	C R	7TP4
8F66R	Trans	WL-6166A
8T92	Trans	WL-892
8T92R	Trans	WL-892R
D2M9	I R	WL-6663
TT10	Trans	WL-813
10E/9	Trans	WL-832A
10E/587	Trans	WL-807
10E/11-141	Trans	WL-807
10FP4	C R	10FP4A
10FP4A	C R	10FP4A
10KP7	C R	10KP7A
10KP7A	C R	10KP7A
10KP7B	C R	10KP7B
10SP4	C R	10SP4
10UP14	C R	10UP14A
10UP14A	C R	10UP14A
10WP7	C R	10WP7
10WP7A	C R	10WP7A
GU12	Rect	WL-866A
TM12	I R	WL-6J4
X-12	M D	WL-124
12ABP7	C R	12ABP7A
12ABP7A	C R	12ABP7A
12AT7	I R	WL-6679
12AT7W	I R	WL-6201
12AT7WA	I R	WL-6201
12AU7	I R	WL-6680
12AU7W	I R	WL-6189
12AU7WA	I R	WL-6189
12AX7	I R	WL-6681
12AX7A	I R	WL-7729
12BY7	I R	WL-7733
12BY7A	I R	WL-7733
12SP7	C R	12SP7D
12SP7B	C R	12SP7D
12SP7D	C R	12SP7D
DG13-32	C R	5UP1
MF13-1	C R	5FP7A
X-13	M D	WL-122
X-13B	M D	WL-121
13D2	I R	WL-5692
AR-14	I R	WL-5551A
MXK-14	M D	WL-6310
P-14	Thyr	WL-5557
AR-14T	I R	WL-5551A
AR-14TP	I R	WL-5551APC
AR-14TWS	I R	WL-5551APC
G15F	Photo	WL-927
MXK-15	M D	WL-6312
EL-C16J	Thyr	WL-5665
GS-16S0	Photo	WL-1P40
MXK-16	M D	WL-6314
QQV16/40A	Trans	WL-5894
TT16	Trans	WL-4D21
TT16D	Trans	WL-4D21
16AKP7	C R	16AKP7
16ALP7	C R	16ALP7
DET17	Trans	WL-810
EE-17	Thyr	WL-5557
FG-17	Thyr	WL-5557
HT-17	Thyr	WL-5557
MT17	Thyr	WL-5557
RL-17	Thyr	WL-5557
TT-17	Thyr	WL-5557
WE-17	Thyr	WL-5557
WL-17	Thyr	WL-5557
17	Thyr	WL-5557
P17A	Trans	WL-807
MXK-18	M D	WL-6316
CE-20	Photo	WL-927
NU-20	Photo	WL-927
20A3	Thyr	WL-5727
KD21	V R	WL-0A3
PL21	Thyr	WL-2D21
RL-21	Thyr	WL-2D21
21A6	Thyr	WL-81A
21EWP4	C R	21EWP4
CE-23	Photo	WL-923
NU-23	Photo	WL-923
BK24	I R	WL-5552A
KD24	V R	WL-0C3
BK24A	I R	WL-5552A
BK24B	I R	WL-5552A
ATS25	Trans	WL-807
G25/3000	Rect	WL-866A
KD25	V R	WL-0D3
NU-25	Photo	WL-927
ATS25A	Trans	WL-807
CE-25C	Photo	WL-927
25B6-G	I R	WL-5824
MXK-26	M D	WL-122
BT27	Thyr	WL-105
D27	I R	WL-6663
RK-28A	Trans	WL-803
CE-30	Photo	WL-1P40
NU-30	Photo	WL-930
CE-30C	Photo	WL-930
CE-30Q	Thyr	WL-5557
ECC32	I R	WL-5692

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
EN32	Thyr	WL-2050
FG-32	Rect	WL-5558
WL-32	Rect	WL-5558
FG-33	Thyr	WL-5720
BK34	I R	WL-5553B
REL34	Trans	WL-2C40
BK34A	I R	WL-5553B
BK34B	I R	WL-5553B
ECC35	I R	WL-5691
TE-35	I R	WL-5654
EL37	I R	WL-5881
RK-39	Trans	WL-807
FG-41	Thyr	WL-5830
WL-41	Thyr	WL-5830
BK42	I R	WL-5551A
CE-42	Photo	WL-922
EB42	Rect	WL-857B
BK42A	I R	WL-5551A
BK42B	I R	WL-5551A
L-FTX44-5	Thyr	WL-5665
TX44-5	Thyr	WL-5665
BK46	I R	WL-5555
GS-47X	Photo	WL-927
HD51	V R	WL-0A2
TS51	I R	WL-5654
51A	Photo	WL-927
R-51A	Photo	WL-927
HD52	V R	WL-0B2
TE-54	I R	WL-5687
V55	M D	WL-134
V56	M D	WL-6315
FG-57	Thyr	WL-5559
MT-57	Thyr	WL-5559
PL-57	Thyr	WL-5559
RL-57	Thyr	WL-5559
TG-57	Thyr	WL-5559
WL-57	Thyr	WL-5559
V-58C	M D	WL-191
DP61	I R	WL-5654
HY-61	Trans	WL-807
HY-61/807	Trans	WL-807
R-61A	Photo	WL-930
61A3	Photo	WL-930
B65	I R	WL-5692
BK66	I R	WL-5550
EC70	I R	WL-5718
EL71	I R	WL-5902
RKR-72	Rect	WL-481B
VR-75	V R	WL-0A3
VR-75ST	V R	WL-0A3
BT77	Thyr	WL-C6H-1
D77	I R	WL-6663
KT77	I R	WL-5881
QD77	I R	WL-5726
CC81E	I R	WL-6201
ECC81	I R	WL-6679
E81CC	I R	WL-6201
FG-81A	Thyr	WL-81A
WL-81A	Thyr	WL-81A
EBF82	I R	WL-6678
ECC82	I R	WL-6680
ECC83	I R	WL-6681
ECC84	I R	WL-6386
84A3	Photo	WL-923
85A2	V R	WL-5651
E88CC	I R	WL-6922
KT88	I R	WL-6550
E90F	I R	WL-6661
EL90	I R	WL-6669
VR-90	V R	WL-0B3
VR-90ST	V R	WL-0B3
BT-91	Thyr	WL-22994
E91AA	I R	WL-6663
E91N	Thyr	WL-2D21
EAA91	I R	WL-6663
EB91	I R	WL-6663
EN91	Thyr	WL-2D21
EC92	I R	WL-6664
EN92	Thyr	WL-5696
VA-92	M D	WL-118
VA-92B	M D	WL-116
VA-92C	M D	WL-110
VA-92D	M D	WL-141
EF93	I R	WL-6660
EF94	I R	WL-6136
E95F	I R	WL-5654
EF95	I R	WL-5654
QV95/25	Trans	WL-807
E99F	I R	WL-6662
ML-100	Rect	WL-5575
TXM100	Thyr	WL-2D21
WL-102A	Rect	WL-402A
X-103	Trans	WL-4D21
FG-104	Rect	WL-5561
WL-104	Rect	WL-5561
WTT-104	Rect	WL-575A
AX-105	Thyr	WL-105
FG-105	Thyr	WL-105
MT-105	Thyr	WL-105
PL-105	Thyr	WL-105
RL-105	Thyr	WL-105
VR-105	V R	WL-0C3

# Direct Interchangeability List

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TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
WL-105	Thyr	WL-105
WTT-105	Trans	WL-892
105	Thyr	WL-105
VR-105MT	V R	WL-0C3
PL-106	Thyr	WL-6858
WL-106	M D	WL-106
WTT-106	Thyr	WL-7307A
WL-107	M D	WL-107
STV108/30	V R	WL-0B2
WL-108	M D	WL-108
WTT-108	Thyr	WL-3C23
108C1	V R	WL-0B2
WL-109	M D	WL-109
WL-110	M D	WL-110
WTT-110	Thyr	WL-5830
WL-111	M D	WL-111
WTT-111	Thyr	WL-5559
WTT-112	Thyr	WL-632B
WL-113	M D	WL-113
WTT-113	Thyr	KU-676
WL-114	M D	WL-114
WL-115	M D	WL-115
WL-116	M D	WL-116
WTT-116	Thyr	WL-5664
WL-117	M D	WL-117
WTT-117	Thyr	WL-5557
X-117	Trans	WL-5D22
WL-118	M D	WL-118
WTT-118	Thyr	WL-105
WL-119	M D	WL-119
WTT-119	Thyr	WL-172
WL-121	M D	WL-121
WL-122	M D	WL-122
WL-123	M D	WL-123
WL-124	M D	WL-124
T-125	Trans	WL-810
E-125A	Trans	WL-4D21
WL-126	M D	WL-126
WTT-127	Trans	WL-833A
WL-128	M D	WL-128
WL-129	M D	WL-129
WL-130	M D	WL-130
BR-132	Trans	WL-5762
WL-132	M D	WL-132
WL-133	M D	WL-133
WL-134	M D	WL-134
WTT-134	Thyr	WL-5665
WL-135	M D	WL-135
WL-136	M D	WL-136
WL-137	M D	WL-137
WL-138	M D	WL-138
WL-139	M D	WL-139
WL-140	M D	WL-140
WL-141	M D	WL-141
B142	Trans	WL-833A
KX142	Rect	WL-2X2A
C143	Trans	WL-813
C144	Trans	WL-829B
WL-146	M D	WL-146
WL-147	M D	WL-147
WL-148	M D	WL-148
WTT-149	Thyr	WL-172
QS150-40	V R	WL-0D3
SM150-30	V R	WL-0A2
STV150/30	V R	WL-0A2
VR-150	V R	WL-0D3
VR-150-30	V R	WL-0D3
VR-150MT	V R	WL-0A2
VR-150ST	V R	WL-0D3
150C1	V R	WL-0A2
150C2	V R	WL-0A2
150C3	V R	WL-0D3
150C4	V R	WL-0A2
V151	M D	WL-6316
B152	I R	WL-6679
D152	I R	WL-6663
V153	M D	WL-6315
V154	M D	WL-133
V157	M D	WL-138
Q160-1	Trans	WL-4D21
BK168B	Ig	WL-5822A
FG-172	Thyr	WL-172
WL-172	Thyr	WL-172
172	Thyr	WL-172
WL-176	M D	WL-176
WL-177	M D	WL-177
C178	Trans	WL-5894
C180	Trans	WL-832A
G180-2M	V R	WL-0D3
WL-186	M D	WL-186
WL-187	M D	WL-187
WL-188	M D	WL-188
ECC189	I R	WL-6922
WL-189	M D	WL-189
EF190	I R	WL-6676
BR191	Trans	WL-5762
WL-191	M D	WL-191
WL-199	Rect	WL-8094
WL-200	Rect	WL-5576
AH201	Rect	WL-866A
VA-204	M D	WL-146
A-206	Rect	WL-579B
GL-207	Trans	WL-207

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
ML-207	Trans	WL-207
RX-207	Rect	WL-670
UE-207	Trans	WL-207
WL-207	Trans	WL-207
207	Trans	WL-207
WT-210-0001	Thyr	WL-2D21
WT-210-0004	Thyr	WL-2050
WT-210-0008	Rect	WL-866A
WT-210-0011	V R	WL-0C3
WT-210-0015	Thyr	WL-5557
WT-210-0016	V R	WL-0B3
WT-210-0017	Thyr	WL-6856
WT-210-0018	V R	WL-0D3
WT-210-0027	Rect	WL-872A
WT-210-0038	Thyr	WL-172
WT-210-0043	Thyr	WL-5796
WT-210-0044	Rect	WL-575A
WT-210-0045	Trans	WL-892
WT-210-0047	Thyr	WL-3C23
WT-210-0051	V R	WL-0A2
WT-210-0054	Thyr	WL-5830
WT-210-0056	Thyr	WL-5559
WT-210-0057	Thyr	WL-632B
WT-210-0058	Thyr	KU-676
WT-210-0059	Thyr	WL-677
WT-210-0062	Thyr	WL-5557
WT-210-0063	Thyr	WL-5685
WT-210-0066	Thyr	WL-5665
WT-210-0069	Thyr	WL-5557
WT-210-0070	Ig	WL-5550
WT-210-0071	Ig	WL-5551A
WT-210-0072	Ig	WL-5552A
WT-210-0073	Ig	WL-5553B
WT-210-0074	Thyr	WL-105
WT-210-0075	Ig	WL-5822A
WT-210-0077	Thyr	WL-5727
WT-210-0078	Thyr	WL-172
WT-210-0079	Thyr	WL-105
WT-210-0086	Trans	WL-833A
WT-210-0093	Trans	WL-5668
WT-210-0100	Thyr	WL-672A
WT-210-0106	Thyr	WL-7306A
WT-210-0116	Thyr	WL-632B
WT-210-0120	Thyr	KU-610
WT-210-0134	Thyr	WL-678
WT-210-0137	Thyr	WL-502A
WT-210-0141	Thyr	WL-5796
WT-210-0147	Ig	WL-5552A
WT-210-0149	Ig	WL-5551A
WT-210-0152	Ig	WL-5553B
WT-210-0156	Ig	WL-5551A
WT-210-0157	Ig	WL-5552A
WT-210-0158	Ig	WL-5551A
WT-210-0159	Ig	WL-5552A
WT-210-0162	Thyr	WL-7509A
WT-210-0165	Ig	WL-5553B
WT-210-0170	Ig	WL-5822A
WT-210-0179	Thyr	WL-C6H-1
WT-210-0181	Thyr	WL-C6H-3
WT-210-0183	Thyr	WL-7556A
WT-210-0188	Thyr	WL-6014
WT-210-0234	Thyr	WL-5665
WT-210-0245	Thyr	WL-C6H-2
WT-210-0246	Ig	WL-7681
WT-210-0249	Ig	WL-5551APC
WT-210-0252	Ig	WL-5552APC
WT-210-0274	Ig	WL-7669
WT-210-0275	Ig	WL-7671
WT-210-0283	Ig	WL-7670
WT-210-0285	Ig	WL-7671PC
WT-210-0290	Ig	WL-7669PC
WT-210-0306	Ig	WL-5553B
AH213	Rect	WL-869B
CE-213	Rect	WL-7018
CE-213A	Rect	WL-7018
VR216A	Rect	WL-866A
AH217	Rect	WL-872A
VA-218B	M D	WL-176
CE-220	M D	WL-481B
CE-221	Rect	WL-670
CE-222	Rect	WL-3B22
AX-224	Rect	WL-3B28
CE-224	Rect	WL-4B24
Z-225	Rect	WL-866A
ECC-230	I R	WL-6080
230N	I Rect	WL-5558
CE-232	I Rect	WL-5558
SRX-232	M D	WL-6781
FG-235A	Ig	WL-5552A
FG-238B	Ig	WL-5555
VA-242	M D	WL-177
CE-245	Rect	WL-7016
VA-246	M D	WL-119
WT-246	M D	WL-2050
VA249	M D	WL-186
G250/3000	Thyr	WL-866A
GRG250/3000	Thyr	WL-5557
RG250/3000	Rect	WL-866A
E-250A	Trans	WL-5D22
K251	Rect	WL-866A
HF-255	Rect	WL-869B
PL-255	Thyr	WL-414
255A	Rect	WL-869B

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
255B	Rect	WL-869B
FG-258A	Ig	WL-5553B
FG-258B	Ig	WL-5553B
FG-259B	Ig	WL-5554
V-260	M D	WL-6310
SRX-262	M D	WL-109
VA-262	M D	WL-187
WT-262	Rect	WL-866A
WT-269	V R	WL-0C3
V-270	M D	WL-6312
FG-271	Ig	WL-5551A
WE-272	Thyr	WL-5557
WT-272	Thyr	WL-5557
WT-272A	Thyr	WL-5557
WE-274B	Rect	WL-5R4-GYB
WT-274	V R	WL-0B3
WT-280	Thyr	WL-C6H-1
V-290	M D	WL-6314
WT-294	V R	WL-0D3
CE-303	Thyr	WL-5664
CE-306	Thyr	WL-C6H-1
F-307A	Trans	WL-207
CE-308	Thyr	WL-C6H-1
ML-308	Trans	WL-5668
ML-308R	Trans	WL-5669
B309	I R	WL-6679
CE-309	Thyr	WL-5557
CE-311	Thyr	WL-3C23
F-319A	Rect	WL-872A
WE-319A	Rect	WL-872A
CE-320	Thyr	WL-7307A
320A	Thyr	WL-7307A
WE-322A	Trans	WL-803
B329	I R	WL-6680
B339	I R	WL-6681
QK-349	M D	WL-6249B
F-353A	Rect	WL-872A
F-357A	Rect	WL-857B
F-357B	Rect	WL-857B
QK-363	M D	WL-6177
F-363A	Trans	WL-892
F-366A	Rect	WL-866A
WE-366A	Rect	WL-866A
F-369B	Rect	WL-869B
WT-373	Rect	WL-7018
F-375A	Rect	WL-575A
WT-382	Rect	WL-872A
Q400-1	Trans	WL-5D22
WE-403A	I R	WL-5654
WE-409A	I R	WL-6A56
GL-414	Thyr	WL-414
WL-414	Thyr	WL-414
GL-415	Ig	WL-5550
QK-417	M D	WL-6310
GL-426	Rect	WL-7018
QK-436	M D	WL-6316
WT-439	Thyr	WL-172
440	Rect	WL-7018
444	Rect	WL-3B22
GL-452	Trans	WL-892
WL-456	Rect	WL-456
ZP-468	C R	7BP7B
GL-473	Trans	WL-5736
ML-473	Trans	WL-5736
WL-473	Trans	WL-5736
X-474	Trans	WL-2C39A
GL-475	C R	5FP7B
ZP-475	C R	5FP7B
WL-481	Rect	WL-481B
WL-481A	Rect	WL-481B
WL-481B	Rect	WL-481B
GL-490	Rect	WL-7016
495	Rect	WL-7016
GL-502	Thyr	WL-502A
ZP-502	Thyr	WL-502A
502	Thyr	WL-502A
GL-502A	Thyr	WL-502A
WL-502A	Thyr	WL-502A
502A	Thyr	WL-502A
GL-506	Ig	WL-6228
GL-509	Trans	WL-889A
GL-509R	Trans	WL-5667
GL-510	Rect	WL-857B
GL-512	Rect	WL-575A
GL-512A	Rect	WL-575A
VH-550A	Rect	WL-866A
VX-550A	Rect	WL-3B28
P552/1E	Trans	WL-4D21
QM559	I R	WL-5726
WT-568	Rect	WL-7018
CK-569AX	I R	WL-5678
CK-571AX	I R	WL-5886
GL-572	Trans	WL-2C39A
ZP-572	Trans	WL-2C39A
DR-575A	Rect	WL-575A
EE-575A	Rect	WL-575A
F-575A	Rect	WL-575A
GL-575A	Rect	WL-575A
ML-575A	Rect	WL-575A
WL-575A	Rect	WL-575A
575A	Rect	WL-575A
WL-579	Rect	WL-579B
WL-579A	Rect	WL-579B





# Direct Interchangeability List

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TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE	TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE	TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
WL-579B	Rect	WL-579B	BL-803	M D	WL-6781	C866	Rect	WL-866A
579B	Rect	WL-579B	GL-803	Trans	WL-803	UX-866	Rect	WL-866A
NL-600	Rect	WL-3B22	HF-803	Trans	WL-803	866	Rect	WL-866A
NL-604	Rect	WL-7014	T-803	Trans	WL-803	C866A	Rect	WL-866A
NL-604L	Rect	WL-7015	WL-803	Trans	WL-803	CE-866A	Rect	WL-866A
NL-606	Rect	WL-7016	803	Trans	WL-803	EE-866A	Rect	WL-866A
WT-606	Thyr	WL-2D21	BL-806	M D	WL-189	GL-866A	Rect	WL-866A
NL-606L	Rect	WL-7017	BL-807	M D	WL-188	HF-866A	Rect	WL-866A
KU-610	Glow	KU-610	DR-807	Trans	WL-807	ML-866A	Rect	WL-866A
ACC612	Thyr	WL-C6H-1	GL-807	Trans	WL-807	NU-866A	Rect	WL-866A
R-612G	Rect	WL-2X2A	WL-807	Trans	WL-807	RCA-866A	Rect	WL-866A
WL-613	Rect	WL-613	807	Trans	WL-807	RK-866A	Rect	WL-866A
613	Rect	WL-613	DR-810	Trans	WL-810	T-866A	Rect	WL-866A
NL-615	Rect	WL-7018	GL-810	Trans	WL-810	UE-866A	Rect	WL-866A
WL-616	Rect	WL-5575	ML-810	Trans	WL-810	WL-866A	Rect	WL-866A
KU-618	Thyr	KU-618	T-810	Trans	WL-810	866A	Rect	WL-866A
ZP-620	Trans	WL-2C40	UE-810	Trans	WL-810	HY-866JR	Rect	WL-816
WL-624	Thyr	WL-624	WL-810	Trans	WL-810	NU-866JR	Rect	WL-816
GL-627	Thyr	WL-627	810	Trans	WL-810	866JR	Rect	WL-816
KU-627	Thyr	WL-627	DR-811	Trans	WL-811A	UV-869	Rect	WL-869B
WL-627	Thyr	WL-627	GL-811	Trans	WL-811A	869	Rect	WL-869B
627	Thyr	WL-627	NU-811	Trans	WL-811A	UV-869A	Rect	WL-869B
WL-629	Thyr	WL-629	WL-811	Trans	WL-811A	869A	Rect	WL-869B
629	Thyr	WL-629	811	Trans	WL-811A	CE-869B	Rect	WL-869B
WL-630	Thyr	WL-2050	GL-811A	Trans	WL-811A	DR-869B	Rect	WL-869B
WT-630	Thyr	WL-2050	WL-811A	Trans	WL-811A	EE-869B	Rect	WL-869B
WL-630A	Thyr	WL-2050	811A	Trans	WL-811A	F-869B	Rect	WL-869B
WL-631	Thyr	WL-5559	DR-812	Trans	WL-812A	GL-869B	Rect	WL-869B
WT-631	Thyr	WL-5559	GL-812	Trans	WL-812A	ML-869B	Rect	WL-869B
NL-632B	Thyr	WL-632B	NU-812	Trans	WL-812A	WL-869B	Rect	WL-869B
WL-632B	Thyr	WL-632B	WL-812	Trans	WL-812A	869B	Rect	WL-869B
KU-634	Thyr	WL-677	812	Trans	WL-812A	WL869BL	Rect	WL-869BL
NL-635	Rect	WL-7019	GL-812A	Trans	WL-812A	869BL	Rect	WL-869BL
WT-635	Thyr	WL-C6H-1	WL-812A	Trans	WL-812A	872	Rect	WL-872A
NL-635L	Rect	WL-7020	812A	Trans	WL-812A	DR-872A	Rect	WL-872A
NL-635P	Rect	WL-6930	DR-813	Trans	WL-813	EE-872A	Rect	WL-872A
KX-642	Glow	KX-642	GL-813	Trans	WL-813	F-872A	Rect	WL-872A
WL-651	Ig	WL-5552A	ML-813	Trans	WL-813	GL-872A	Rect	WL-872A
WL-652	Ig	WL-5551A	RK-813	Trans	WL-813	ML-872A	Rect	WL-872A
WL-653	Ig	WL-5555	T-813	Trans	WL-813	RK-872A	Rect	WL-872A
WL-653A	Ig	WL-5555	UE-813	Trans	WL-813	UE-872A	Rect	WL-872A
WL-653B	Ig	WL-5555	WL-813	Trans	WL-813	WL-872A	Rect	WL-872A
DF654	I R	WL-5678	813	Trans	WL-813	872A	Rect	WL-872A
WL-655	Ig	WL-5553B	GL-815	Trans	WL-815	T-875A	Rect	WL-575A
WL-656	Ig	WL-5552A	WL-815	Trans	WL-815	879	Rect	WL-2X2A
WL-657	Ig	WL-5551A	815	Trans	WL-815	GL-880	Trans	WL-5658
WL-658	Ig	WL-5553B	DR-816	Rect	WL-816	ML-880	Trans	WL-5658
KI-664	Rect	WL-4B24	GL-816	Rect	WL-816	UE-880	Trans	WL-5658
WL-670	Rect	WL-670	WL-816	Rect	WL-816	WL-880	Trans	WL-5658
WL-672	Thyr	WL-672A	816	Rect	WL-816	880	Trans	WL-5658
GL-672	Thyr	WL-672A	BL-829	M D	WL-177	GL-885	Thyr	WL-885
672	Thyr	WL-672A	GL-829	Trans	WL-829B	RCA-885	Thyr	WL-885
GL-672A	Thyr	WL-672A	NU-829	Trans	WL-829B	RX-885	Thyr	WL-885
WL-672A	Thyr	WL-672A	RK-829	Trans	WL-829B	WL-885	Thyr	WL-885
672A	Thyr	WL-672A	829	Trans	WL-829B	885	Thyr	WL-885
GL-673	Rect	WL-673	829A	Trans	WL-829B	889	Trans	WL-889A
ML-673	Rect	WL-673	GL-829B	Trans	WL-829B	F-889A	Trans	WL-889A
WL-673	Rect	WL-673	ML-829B	Trans	WL-829B	GL-889A	Trans	WL-889A
673	Rect	WL-673	RK-829B	Trans	WL-829B	ML-889A	Trans	WL-889A
KU-676	Thyr	KU-676	WL-829B	Trans	WL-829B	UE-889A	Trans	WL-889A
676	Thyr	KU-676	829B	Trans	WL-829B	WL-889A	Trans	WL-889A
WL-677	Thyr	WL-677	T830B	Photo	WL-930	889A	Trans	WL-889A
677	Thyr	WL-677	GL-832	Trans	WL-832A	889R	Trans	WL-5667
GL-678	Thyr	WL-678	NU-832	Trans	WL-832A	F-889RA	Trans	WL-5667
WL-678	Thyr	WL-678	832	Trans	WL-832A	GL-889RA	Trans	WL-5667
678	Thyr	WL-678	DR-832A	Trans	WL-832A	ML-889RA	Trans	WL-5667
WL-679	Ig	WL-5554	GL832A	Trans	WL-832A	UE-889RA	Trans	WL-5667
WL-681	Ig	WL-5550	ML-832A	Trans	WL-832A	WL-889RA	Trans	WL-5667
WL-682	Ig	WL-5550	RK-832A	Trans	WL-832A	889RA	Trans	WL-5667
WL-686	Ig	WL-5550	WL-832A	Trans	WL-832A	F-891	Trans	WL-891
WL-689	Ig	WL-6228	832A	Trans	WL-832A	GL-891	Trans	WL-891
WT-699	Ig	WL-5550	WL-833	Trans	WL-833A	ML-891	Trans	WL-891
NL-710	Thyr	WL-7307A	833	Trans	WL-833A	UE-891	Trans	WL-891
NL-710L	Thyr	WL-7509A	DR-833A	Trans	WL-833A	WL-891	Trans	WL-891
NL-715	Thyr	WL-5557	GL-833A	Trans	WL-833A	891	Trans	WL-891
D717	I R	WL-6663	ML-833A	Trans	WL-833A	F-891R	Trans	WL-891R
T717	Thyr	WL-5557	WL-833A	Trans	WL-833A	GL-891R	Trans	WL-891R
N727	I R	WL-6669	UE-833A	Trans	WL-833A	ML-891R	Trans	WL-891R
W727	I R	WL-6660	WL-833A	Trans	WL-833A	UE-891R	Trans	WL-891R
ML-728	Thyr	WL-5557	833A	Trans	WL-836	WL-891R	Trans	WL-891R
DC728A	Thyr	WL-627	EE-836	Rect	WL-836	891R	Trans	WL-891R
XC728A	Thyr	WL-627	GL-836	Rect	WL-836	F-892	Trans	WL-892
EF730	I R	WL-5636	RK-836	Rect	WL-836	GL-892	Trans	WL-892
NL-730	Thyr	WL-22994	WL-836	Rect	WL-836	ML-892	Trans	WL-892
731A	I R	WL-5654	836	Rect	WL-836	UE-892	Trans	WL-892
EF734	I R	WL-6205	BL-841	M D	WL-177	WL-892	Trans	WL-892
NL-734	Thyr	WL-22994	BL-843	M D	WL-109	892	Trans	WL-892
NL-740	Thyr	WL-6856	S-856	V R	WL-0A2	DR-892R	Trans	WL-892R
NL-740L	Thyr	WL-7022	857	Rect	WL-857B	F-892R	Trans	WL-892R
NL-740P	Thyr	WL-6857	F-857A	Rect	WL-857B	GL-892R	Trans	WL-892R
WL-741	Photo	WL-923	GL-857A	Rect	WL-857B	ML-892R	Trans	WL-892R
WL-759	Glow	WL-759	857A	Rect	WL-857B	UE-892R	Trans	WL-892R
NL-760	Thyr	WL-C6H-1	DR-857B	Rect	WL-857B	WL-892R	Trans	WL-892R
NL-760L	Thyr	WL-7023	F-857B	Rect	WL-857B	892R	Trans	WL-892R
NL-760P	Thyr	WL-6859	GL-857B	Rect	WL-857B	GL-895	Trans	WL-895
NL-761	Thyr	WL-C6H-1	ML-857B	Rect	WL-857B	ML-895	Trans	WL-895
NL-762	G A	WL-762	WL-857B	Rect	WL-857B	WL-895	Trans	WL-895
WL-765	G A	WL-765	857B	Rect	WL-857B	895	Trans	WL-895
WL-765A	G A	WL-765A	S-859	V R	WL-0C2	GL-895R	Trans	WL-895R
XB767A	Thyr	WL-2050	S-860	V R	WL-0B2	ML-895R	Trans	WL-895R
BL-800	M D	WL-6780	F-863	Trans	WL-892	WL-895R	Trans	WL-895R
BL-800A	M D	WL-6316	RCA863	Trans	WL-892	895R	Trans	WL-895R
ECC801S	S P	WL-6201	F-863A	Trans	WL-892	Z900T	Glow	WL-5823

# Direct Interchangeability List

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TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE	TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE	TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
EAA901	I R	WL-6663	ZV-1798	Rect	WL-5973	WX-5056	M D	WL-119
S901C	V R	WL-5651	1812P7	C R	5FP7B	WX-5059	N	WL-22791
EAA901S	I R	WL-6663	1812P11	C R	5FP11A	WX-5073	HCDD	WL-22819
EF905	I R	WL-5654	1813P7	C R	7BP7B	ASG5121	Thyr	WL-2D21
UL-905	Thyr	WL-5559	A-1834	I R	WL-6	WX-5382	HCDD	WL-22820
TX-920	Thyr	WL-5559	E-1870	Trans	WL-4D21	WX-5399	HCDD	WL-22821
UL-905	Thyr	WL-5559	1971	Trans	WL-207	WX-5434	HCDD	WL-22838
GL-922	Photo	WL-922	2014	I R	WL-6197	WX-5463	HCDD	WL-22823
WL-922	Photo	WL-922	GL-2050	Thyr	WL-2050A	WX-5464	HCDD	WL-22824
922	Photo	WL-922	RK-2050	Thyr	WL-2050A	WX-5471	HCDD	WL-22825
GL-923	Photo	WL-923	WL-2050	Thyr	WL-2050A	WX-5472	HCDD	WL-22826
WL-923	Photo	WL-923	2050	Thyr	WL-2050A	WX-5485	HCDD	WL-22827
923	Photo	WL-923	GL-2050A	Thyr	WL-2050A	WX-5486	HCDD	WL-22828
GL-927	Photo	WL-927	WL-2050A	Thyr	WL-2050A	WX-5487	HCDD	WL-22829
WL-927	Photo	WL-927	2050A	Thyr	WL-2050A	WX-5488	HCDD	WL-22830
927	Photo	WL-927	RK-2051	Thyr	WL-2050	WX-5489	HCDD	WL-22831
GL-930	Photo	WL-930	2051	Thyr	WL-2050	WX-5490	HCDD	WL-22832
WL-930	Photo	WL-930	2179A	Trans	WL-2C40	WL-5513	Trans	WL-5513
930	Photo	WL-930	A2209	I R	WL-6J4	5513	Trans	WL-5513
931	Photo	WL-931A	A2209A	I R	WL-6J4	ASG-5544	Thyr	WL-22994
GL-931A	Photo	WL-931A	CV2210	Thyr	WL-22994	GL-5544	Thyr	WL-22994
WL-931A	Photo	WL-931A	CV2215	Thyr	WL-C6H-1	5544	Thyr	WL-22994
931A	Photo	WL-931A	A-2229A	Trans	WL-2C40	ASG-5545	Thyr	WL-C6H-1
UE-966	Rect	WL-866A	A-2251A	Trans	WL-5667	GL-5545	Thyr	WL-C6H-1
UE-966A	Rect	WL-866A	A-2251B	Trans	WL-5667	5545	Thyr	WL-C6H-1
BM-966B	Rect	WL-866A	QA2404	I R	WL-6663	AX-5550	Ig	WL-5550
HV-966B	Rect	WL-866A	QA2408	I R	WL-5692	GL-5550/415	Ig	WL-5550
NU-967	Thyr	WL-5557	Stel-2500-6-40	Thyr	WL-105	NL-5550	Ig	WL-5550
UE-967	Thyr	WL-5557	CV2723	Rect	WL-869B	WL-5550	Ig	WL-5550
UE-972	Rect	WL-872A	CV2957	Thyr	WL-5557	WT-5550	Ig	WL-5550
UE-972A	Rect	WL-872A	3069	Rect	WL-866A	5550	Ig	WL-5550
UE-975A	Rect	WL-575A	3070	Rect	WL-872A	AJ-5551	Ig	WL-5551A
SN976	I R	WL-5902	3071	Rect	WL-869B	AX-5551	Ig	WL-5551A
SN976D	I R	WL-5902	WX-3072	Rect	WL-670	GL-5551	Ig	WL-5551A
SN979	I R	WL-5718	3072	Rect	WL-857B	NL-5551	Ig	WL-5551A
SN979D	I R	WL-5718	WX-3141	Thyr	WL-676	PL-5551	Ig	WL-5551A
RG1000/3000	Rect	WL-872A	WX-3172	Thyr	WL-672A	VJ-5551	Ig	WL-5551A
Stel-1000-2.5-15	Thyr	WL-5559	WX-3187	Thyr	WL-414	WL-5551	Ig	WL-5551A
RS-1007	Trans	WL-4D21	WX-3194	Ig	WL-5550	WT-5551	Ig	WL-5551A
SN1007	I R	WL-5636	XRI-3200	Thyr	WL-22994	5551	Ig	WL-5551A
SN1007A	I R	WL-5636	WX-3230	Thyr	WL-678	AJ-5551A	Ig	WL-5551A
WT-1009	Ig	WL-7681	3546PW	Photo	WL-927	AX-5551A	Ig	WL-5551A
NL-1009A	Ig	WL-7681	WX-3751	C R	5CEP11	GL-5551A	Ig	WL-5551A
NL-1009AP	Ig	WL-7681PC	3572	Rect	WL-866A	PL-5551A	Ig	WL-5551A
NL-1011A	Ig	WL-23011	3874A	Trans	WL-813	WL-5551A	Ig	WL-5551A
NL-1011AP	Ig	WL-23011PC	3885A	Rect	WL-3u28	5551A	Ig	WL-5551A
NL-1012A	Ig	WL-23012	WX-3989	C S	WL-7383	WL-5551APC	Ig	WL-5551APC
NL-1012AP	Ig	WL-23012PC	4017	Rect	WL-866A	AX-5552	Ig	WL-5552A
NL-1013A	Ig	WL-23013	A-4051	Trans	WL-807	GL-5552	Ig	WL-5552A
NL-1016	Ig	WL-23016	A-4051G	Trans	WL-807	NL-5552	Ig	WL-5552A
NL-1022	Ig	WL-5822A	A-4051J	Trans	WL-807	PL-5552	Ig	WL-5552A
QK-1022	M D	WL-137	4078F	Rect	WL-869B	WL-5552	Ig	WL-5552A
WT-1022	Ig	WL-5822A	4078Z	Rect	WL-869B	WT-5552	Ig	WL-5552A
NL-1022A	Ig	WL-5822A	WX-4113	G A	WL-22618	5552	Ig	WL-5552A
D1031A	Trans	WL-8045	A-4229	Trans	WL-4E27A	AJ5552A	Ig	WL-5552A
NL-1036	Ig	WL-7171	4260	Thyr	WL-5557	GL-5552A	Ig	WL-5552A
B-1038	C R	10WP7	4261	Thyr	WL-5557	NL-5552A	Ig	WL-5552A
NL-1051	Ig	WL-5551A	A4273B	I R	WL-5692	PL-5552A	Ig	WL-5552A
NL-1051A	Ig	WL-5551A	SYK-4333A	M D	WL-147	VJ-5552A	Ig	WL-5552A
WT-1051A	Ig	WL-5551A	WX-4424	G A	WL-22614	WL-5552A	Ig	WL-5552A
NL-1051P	Ig	WL-5551APC	WX-4433	Rect	WL-22800	5552A	Ig	WL-5552A
WT-1051P	Ig	WL-5551APC	WX-4433A	Rect	WL-22800	WL-5552APC	Ig	WL-5552APC
NL-1052	Ig	WL-5552A	WX-4436	HCDD	WL-22602	AX-5553	Ig	WL-5553B
NL-1052A	Ig	WL-5552A	WX-4451	G A	WL-22620	GL-5553	Ig	WL-5553B
WT-1052A	Ig	WL-5552A	A4461	I R	WL-6660	WL-5553	Ig	WL-5553B
NL-1052P	Ig	WL-5552APC	A4475	I R	WL-6A57GA	5553	Ig	WL-5553B
WT-1052P	Ig	WL-5552APC	WX-4484	HCDD	WL-22603	GL-5553A	Ig	WL-5553B
NL-1053	Ig	WL-5553B	WX-4492	Rect	WL-22801	5553A	Ig	WL-5553B
WT-1053A	Ig	WL-5553B	A-4522A	I R	WL-6681	AJ-5553B	Ig	WL-5553B
WT-1053P	Ig	WL-5553BPC	A-4524A	I R	WL-6681	AX-5553B	Ig	WL-5553B
NL-1061	Ig	WL-7669	A-4535	I R	WL-6080	GL-5553B	Ig	WL-5553B
NL-1061P	Ig	WL-7669PC	A-4535A	I R	WL-6080	VJ-5553B	Ig	WL-5553B
NL-1062	Ig	WL-7671	A-4541H	Trans	WL-5763	WL-5553B	Ig	WL-5553B
NL-1066	Ig	WL-7670	WX-4580	HCDD	WL-22604	5553B	Ig	WL-5553B
NL-1071	Ig	WL-23014	WX-4586	Rect	WL-22802	WL-5553BPC	Ig	WL-5553BPC
NL-1071P	Ig	WL-23014PC	WX-4620	HCDD	WL-22605	AX-5554	Ig	WL-5554
NL-1072	Ig	WL-23015	WX-4650	HCDD	WL-22606	GL-5554	Ig	WL-5554
NL-1072P	Ig	WL-23015PC	WX-4651	HCDD	WL-22607	WL-5554	Ig	WL-5554
NL-1073	Ig	WL-23017	WX-4659	HCDD	WL-22608	5554	Ig	WL-5554
NL-1079	Ig	WL-23018	WX-4663	HCDD	WL-22609	AX-5555	Ig	WL-5555
CK-1090	Glow	WL-5823	WX-4664	HCDD	WL-22610	GL-5555	Ig	WL-5555
C-1108	Trans	WL-4D21	WX-4680	HCDD	WL-22804	WL-5555	Ig	WL-5555
SC1156A	I R	WL-5636	WX-4688	HCDD	WL-22809	5555	Ig	WL-5555
K-1195P7	C R	7ABP7A	WX-4689	HCDD	WL-22611	5555	Ig	WL-5555
QS-1206	V R	WL-OC3	WX-4715A	Trans	WL-22803	WL-5555A	Ig	WL-5555A
QS-1207	V R	WL-OB2	WX-4743	HCDD	WL-22563	5555A	Ig	WL-5555A
QS-1208	V R	WL-OB2	WX-4748	HCDD	WL-22811	AX-5557	Thyr	WL-5557
1220	I R	WL-5654	WX-4836	N	WL-22792	GL-5557	Thyr	WL-5557
1266	V R	WL-OB3	WX-484Z	M D	WL-177	WL-5557	Thyr	WL-5557
1295	V R	WL-632B	WX-4930	HCDD	WL-22812	5557	Thyr	WL-5557
Stel-1300-01-05	Thyr	WL-2D21	WX-4931A	HCDD	WL-22822	GL-5558	Rect	WL-5558
K-1304P7	C R	7ABP7A	WX-4932	HCDD	WL-22813	NL-5558	Rect	WL-5558
1381HQ	I R	WL-5654	WX-4933	HCDD	WL-22815	WL-5558	Rect	WL-5558
Z1494	I R	WL-5654	WX-4934	HCDD	WL-22805	5558	Rect	WL-5558
Z1498	I R	WL-6189	WX-4936	HCDD	WL-22816	AX-5559	Thyr	WL-5559
ME-1504	Thyr	WL-5559	WX-4937	HCDD	WL-22817	GL-5559	Thyr	WL-5559
GL-1614	I R	WL-5881	WX-4972	HCDD	WL-22818	NL-5559	Thyr	WL-5559
RK-1614	I R	WL-5881	ASG 5017	Thyr	WL-5557	WL-5559	Thyr	WL-5559
1614	I R	WL-5881	PA-5021	Rect	WL-866A	5559	Thyr	WL-5559
1657	Thyr	WL-2050	TH 5021B	Rect	WL-866A	5560	Thyr	WL-632B
1665	Thyr	WL-2050	ASG 5023	Thyr	WL-3C23	GL-5561	Rect	WL-5561
1672	Thyr	WL-172	CV5027	Thyr	WL-5559	WL-5561	Rect	WL-5561
HF-1701	Thyr	WL-5557	TH5031B	Rect	WL-872A	5561	Rect	WL-5561



# Direct Interchangeability List

*continued*

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
ML-5575	Rect	WL-5575
WL-5575	Rect	WL-5575
ML-5576	Rect	WL-5576
WL-5576	Rect	WL-5576
5591	I R	WL-5654
AX-5604	Trans	WL-5604
ML-5604	Trans	WL-5604
WL-5604	Trans	WL-5604
5604	Trans	WL-5604
ML-5606	Trans	WL-5606
WL-5606	Trans	WL-5606
5606	Trans	WL-5606
ML-5619	Trans	WL-5619
WL-5619	Trans	WL-5619
5619	Trans	WL-5619
GL-5625	Rect	WL-5575
5625	Rect	WL-5575
GL-5632	Thyr	WL-7307A
5632	Thyr	WL-7307A
5640	I R	WL-5902
5648	Trans	WL-2C39B
GL-5651	V R	WL-5651
WL-5651	V R	WL-5651
5651	V R	WL-5651
CK-5654	V R	WL-5654
GL-5654	I R	WL-5654
WL-5654	I R	WL-5654
5654	S P	WL-5654
ML-5658	Trans	WL-5658
WL-5658	Trans	WL-5658
5658	Trans	WL-5658
WL-5664	Thyr	WL-5664
5664	Thyr	WL-5664
GL-5665	Thyr	WL-5665
WL-5665	Thyr	WL-5665
5665	Thyr	WL-5665
F-5667	Trans	WL-5667
ML-5667	Trans	WL-5667
WL-5667	Trans	WL-5667
5667	Trans	WL-5667
F-5668	Trans	WL-5668
ML-5668	Trans	WL-5668
WL-5668	Trans	WL-5668
5668	Trans	WL-5668
F-5669	Trans	WL-5669
ML-5669	Trans	WL-5669
WL-5669	Trans	WL-5669
5669	Trans	WL-5669
CK-5678	I R	WL-5678
WL-5678	I R	WL-5678
5678	I R	WL-5678
WL-5682	Trans	WL-5682
5682	Trans	WL-5682
5683	Thyr	WL-6014
WL-5684	Thyr	WL-7306A
AX-5685	Thyr	WL-5685
WL-5685	Thyr	WL-5685
5685	Thyr	WL-5685
GL-5687	I R	WL-5687
WL-5687	I R	WL-5687
5687	I R	WL-5687
GL-5691	I R	WL-5691
WL-5691	I R	WL-5691
5691	I R	WL-5691
GL-5692	I R	WL-5692
WL-5692	I R	WL-5692
5692	I R	WL-5692
GL-5693	I R	WL-5693
WL-5693	I R	WL-5693
5693	I R	WL-5693
GL-5696	Thyr	WL-5696
WL-5696	Thyr	WL-5696
5696	Thyr	WL-5696
GL-5718	I R	WL-5718
WL-5718	I R	WL-5718
5718	I R	WL-5718
GL-5718A	I R	WL-5718
5718A	I R	WL-5718
GL-5720	Thyr	WL-5720
NL-5720	Thyr	WL-5720
WL-5720	Thyr	WL-5720
5720	Thyr	WL-5720
5725	I R	WL-6AS6
5726	I R	WL-6663
GL-5727	Thyr	WL-5727
WL-5727	Thyr	WL-5727
5727	Thyr	WL-5727
GL-5736	Trans	WL-5736
ML-5736	Trans	WL-5736
WL-5736	Trans	WL-5736
5736	Trans	WL-5736
GL-5749	I R	WL-6660
5749	I R	WL-6660
GL-5751	I R	WL-5751
WL-5751	I R	WL-5751
5751	I R	WL-5751
WL-5762	Trans	WL-5762
5762	Trans	WL-5762
GL-5763	Trans	WL-5763
WL-5763	Trans	WL-5763
5763	Trans	WL-5763
GL-5771	Trans	WL-5771

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
ML-5771	Trans	WL-5771
WL-5771	Trans	WL-5771
5771	Trans	WL-5771
WL-5796	Thyr	WL-5796
CK-5814	I R	WL-5814A
5814	I R	WL-5814A
GL-5814A	I R	WL-5814A
WL-5814A	I R	WL-5814A
5814A	I R	WL-5814A
GL-5820	C S	WL-5820A
ML-5820	C S	WL-5820A
WL-5820	C S	WL-5820A
5820	C S	WL-5820A
WL-5820A	C S	WL-5820A
5820A	C S	WL-5820A
GL-5822	Ig	WL-5822A
NL-5822	Ig	WL-5822A
WL-5822	Ig	WL-5822A
5822	Ig	WL-5822A
GL-5822A	Ig	WL-5822A
NL-5822A	Ig	WL-5822A
WL-5822A	Ig	WL-5822A
5822A	Ig	WL-5822A
WL-5823	Glow	WL-5823
5823	Glow	WL-5823
GL-5824	I R	WL-5824
WL-5824	I R	WL-5824
5824	I R	WL-5824
GL-5830	Thyr	WL-5830
WL-5830	Thyr	WL-5830
5830	Thyr	WL-5830
WL-5846	M D	WL-5846
WL-5859	Rect	WL-5859
WL-5860	Rect	WL-5859
WL-5877	Thyr	WL-2299A
WL-5878	Thyr	WL-C6H-1
GL-5879	I R	WL-5879
WL-5879	I R	WL-5879
5879	I R	WL-5879
GL-5881	I R	WL-5881
WL-5881	I R	WL-5881
5881	I R	WL-5881
CK-5886	I R	WL-5886
WL-5886	I R	WL-5886
5886	I R	WL-5886
WL-5891	Trans	WL-5891
ML-5894	Trans	WL-5894
WL-5894	Trans	WL-5894
5894	Trans	WL-5894
GL-5902	I R	WL-5902
WL-5902	I R	WL-5902
5902	I R	WL-5902
5902A	I R	WL-5902
F-5918A	Trans	WL-5918A
WL-5918A	Trans	WL-5918A
5918A	Trans	WL-5918A
5932	I R	WL-5881
5933	Rect	WL-807
WL-5934	Trans	WL-5934
WL-5936	Trans	WL-6310
GL-5963	I R	WL-5963
WL-5963	I R	WL-5963
5963	I R	WL-5963
GL-5964	I R	WL-5964
5964	I R	WL-5964
GL-5965	I R	WL-5965
WL-5965	I R	WL-5965
5965	I R	WL-5965
WL-5966	G A	WL-5966
GL-5973	Rect	WL-5973
WL-5973	Rect	WL-5973
5973	Rect	WL-5973
WL-5986	Trans	WL-5986A
WL-5986A	Trans	WL-5986A
6005	I R	WL-6669
GL-6011	Thyr	WL-7307A
PL-6011	Thyr	WL-7307A
TH-6011	Thyr	WL-7307A
WL-6011	Thyr	WL-7307A
6011	Thyr	WL-7307A
WL-6012	Thyr	WL-6012
6012	Thyr	WL-6012
GL-6014	Thyr	WL-6014
WL-6014	Thyr	WL-6014
6014	Thyr	WL-6014
GL-6021	I R	WL-6021
WL-6021	I R	WL-6021
6021	I R	WL-6021
R6025	C R	10FPA4
TH-6031	Thyr	WL-5559
WL-6040	M D	WL-6040
WL-6041	M D	WL-6041
6057	I R	WL-5751
6058	I R	WL-6663
6060	I R	WL-6679
6062	Trans	WL-5763
6067	I R	WL-5814A
GL-6072	I R	WL-6072
WL-6072	I R	WL-6072
6072	I R	WL-6072
6073	V R	WL-0A2WA

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
6074	V R	WL-0B2WA
WL-6080	I R	WL-6080
6080	I R	WL-6080
6096	I R	WL-5654
6097	I R	WL-6663
6113	I R	WL-5691
TH-6120	Thyr	WL-105
GL-6136	I R	WL-6136
WL-6136	I R	WL-6136
6136	I R	WL-6136
GL-6146	Trans	WL-6146
R6146	Rect	WL-8008
WL-6146	Trans	WL-6146
6146	Trans	WL-6146
WL-6146A	Trans	WL-6146A
6146A	Trans	WL-6146A
6155	Trans	WL-4D21
6156	Trans	WL-5D22
GL-6159	Trans	WL-6159
WL-6159	Trans	WL-6159
6159	Trans	WL-6159
WL-6166A	Trans	WL-6166A
6166A	Trans	WL-6166A
R6175B	Rect	WL-5R4-GYB
RK-6177	M D	WL-6177
WL-6177	M D	WL-6177
6180	S P	WL-5692
6187	S P	WL-6AS6
GL-6189	S P	WL-6189
WL-6189	S P	WL-6189
6189	S P	WL-6189
WL-6197	S P	WL-6197
6197	S P	WL-6197
GL-6198	C S	See 6198A
WL-6198	C S	See 6198A
6198	C S	See 6198A
GL-6198A	C S	See 6198A
ML-6198A	C S	See 6198A
WL-6198A	C S	See 6198A
6198A	C S	See 6198A
R6200	Thyr	WL-7038
GL-6201	I R	WL-2D21
6201	I R	WL-6201
TH-6220	Thyr	WL-C6H-1
GL-6228	Ig	WL-6228
WL-6228	Ig	WL-6228
6228	Ig	WL-6228
TH-6230	Thyr	WL-3C23
RK-6249	M D	WL-6249B
WL-6249	M D	WL-6249B
RK-6249A	M D	WL-6249B
WL-6249A	M D	WL-6249B
WL-6249B	M D	WL-6249B
6265	I R	WL-6661
WL-6293	Trans	WL-6293
6293	Trans	WL-6293
WL-6307	N	WL-6307
WL-6307A	N	WL-6307A
6310	M D	WL-6310
6310	M D	WL-6310
WL-6312	M D	WL-6312
6312	M D	WL-6312
WL-6314	M D	WL-6314
6314	M D	WL-6314
WL-6315	M D	WL-6315
6315	M D	WL-6315
WL-6316	M D	WL-6316
6316	M D	WL-6316
TS-6336	I R	WL-6336A
6336	I R	WL-6336A
TS-6336A	I R	WL-6336A
WL-6336A	I R	WL-6336A
6336A	I R	WL-6336A
AJ-6346	Ig	WL-5551A
6346	Ig	WL-5551A
AJ-6347	Ig	WL-5552A
6347	Ig	WL-5552A
6348	Ig	WL-5553A
WL-6376	N	WL-6376A
WL-6376A	N	WL-6376A
6376	N	WL-6377
WL-6379	Trans	WL-6379
6379	Trans	WL-6379
F-6399	Trans	WL-6399
WL-6399	Trans	WL-6399
6399	Trans	WL-6399
XRI-6400	Thyr	WL-C6H-1
XRI-6400A	Thyr	WL-C6H-1
ML-6420	Trans	WL-6420
WL-6420	Trans	WL-6420
6420	Trans	WL-6420
ML-6421	Trans	WL-6421
WL-6421	Trans	WL-6421
6421	Trans	WL-6421
ML-6421F	Trans	WL-6421F
WL-6421F	Trans	WL-6421F
6421F	Trans	WL-6421F
ML-6422	Trans	WL-6422
WL-6422	Trans	WL-6422
6422	Trans	WL-6422
ML-6423	Trans	WL-6423
WL-6423	Trans	WL-6423



# Direct Interchangeability List

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TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
6423	Trans	WL-6423
ML-6423F	Trans	WL-6423F
WL-6423F	Trans	WL-6423F
6423F	Trans	WL-6423F
WL-6424	Trans	WL-6424
WL-6424	Trans	WL-6424
6424	Trans	WL-6424
ML-6425	Trans	WL-6425
WL-6425	Trans	WL-6425
6425	Trans	WL-6425
ML-6425F	Trans	WL-6425F
WL-6425F	Trans	WL-6425F
6425F	Trans	WL-6425F
ML-6426	Trans	WL-6426
WL-6426	Trans	WL-6426
6426	Trans	WL-6426
ML-6427	Trans	WL-6427
WL-6427	Trans	WL-6427
6427	Trans	WL-6427
GL-6511	Rect	WL-575A
6511	Rect	WL-575A
6520	I R	WL-6080
WL-6550	I R	WL-6550
6550	I R	WL-6550
WL-6567	Trans	WL-6567
6567	Trans	WL-6567
6582	I R	WL-5654
WL-6623	Trans	WL-6623
6623	Trans	WL-6623
6626	V R	WL-0A2WA
6627	V R	WL-0B2WA
GL-6660	I R	WL-6660
WL-6660	I R	WL-6660
6660	I R	WL-6660
GL-6661	I R	WL-6661
WL-6661	I R	WL-6661
6661	I R	WL-6661
GL-6662	I R	WL-6662
WL-6662	I R	WL-6662
6662	I R	WL-6662
GL-6663	I R	WL-6663
WL-6663	I R	WL-6663
6663	I R	WL-6663
GL-6664	I R	WL-6664
WL-6664	I R	WL-6664
6664	I R	WL-6664
GL-6669	I R	WL-6669
WL-6669	I R	WL-6669
6669	I R	WL-6669
GL-6676	I R	WL-6676
WL-6676	I R	WL-6676
6676	I R	WL-6676
GL-6677	I R	WL-6677
WL-6677	I R	WL-6677
6677	I R	WL-6677
GL-6678	I R	WL-6678
WL-6678	I R	WL-6678
6678	I R	WL-6678
GL-6679	I R	WL-6679
WL-6679	I R	WL-6679
6679	I R	WL-6679
GL-6680	I R	WL-6680
WL-6680	I R	WL-6680
6680	I R	WL-6680
GL-6681	I R	WL-6681
WL-6681	I R	WL-6681
6681	I R	WL-6681
AX-6693	Rect	WL-673
6693	Rect	WL-673
WL-6696	Trans	WL-6696
6696	Trans	WL-6696
WL-6697	Trans	WL-6697
6697	Trans	WL-6697
6778	I R	WL-5718
WL-6780	M D	WL-6780
6780	M D	WL-6780
WL-6781	M D	WL-6781
6781	M D	WL-6781
GL-6807	Thyr	WL-6807
WL-6807	Thyr	WL-6807
6807	Thyr	WL-6807
GL-6808	Thyr	WL-6808
WL-6808	Thyr	WL-6808
6808	Thyr	WL-6808
GL-6809	Thyr	WL-C6H-3
6809	Thyr	WL-C6H-3
GL-6829	I R	WL-5955
6829	I R	WL-5955
GL-6849	C S	WL-6849
WL-6849	C S	WL-6849
6849	C S	WL-6849
GL-6856	Thyr	WL-6856
WL-6856	Thyr	WL-6856
6856	Thyr	WL-6856
GL-6857	Thyr	WL-6857
WL-6857	Thyr	WL-6857
6857	Thyr	WL-6857
GL-6858	Thyr	WL-6858
WL-6858	Thyr	WL-6858
6858	Thyr	WL-6858
GL-6859	Thyr	WL-6859
WL-6859	Thyr	WL-6859
6859	Thyr	WL-6859

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
GL-6860	Thyr	WL-6860
WL-6860	Thyr	WL-6860
6860	Thyr	WL-6860
6864	Thyr	WL-C6H-1
6871	Thyr	WL-C6H-2
GL-6883	Trans	WL-8032
WL-6883	Trans	WL-8032
6883	Trans	WL-8032
WL-6893	Trans	WL-6893
6893	Trans	WL-6893
6900	I R	WL-5687
WL-6922	I R	WL-6922
6922	I R	WL-6922
6928	I R	WL-6669
WL-6937	N	WL-6937A
WL-6937A	N	WL-6937A
6938	N	WL-6938
WL-6941	N	WL-6941A
WL-6941A	N	WL-6941A
6954	I R	WL-6954
6958	I R	WL-5654
WL-6971	N	WL-6971A
WL-6971A	N	WL-6971A
6982	Rect	WL-7015
6984	Thyr	WL-6856
6985	Thyr	WL-6857
6988	Thyr	WL-7321
6989	Thyr	WL-C6H-3
WL-6998	N	WL-6998
6999	Thyr	WL-C6H-3
ML-7007	Trans	WL-7007
WL-7007	Trans	WL-7007
WL-7008	M D	WL-7008
7008	M D	WL-7008
NL-7014	Rect	WL-7014
WL-7014	Rect	WL-7014
7014	Rect	WL-7014
NL-7015	Rect	WL-7015
WL-7015	Rect	WL-7015
7015	Rect	WL-7015
NL-7016	Rect	WL-7016
WL-7016	Rect	WL-7016
7016	Rect	WL-7016
NL-7017	Rect	WL-7017
WL-7017	Rect	WL-7017
7017	Rect	WL-7017
NL-7018	Rect	WL-7018
WL-7018	Rect	WL-7018
7018	Rect	WL-7018
NL-7019	Rect	WL-7019
WL-7019	Rect	WL-7019
7019	Rect	WL-7019
NL-7020	Rect	WL-7020
TH-7020	Ig	WL-5551A
WL-7020	Rect	WL-7020
7020	Rect	WL-7020
TH7021	Ig	WL-5551A
NL-7023	Thyr	WL-7023
WL-7023	Thyr	WL-7023
7023	Thyr	WL-7023
7025	I R	WL-7729
TH7030	Ig	WL-5552A
TH7031	Ig	WL-5552A
WL-7038	C S	WL-7038
7038	C S	WL-7038
TH7040	Ig	WL-5553B
TH7041	Ig	WL-5553B
WL-7087	N	WL-7087
WL-7087A	N	WL-7087A
WL-7111	M D	WL-7111
7111	M D	WL-7111
7136	Rect	WL-575A
GL-7171	Ig	WL-7171
WL-7171	Ig	WL-7171
7171	Ig	WL-7171
WL-7186	N	WL-7186
WL-7187	N	WL-7187
WL-7188	N	WL-7188
WL-7203	Trans	WL-4CX250B
7203	Trans	WL-4CX250B
WL-7215	Trans	WL-7215
7216	Thyr	WL-7556A
WL-7243	N	WL-7243
WL-7255	Trans	WL-7255
WL-7268	C S	WL-7268A
7268	C S	WL-7268A
WL-7269	Thyr	8043
WL-7290	C S	WL-7290
WL-7297	Thyr	WL-23052
WL-7298	Thyr	WL-C6H-2
WL-7299	Thyr	WL-C6H-2
WL-7306	Thyr	WL-7306A
WL-7306A	Thyr	WL-7306A
WL-7307	Thyr	WL-7307A
WL-7307A	Thyr	WL-7307A
7316	I R	WL-6189
WL-7317	N	WL-7317
WL-7321	N	WL-7321
F-7328	Trans	WL-7328A
WL-7328	Trans	WL-7328A
7328	Trans	WL-7328A
WL-7328A	Trans	WL-7328A
WL-7353	N	WL-7353

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
WL-7363	Thyr	WL-7363
WL-7383	C S	WL-7383
7386	Thyr	WL-C6H-1
VH7400	Rect	WL-872A
WL-7413	Trans	WL-7413
WL-7463	Trans	WL-7463
WL-7464	Trans	WL-7464
C7473D	C R	5FP7A
C7475A	C R	7BP7B
ML-7482	Trans	WL-7482
WL-7482	Trans	WL-7482
7482	Trans	WL-7482
WL-7509	Thyr	WL-7509A
WL-7509A	Thyr	WL-7509A
GL-7518	Thyr	WL-7509A
WL-7540	Trans	WL-7540
7543	I R	WL-6136
WL-7556	Thyr	WL-7556A
WL-7556A	Thyr	WL-7556A
ML-7560	Trans	WL-7560
WL-7560	Trans	WL-7560
7560	Trans	WL-7560V
WL-7560V	Trans	WL-7560V
WL-7565	Trans	WL-7565
GL-7581	I R	WL-5881
7581	I R	WL-5881
AX-7585	Ig	WL-5552A
7585	Ig	WL-5552A
WL-7604	Trans	WL-7604
WL-7606	N	WL-7606
WL-7657	N	WL-7657
WL-7658	Rect	WL-7658
WL-7659	Rect	WL-7659
WL-7676	G A	WL-7676
WL-7685	Trans	WL-7685
WL-7691	Trans	WL-7691
7725	Thyr	WL-7307A
7726	Thyr	WL-7509A
WL-7729	I R	WL-6681
7729	I R	WL-6681
WL-7730	I R	WL-7730
7730	I R	WL-7730
WL-7732	I R	WL-7732
7732	I R	WL-7732
7735	C S	WL-7735A
WL-7735A	C S	WL-7735A
7735A	C S	WL-7735A
WL-7740	Ig	WL-7740
WL-7741	N	WL-7741
WL-7748	Trans	WL-7748
WL-7750	Trans	WL-7750
7752	I R	WL-6A56
WL-7903	G A	WL-7903
WL-7904	G A	WL-7904
WL-7982	Trans	WL-7982
GL-8005	Trans	WL-8005
ML-8005	Trans	WL-8005
WL-8005	Trans	WL-8005
8005	Trans	WL-8005
DR-8008	Rect	WL-8008
EE-8008	Rect	WL-8008
GL-8008	Rect	WL-8008
ML-8008	Rect	WL-8008
UE-8008	Rect	WL-8008
WL-8008	Rect	WL-8008
8008	Rect	WL-8008
8018	Trans	WL-807
8024	Trans	WL-832A
WL-8032	Trans	WL-8032
WL-8043	Thyr	WL-8043
WL-8044	Trans	WL-8044
F-8045	Trans	WL-8045
WL-8045	Trans	WL-8045
8045	Trans	WL-8045
WL-8057	G A	WL-8057
WL-8073	N	WL-8073
WL-8074	N	WL-8074
WL-8075	N	WL-8075
M8079	I R	WL-6663
WL-8094	Rect	WL-8094
M8100	I R	WL-5654
M8101	I R	WL-6660
WL-8105	N	WL-8105
M8136	I R	WL-6189
M8137	I R	WL-5751
WL-8137	N	WL-8137
M8149	I R	WL-7730
8161	Trans	WL-3X2500A3
M8162	I R	WL-6201
8166	Trans	WL-4-1000A
8170	Trans	WL-4CX5000A
M8178	Thyr	WL-5727
M8196	I R	WL-6A56
M8204	Thyr	WL-5727
M8212	I R	WL-6663
M8214	I R	WL-6681
WL-8214	N	WL-8214
M8223	V R	WL-0A2
M8224	V R	WL-0B2
M8245	I R	WL-6669
8251	Trans	WL-3X2500F3
8298	Trans	WL-8298
WL-8306	Ig	WL-8306



# Direct Interchangeability List

continued

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
8348	Trans	WL-4-400A
WL-8461	Trans	WL-8461
GL-9002	I R	WL-9002
WL-9002	I R	WL-9002
9002	I R	WL-9002
AX-9903	Trans	WL-5894
WL-22602	HCDD	WL-22602
WL-22603	HCDD	WL-22603
WL-22604	HCDD	WL-22604
WL-22605	HCDD	WL-22605
WL-22606	HCDD	WL-22606
WL-22607	HCDD	WL-22607
WL-22608	HCDD	WL-22608
WL-22609	HCDD	WL-22609
WL-22610	HCDD	WL-22610
WL-22611	HCDD	WL-22611
WL-22612	G A	WL-22612
WL-22613	G A	WL-22613
WL-22614	G A	WL-22614
WL-22618	G A	WL-22618
WL-22619	G A	WL-22619
WL-22620	G A	WL-22620
WL-22627	G A	WL-22627
WL-22637	G A	WL-22637
WL-22640	G A	WL-22640
WL-22643	G A	WL-22643
WL-22663	HCDD	WL-22663
WL-22754	G A	WL-22754
WL-22759	Trans	WL-22759
WL-22789	Trans	WL-22789
WL-22791	N	WL-22791
WL-22792	N	WL-22792
WL-22793	N	WL-22793
WL-22800	Rect	WL-22800
WL-22801	Rect	WL-22801
WL-22802	Rect	WL-22802
WL-22803	Trans	WL-22803
WL-22804	HCDD	WL-22804
WL-22805	HCDD	WL-22805
WL-22806	HCDD	WL-22806
WL-22809	HCDD	WL-22809
WL-22810	HCDD	WL-22810
WL-22811	HCDD	WL-22811
WL-22812	HCDD	WL-22812
WL-22813	HCDD	WL-22813
WL-22814	HCDD	WL-22814
WL-22815	HCDD	WL-22815
WL-22816	HCDD	WL-22816
WL-22817	HCDD	WL-22817
WL-22818	HCDD	WL-22818
WL-22819	HCDD	WL-22819
WL-22820	HCDD	WL-22820
WL-22821	HCDD	WL-22821
WL-22822	HCDD	WL-22822
WL-22823	HCDD	WL-22823
WL-22824	HCDD	WL-22824
WL-22825	HCDD	WL-22825
WL-22826	HCDD	WL-22826
WL-22827	HCDD	WL-22827
WL-22828	HCDD	WL-22828
WL-22829	HCDD	WL-22829
WL-22830	HCDD	WL-22830
WL-22831	HCDD	WL-22831
WL-22832	HCDD	WL-22832
WL-22833	HCDD	WL-22833
WL-22834	HCDD	WL-22834
WL-22835	HCDD	WL-22835
WL-22836	HCDD	WL-22836
WL-22837	HCDD	WL-22837
WL-22838	HCDD	WL-22838
WL-22839	HCDD	WL-22839
WL-22840	HCDD	WL-22840
WL-22841	HCDD	WL-22841
WL-22842	HCDD	WL-22842
WL-22843	HCDD	WL-22843
WL-22844	HCDD	WL-22844
WL-22845	HCDD	WL-22845
WL-22846	HCDD	WL-22846
WL-22847	HCDD	WL-22847
WL-22848	HCDD	WL-22848
WL-22849	HCDD	WL-22849
WL-22850	HCDD	WL-22850
WL-22851	HCDD	WL-22851
WL-22856	HCDD	WL-22856
WL-22857	HCDD	WL-22857
WL-22858	HCDD	WL-22858
WL-22859	HCDD	WL-22859
WL-22860	HCDD	WL-22860
WL-22862	Trans	WL-22862
WL-22863	HCDD	WL-22863
WL-22864	HCDD	WL-22864
WL-22867	HCDD	WL-22867
WL-22868	G A	WL-22868
WL-22869	G A	WL-22869
WL-22870	HCDD	WL-22870
WL-22871	HCDD	WL-22871
WL-22872	HCDD	WL-22872
WL-22873	HCDD	WL-22873
WL-22874	HCDD	WL-22874
WL-22875	HCDD	WL-22875
WL-22876	HCDD	WL-22876
WL-22877	HCDD	WL-22877

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
WL-22878	HCDD	WL-22878
WL-22879	HCDD	WL-22879
WL-22880	HCDD	WL-22880
WL-22881	HCDD	WL-22881
WL-22882	HCDD	WL-22882
WL-22883	HCDD	WL-22883
WL-22884	HCDD	WL-22884
WL-22885	HCDD	WL-22885
WL-22886	HCDD	WL-22886
WL-22887	HCDD	WL-22887
WL-22888	HCDD	WL-22888
WL-22889	HCDD	WL-22889
WL-22890	HCDD	WL-22890
WL-22891	HCDD	WL-22891
WL-22892	HCDD	WL-22892
WL-22893	HCDD	WL-22893
WL-22894	HCDD	WL-22894
WL-22895	HCDD	WL-22895
WL-22896	HCDD	WL-22896
WL-22897	HCDD	WL-22897
WL-22898	HCDD	WL-22898
WL-22899	HCDD	WL-22899
WL-22900	HCDD	WL-22900
WL-22901	HCDD	WL-22901
WL-22902	HCDD	WL-22902
WL-22903	HCDD	WL-22903
WL-22904	HCDD	WL-22904
WL-22905	HCDD	WL-22905
WL-22906	HCDD	WL-22906
WL-22907	HCDD	WL-22907
WL-22908	HCDD	WL-22908
WL-22909	HCDD	WL-22909
WL-22910	HCDD	WL-22910
WL-22911	HCDD	WL-22911
WL-22912	HCDD	WL-22912
WL-22913	HCDD	WL-22913
WL-22914	HCDD	WL-22914
WL-22915	HCDD	WL-22915
WL-22916	HCDD	WL-22916
WL-22917	HCDD	WL-22917
WL-22923	G A	WL-22923
WL-22925	HCDD	WL-22925
WL-22926	HCDD	WL-22926
WL-22927	HCDD	WL-22927
WL-22928	HCDD	WL-22928
WL-22929	HCDD	WL-22929
WL-22930	HCDD	WL-22930
WL-22931	HCDD	WL-22931
WL-22932	HCDD	WL-22932
WL-22933	HCDD	WL-22933
WL-22934	HCDD	WL-22934
WL-22935	HCDD	WL-22935
WL-22936	HCDD	WL-22936
WL-22937	HCDD	WL-22937
WL-22938	HCDD	WL-22938
WL-22939	HCDD	WL-22939
WL-22940	HCDD	WL-22940
WL-22941	HCDD	WL-22941
WL-22942	HCDD	WL-22942
WL-22951	HCDD	WL-22951
WL-22952	HCDD	WL-22952
WL-22953	HCDD	WL-22953
WL-22954	HCDD	WL-22954
WL-22955	HCDD	WL-22955
WL-22956	HCDD	WL-22956
WL-22957	HCDD	WL-22957
WL-22958	HCDD	WL-22958
WL-22959	HCDD	WL-22959
WL-22960	HCDD	WL-22960
WL-22961	HCDD	WL-22961
WL-22962	HCDD	WL-22962
WL-22963	HCDD	WL-22963
WL-22964	HCDD	WL-22964
WL-22965	HCDD	WL-22965
WL-22966	HCDD	WL-22966
WL-22967	HCDD	WL-22967
WL-22968	HCDD	WL-22968
WL-22969	HCDD	WL-22969
WL-22970	HCDD	WL-22970
WL-22971	HCDD	WL-22971
WL-22972	HCDD	WL-22972
WL-22973	HCDD	WL-22973
WL-22974	HCDD	WL-22974
WL-22975	HCDD	WL-22975
WL-22976	HCDD	WL-22976
WL-22977	HCDD	WL-22977
WL-22978	HCDD	WL-22978
WL-22979	HCDD	WL-22979
WL-22980	HCDD	WL-22980
WL-22981	HCDD	WL-22981
WL-22982	HCDD	WL-22982
WL-22983	HCDD	WL-22983
WL-22984	HCDD	WL-22984
WL-22985	HCDD	WL-22985
WL-22986	HCDD	WL-22986
WL-22987	HCDD	WL-22987
WL-22988	HCDD	WL-22988
WL-22989	HCDD	WL-22989
WL-22990	HCDD	WL-22990
WL-22991	HCDD	WL-22991
WL-22992	HCDD	WL-22992
WL-22996	HCDD	WL-22996

TUBE TYPE MARKED	CLASS OF TUBE	EQUIVALENT WESTINGHOUSE TYPE
WL-22997	HCDD	WL-22997
WL-22998	HCDD	WL-22998
WL-23007	HCDD	WL-23007
WL-23008	HCDD	WL-23008
WL-23009	HCDD	WL-23009
WL-23010	HCDD	WL-23010
WL-23011	ig	WL-23011
WL-23011PC	ig	WL-23011PC
WL-23012	ig	WL-23012
WL-23012PC	ig	WL-23012PC
WL-23013	ig	WL-23013
WL-23013PC	ig	WL-23013PC
WL-23014	ig	WL-23014
WL-23014PC	ig	WL-23014PC
WL-23015	ig	WL-23015
WL-23015PC	ig	WL-23015PC
WL-23016	ig	WL-23016
WL-23017	ig	WL-23017
WL-23018	ig	WL-23018
WL-23027	HCDD	WL-23027
WL-23028	HCDD	WL-23028
WL-23029	Rect	WL-23029
WL-23034	HCDD	WL-23034
WL-23035	HCDD	WL-23035
WL-23036	HCDD	WL-23036
WL-23041	HCDD	WL-23041
WL-23042	HCDD	WL-23042
WL-23046	HCDD	WL-23046
WL-23049	HCDD	WL-23049
WL-23059	HCDD	WL-23059
WL-23060	HCDD	WL-23060
WL-23063	Trans	WL-23063
WL-23095	Rect	WL-23095
WL-23102	Rect	WL-23102
WX-30008	HCDD	WL-22806
WX-30009	HCDD	WL-22833
WX-30010	HCDD	WL-22834
WX-30011	HCDD	WL-22835
WX-30024	HCDD	WL-22837
WX-30040	HCDD	WL-22843
WX-30041	HCDD	WL-22842
WX-30042	HCDD	WL-22836
WX-30043	HCDD	WL-22841
WX-30044	HCDD	WL-22840
WX-30052	HCDD	WL-22814
WX-30053	HCDD	WL-22844
WX-30054	HCDD	WL-22839
WX-30103	HCDD	WL-22845
WX-30104	HCDD	WL-22846
WX-30105	HCDD	WL-22867
WX-30106	HCDD	WL-22847
WX-30108	HCDD	WL-22848
WX-30143	HCDD	WL-22849
WX-30144	HCDD	WL-22850
WX-30145	HCDD	WL-22851
WX-30146	HCDD	WL-22857
WX-30147	HCDD	WL-22860
WX-30148	HCDD	WL-22859
WX-30213	ig	WL-23014
C73111	C R	10KP7A
82170	C R	10WP7A
175771	I R	WL-5814A
823623	I R	WL-6189
845712	I R	WL-6681
845722	I R	WL-6A57GA
845723	I R	WL-5881
845724	I R	WL-5654
845926	Trans	WL-5763

Inclusion of a tube type in this book does not necessarily imply availability of that type from Westinghouse. Although every effort has been made to ensure accuracy of these data, no liability is assumed for their use.

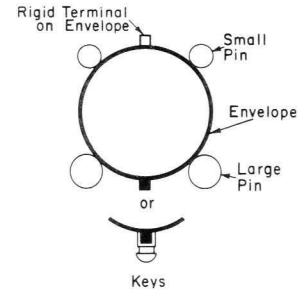
# WESTINGHOUSE INDUSTRIAL AND POWER TUBES



## KEY TO ABBREVIATIONS

<b>A</b>	Anode	<b>IC</b>	Internal Connection (Do NOT Use)	<b>PK</b>	Peak
<b>Å</b>	Angstrom Units	<b>ITV</b>	Industrial & Closed Circuit TV	<b>PN</b>	Pentode
<b>AMP</b>	Ampere (s)	<b>K</b>	Cathode	<b>RAD</b>	Radius
<b>AVG</b>	Average	<b>KV</b>	Kilovolt (s)	<b>REFL</b>	Reflector
<b>CO</b>	Cut-off	<b>KVA</b>	Kilovolt-Ampere (s)	<b>RES</b>	Resonator
<b>COLL</b>	Collector	<b>KW</b>	Kilowatt (s)	<b>RP</b>	Plate Resistance
<b>COOL</b>	Type of Cooling	<b>LUM</b>	Luminous	<b>SEC</b>	Second (s)
<b>DIAM</b>	Diameter	<b>Ma</b>	Milliampere (s)	<b>SENS</b>	Sensitivity
<b>DISS</b>	Dissipation	<b>MAX</b>	Maximum	<b>T</b>	Triode
<b>DWG</b>	Drawing	<b>Mc</b>	Megacycle (s)	<b>Trig</b>	Trigger Electrode
<b>FREQ</b>	Frequency	<b>MIN</b>	Minute	<b>TV</b>	Television Broadcasting
<b>G</b>	Grid	<b>Min</b>	Miniature	<b>TYP</b>	Typical
<b>G1</b>	Grid One	<b>Min</b>	Minimum	<b>V</b>	Volt (s)
<b>G2</b>	Grid Two	<b>mmHG</b>	Millimeters of Mercury	<b>µA</b>	Microampere (s)
<b>G3</b>	Grid Three	<b>NC</b>	No Connection	<b>µMHOS</b>	Micromhos
<b>GC</b>	Gigacycle (s)	<b>nv</b>	Neutrons/cm <sup>2</sup> /Second	<b>µSEC</b>	Microsecond (s)
<b>H</b>	Heater	<b>OAL</b>	Overall Length	<b>°C</b>	Degrees Centigrade
		<b>PC</b>	Photocathode		

## GUIDE TO BASE DRAWINGS



# THYRATRONS

A thyatron is a gas tube having a heated cathode and one or more electrodes which initiate the current flow. The gas content may be one or more of the inert gases, mercury vapor or a combination of these. Mercury-vapor types are used where ambient temperature ranges are small. Inert gas types change characteristics very little with ambient temperature changes and do not require as long a warm-up time before applying anode voltage.

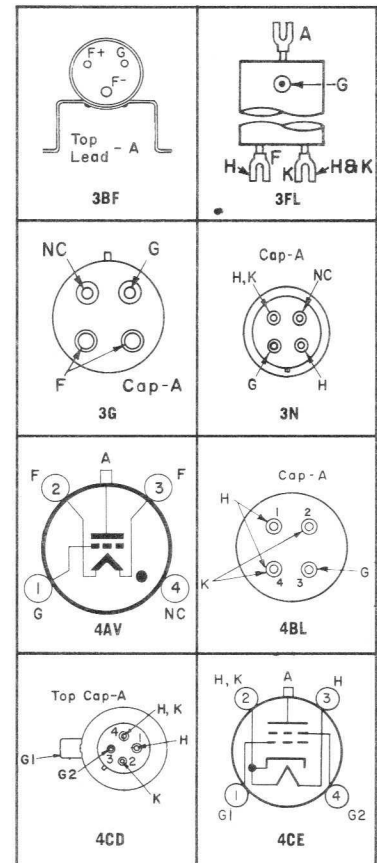
In a high vacuum tube, the negative field of the grid space charge acts to limit the flow of electrons. This space charge is neutralized by positive ions during conduction through a gas or vapor such that the voltage drop through the tube is reduced. With smaller tube losses, the thyatron can conduct more current with less cooling required than an equivalent high vacuum tube.

The grid has no control of the current after conduction starts. With direct current supplied to the anode, it is necessary to reduce the anode voltage below the ionizing potential of the

gas fill, long enough for the gas to deionize and stop tube conduction. With alternating current supplied to the anode, the grid regains control of the current each time the voltage drops to zero and can delay the beginning of conduction to a later point in the next half-cycle by being held at a negative voltage. The grid can exert very fine control of the average current, with alternating current anode and grid supply by varying the phase relation between the voltages impressed on them. The grid circuit requires very little power to control the thyatron compared to the power controlled in the anode circuit.

Thyatrions are used in light duty resistance welders, motor speed and torque controllers, relaxation oscillators, variable voltage power supplies, control circuits of lighting or heating devices, light sensitive relay exciters, and other equipment requiring either precise control of average moderate currents or ability to turn on moderate currents by a small voltage change.

TUBE TYPE	CATHODE		FILL	RATINGS			MECHANICAL		
	VOLTS	AMPS		ANODE VOLTS	PEAK AMPS	AVG. AMPS	MAX. OAL	MAX. DIAM.	BASE DWG.
WL-2D21	6.3	0.6	gas	1300	0.5	0.1	2 1/8"	3/4"	7BN
WL-3C23	2.5	7.0	Hg.	1250	6.0	1.0	6 1/8"	2 1/16"	3G
WL-5C21	2.5	21	gas	1250	77	6.4	9 1/2"	2 1/32"	4AV
WL-C6H-1	2.5	21	gas	1700	80	6.4	8 3/4"	2 1/32"	4AV
WL-C6H-2	2.5	21	gas	1700	80	6.4	8"	2 1/32"	4AV(F)
WL-C6H-3	2.5	21	gas	1700	80	6.4	9 1/2"	2 3/16"	4AV(L)
WL-81A	2.5	5.0	gas	500	2.0	0.5	6 5/8"	2 1/16"	3G
WL-105	5.0	10	Hg.	2500	40	6.4	11 1/4"	2 3/16"	105
WL-172	5.0	10	Hg.	2000	40	6.4	18 7/8"	2 1/4"	3FL
WL-414	5.0	20	Hg.	2000	100	12.5	15 3/8"	3 7/8"	3FL
WL-502A	6.3	0.6	gas	1300	1.0	0.1	2 19/32"	1 5/16"	6BS
KU-610	2.5	6.5	gas	500	0.4	0.1	6 1/2"	2 1/16"	610
WL-624	5.0	10	Hg.	2500	80	6.4	11 1/8"	3 3/16"	4CE
WL-627	2.5	5	Hg.	5000	2.5	0.64	6 5/8"	2 1/16"	4AV
WL-629	2.5	2.6	gas	350	0.2	0.04	4 1/4"	1 9/16"	5A
WL-632B	5.0	5	Hg.	1500	30	2.5	8 3/4"	1 3/4"R	4CD
WL-672A	5.0	5	Hg.	2500	40	3.2	8 3/8"	2 5/16"	4CE
WL-676	5.0	10	Hg.	2500	40	6.4	11 3/4"	3 13/16"	4PB
WL-677	5.0	10	Hg.	10000	15	4.0	11 3/8"	3 13/16"	4PB
WL-678	5.0	7.5	Hg.	15000	6.0	1.6	11 3/16"	2 1/16"	3N
WL-885	2.5	65	gas	350	0.3	0.075	4 3/16"	1 9/16"	5A
WL-2050	6.3	0.6	gas	1300	1.0	0.1	4 1/8"	1 9/16"	6BS
WL-2050A	6.3	0.6	gas	1300	1.0	0.1	3 1/16"	1 3/32"	6BS
WL-5557	2.5	5	Hg.	5000	2.0	0.5	6 1/8"	2 1/16"	3G
WL-5559	5.0	4.5	Hg.	1000	15	2.5	7 1/2"	3"	4BL
WL-5563A	5	10	Hg.	15000	10	1.8	10 1/2"	2 5/8"	3N
WL-5632	2.5	9	gas	1250	30	2.5	6"	1 5/8"	4CF
WL-5664	2.5	6.3	gas	1250	8.0	1.0	4 3/4"	1 9/16"	3G
WL-5665	2.5	31	gas	1250	160	16.0	11 1/4"	2 1/16"	3BF(F)



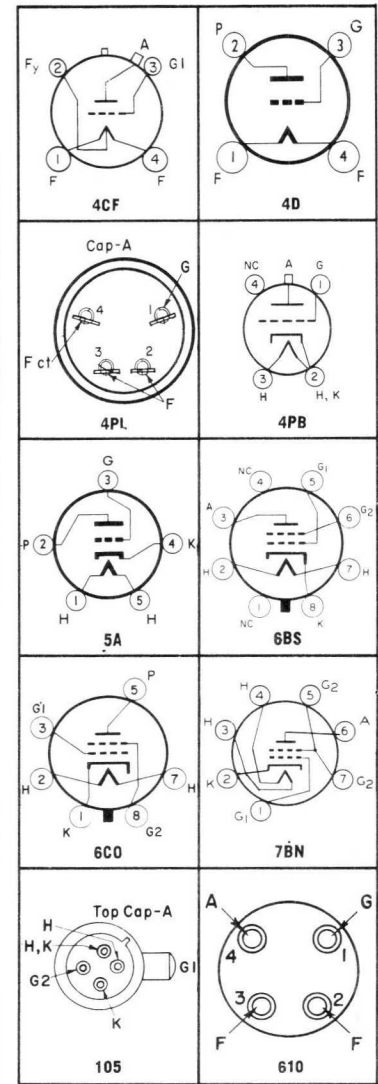




# Thyratrons

continued

TUBE TYPE	CATHODE		FILL	RATINGS			MECHANICAL		
	VOLTS	AMPS		ANODE VOLTS	PEAK AMPS	AVG. AMPS	MAX. OAL	MAX. DIAM.	BASE DWG.
WL-5685	2.5	21	gas	1250	77	6.4	9 1/2"	2 1/8"	4AV
WL-5696	6.3	0.15	gas	500	0.1	0.025	1 3/4"	3/4"	7BN
WL-5720	5.0	4.5	Hg.	1000	15	2.5	7 1/2"	3"	4BL
WL-5727	6.3	0.60	gas	1300	0.5	0.1	2 1/8"	3/4"	7BN
WL-5796	2.5	8.5	gas	1500	20	1.6	5 1/4"	1 1/16"	4CF
WL-5830	5.0	20	Hg.	10000	75	12.5	17 1/16"	5 1/16"	4BL
WL-6012	6.3	2.6	gas	1300	5.0	0.5	3 7/8"	1 23/32"	6CO
WL-6014	2.5	6.3	gas	1250	8.0	1.0	4 1/4"	1 1/16"	4D
WL-6807	2.5	21	gas	1500	80	6.4	9"	2 5/8"	4AV
WL-6808	2.5	21	gas	1500	80	6.4	8 5/16"	2 5/8"	4AV(F)
WL-6856	2.5	16	gas & Hg.	1500	50	2.5	9 1/2"	2 1/16"	4PB
WL-6857	2.5	16	gas & Hg.	1500	30	4.0	8 5/8"	2 1/16"	4PB(F)
WL-6858	2.5	21	gas & Hg.	1500	77	6.4	9 1/2"	2 1/16"	4AV
WL-6859	2.5	21	gas & Hg.	1500	77	6.4	8 3/4"	2 1/16"	4AV(F)
WL-6860	2.5	21	gas	1250	77	6.4	8 3/4"	2 1/32"	4AV(F)
WL-7023	2.5	21	gas & Hg.	1500	77	6.4	10"	2 1/16"	4PB(L)
WL-7297	2.5	10.8	gas	1500	40	3.2	6 3/8"	2 3/16"	4PL(L)
WL-7306A	2.5	9	gas	1250	30	2.5	5 1/16"	1 1/16"	4CF
WL-7307A	2.5	9	gas & Hg.	1500	30	2.5	6 1/4"	1 1/16"	4CF
WL-7321	2.5	21	gas	1250	77	6.4	10"	2 3/16"	4AV(L)
WL-7363	2.5	8.5	gas	1500	20	1.6	5"	1 1/16"	4CF
WL-7509A	2.5	9	gas & Hg.	1500	30	2.5	7"	2 3/16"	4PL(L)
WL-7556A	2.5	9	gas	1250	30	2.5	7"	2 3/16"	4PL(L)
WL-8043	5	6	Hg.	21000	50	2.5	11 1/16"	2 3/16"	3N
WL-22994/ 5877	2.5	10.8	gas	1500	40	3.2	7 1/8"	2 1/32"	4AV
WL-23052/ 7297	2.5	10.8	gas	1500	40	3.2	7 3/8"	2 3/32"	4PL(L)



## HIGH VACUUM AMPLIFIERS

High vacuum amplifiers are multielectrode tubes with heated cathodes and one or more electrodes which are able to control the current flow through the tube. These types are similar to the high vacuum rectifiers with the addition of control electrodes.

The current is limited by the formation of a negative space charge near the cathode. A positively charged grid will tend to neutralize this space charge permitting more electrons to go to the plate. A negatively charged grid will tend to increase this space charge reducing electron flow and if the grid is sufficiently negative, it will cut off the electron flow. The grid has continuous control of the number of electrons allowed to go to the plate. This controlled power ranges from a few watts in smaller designs to hundreds of thousands of watts in the largest designs. By proper design of the electrode structure, the tube can be made to control more power in the plate circuit than is required in the grid circuit. The tube therefore can act as an amplifier. By feeding back part of the output power to the grid circuit, the tube can be made to generate sustained oscillations. This arrangement is termed an oscillator.

Additional electrodes are employed in tetrodes and pentodes as electrostatic screens and to suppress secondary emission from the plate. Electrodes may also be designed to form electrons into beams or sheets. These variations are usually incorporated to overcome inherent faults of the basic triode and to increase the efficiency and

power handling capability of the tube. Some types have two units in one envelope to conserve space, reduce cost, and simplify circuit designs.

The cooling of the tubes handling large amounts of power must be carefully controlled. Radiation with free air convection is employed with types having low dissipation ratings for their size. With these types care must be taken that nearby components are not damaged by directly radiated heat. Tube types with medium size dissipation ratings often have finned radiators soldered to the anode and heat is dissipated by forcing air through the radiator. High vacuum amplifiers with high dissipation ratings are operated either water cooled or vapor cooled. Both groups require water with low mineral content. Cooling system control circuits should be provided to remove power from the tube if cooling is inadequate.

Tubes designed for communications service (such as types 891, 892, 895 and 5606) have thin anode walls and should not be used in industrial heating applications. The wide fluctuation of loading and impedance, inherent in this service, induces parasitic and arc-discharge conditions which require the greater thermal inertia of a thick anode wall. Overload and arc sensing circuits designed to remove or divert power from the tube within 6 cycles of energy are also essential.

High vacuum amplifiers are used to generate, amplify or modulate audio or radio frequencies in radio and television transmitters and induction and dielectric heating equipment for industrial use.

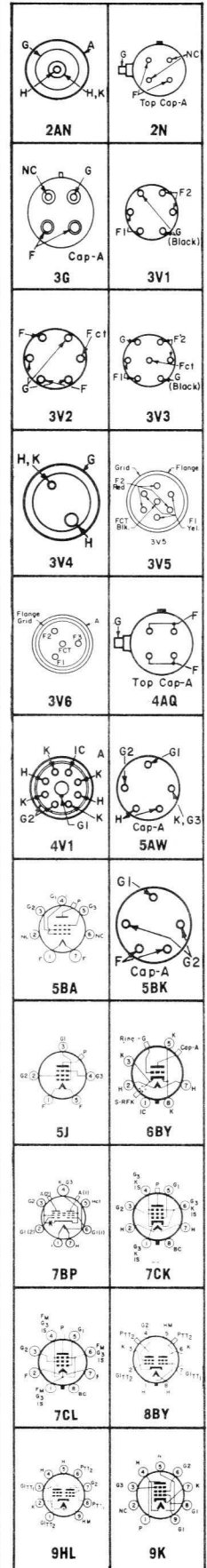
TUBE TYPE	COOL	CATHODE		RATINGS (1)				PERFORMANCE					MECHANICAL			
		VOLTS	AMPS.	ANODE KV	INPUT KW	DISS. KW	FREQ. MHz <sup>(2)</sup>	ANODE KV	GRID VOLTS	ANODE AMPS.	DRIVE WATTS	OUT KW	(4) gm or μ	MAX. OAL (2) INCH	MAX. DIAM. (2) INCH	BASE DWG.
WL-2C39A	F	6.3	1	1	125W	100W	2500	800V	-20(6)	80mA	6	27(5)	100	2 3/4	1 1/4	2AN
WL-2C39B	F	6.3	1	1	125W	100W	2500	800V	-20(6)	80mA	6	27(5)	100	2 3/4	1 1/4	2AN
WL-2C40	A	6.3	0.75	500V	12.5W	6.5W	3370	250V	-5	20mA	-	75(6)	36	2 1/16	1 3/16	6BY
WL-2E24	A	6.3	0.65	600V	40W	13.5W	125	600V	-50	66mA	0.21	27W	3200	3 21/32	1 3/16	7CL
WL-2E26	A	6.3	0.8	600V	40W	13.5W	125	600V	-45	66mA	0.17	27W	3500	3 21/32	1 3/16	7CK

# High Vacuum Amplifiers

continued



TUBE TYPE	COOL	CATHODE		RATINGS (1)				PERFORMANCE						MECHANICAL		
		VOLTS	AMPS.	ANODE KV	INPUT KW	DISS. KW	FREQ. MHZ <sup>(3)</sup>	ANODE KV	GRID VOLTS	ANODE AMPS.	DRIVE WATTS	OUT KW	(4) gm or $\mu$	MAX. OAL (2) INCH	MAX. DIAM. (2) INCH	BASE DWG.
WL-4CX250B	F	6	2.6	2	0.5	0.25	500	2	-90	0.25	1	0.4	12000	2½	1⅝	4V1
WL-4CX5000A	F	7.5	75	7.5	22.5	5	30	7.5	-350	2.8	150	16	—	9⅞	4⅛	VC2
WL-4D21	A	5	6.5	3	0.5	125W	120	3	-150	0.167	2.5	0.375	2450	5⅞	2¾	5BK
WL-4X500A	F	5	13.5	4	1.4	0.5	120	4	-150	0.315	5	0.835	5200	4¾	2⅝	VP1
WL-4-400A	A	5	14.5	4	1.4	0.4	110	4	-220	0.35	12	1.1	4000	6⅞	3⅞	5BK
WL-4-1000A	F	7.5	21	6	4.2	1	110	6	-200	0.7	200	3.4	10000	9⅝	5¼	5BK
WL-5D22	F	5	14.5	4	1.4	0.25	110	4	-225	0.312	10	1	4000	6⅞	3⅞	5BK
WL-207	W	22	52	15	30	10	1.6	12	-1660	1.67	235	15	20	20¼	4⅞	VF2
WL-803	A	10	5	2	0.35	0.125	20	2	-90	0.16	2	0.21	4000	9⅞	2⅞	5J
WL-807	A	6.3	0.9	600V	60W	25W	60	600V	-45	100mA	0.2	40W	6000	5¾	2⅞	5AW
WL-810	A	10	4.5	2	0.5	125W	30	2	-160	0.25	12	0.375	36	8¾	2⅞	2N
WL-811A	A	6.3	4	1.5	260W	65W	30	1.5	-70	0.173	7.1	0.2	160	6⅞	2⅞	3G
WL-812A	A	6.3	4	1.5	260W	65W	30	1.5	-120	0.173	6.5	0.19	29	6⅞	2⅞	3G
WL-813	A	10	5	2	0.36	100W	30	2	-120	0.18	1.9	0.275	3750	7½	2⅞	5BA
WL-815	A	12.6(8)	0.8	500V	75W	25W	150	500V	-45	0.15	0.18	56W	4000	4⅞	2⅞	8BY
WL-829B(7)	A	12.6(8)	1.125	750V	45W	15W	200	750V	-50	0.12	0.45	65W	8500	4⅞	2⅞	7BP
WL-832A(7)	A	12.6(8)	0.80	750V	18W	7.5W	200	750V	-65	48mA	0.19	26W	3500	3⅞	2⅞	7BP
WL-833A	F	10	10	4	1.8	0.4	20	4	-200	0.45	26	1.44	35	8⅞	4⅞	VP2
WL889A	W	11	120	8.5	16	5	50	7.5	-800	2	400	10	21	10⅞	3⅞	VP6
WL-891	W	22(9)	60	12	18	6	1.6	10	-2000	1.4	310	10	8.5	20⅞	4¼	VP3
WL-891R	F	22(9)	60	10	15	4	1.6	10	-2000	1.4	310	10	8.5	22	12	VP3
WL-892	W	22(9)	60	15	30	10	1.6	12	-1600	1.64	500	14	50	20⅞	4¼	VP3
WL-892R	F	22(9)	60	12.5	18	4	1.6	10	-1300	1.4	495	10	50	22	12	VP3
WL-895	W	19(10)	139	17	140	40	6	17	-1000	7.5	1700	100	37	23⅞	6¾	VP4
WL-895R	F	19(10)	139	17	110	20	6	17	-1800	6	2200	84	37	24½	17	VP5
WL-5513	F	6.3	30	4	3.6	1.2	220	3750	-150	0.94	64	2370	49	6⅞	3	VC1
WL-5604	F	11	176	12.5	32.5	10	25	12	-1170	2.5	470	22.5	20	13¾	8⅞	VP6
WL-5606	W	22	60	14	25	10	1.6	12	-1100	1.8	—	15.5	50	16	4⅞	VP7
WL-5619	W	11	176	12.5	32.5	20	25	12	-1170	2.5	470	22.5	20	13	5¼	VP6
WL-5658	W	12	290	12.5	60	20	15	12	-870	4.5	800	40	20	11½	7	VP8
WL-5666	W	11	120	10	20	12.5	22.5	9	-750	2	340	12.2	21	10¾	3⅞	VP6
WL-5667	F	11	120	10	20	7.5	22.5	9	-750	2	340	12.2	21	11¾	11	VP6
WL-5668	W	22	60	14	28	20	5	12	-700	2	—	17	50	16	4⅞	VP7
WL-5669	F	22	60	14	26	10	5	12	-700	2	—	17	50	17⅞	8⅞	VP7
WL-5682	W	16.5	325	16	300	120	30	15	-1400	18.4	7200	215	30	23¼	8⅞	VC3
WL-5736	F	6	60	3.5	3.5	2.5	110	3.5	-300	1	85	2.55	22	7¼	3⅞	VP9
WL-5762	F	12.6	29	6.2	8.7	3	30	6	-550	1.25	225	6	29	7⅞	4⅞	VF3
WL-5763	A	6	0.75	300V	15W	12W	50	300V	-60	50mA	0.35	7W	7000	2⅞	⅞	9K
WL-5771	W	7.5	170	15	67.5	22.5	1.6	15	-990	4.5	1160	53	20	11⅞	7	VP8
WL-5891	F	11	95	15	100	25	10	15	-1500	6.1	1785	73.5	36	24½	11⅞	VP5
WL-5894(7)	A	12.6	0.9	750V	60W	20W	250	600V	-80	200mA	3	90W	—	4⅞	1⅞	VP0
WL-5918A	W	11	285	17.5	300	70	22	17.5	-1000	13.8	3600	180	37	23⅞	7⅞	3V1
WL-5936	W	20	143	18	180	70	15	17	-1400	10	4500	136	37	23⅞	8⅞	VP5
WL-5986A	W	11	285	17.5	300	70	22	17.5	-1000	13.8	3600	180	37	24	8⅞	VF4
WL-6146	A	6.3	1.25	600V	67.5W	20W	60	600V	-58	112mA	0.2	52W	7000	3⅞	1⅞	7CK
WL-6146A	A	6.3	1.25	600V	67.5W	20W	60	600V	-58	112mA	0.2	52W	7000	3⅞	1⅞	7CK
WL-6146B	A	6.3	1.25	600V	90W	27W	60	600V	-70	0.15	0.3	63W	7000	3⅞	1⅞	7CK
WL-6159	A	26.5	0.30	600V	67.5W	20W	60	600V	-58	112mA	0.2	52W	7000	3⅞	1⅞	7CK
WL-6360	A	12.6(8)	0.41	300V	22.5W	10W	200	300V	-40	75mA	0.1	14.5W	3300	3⅞	⅞	9HL
WL-6379(11)	W	11	285	17.5	150	70	Note 14	14.7	-3100	1.2 Min. 20 Max.	0	150	5	23⅞	6¾	3V1
WL-6399	W	11	29	6.2	9	6	30	6	-800	1.4	210	6	25	8½	2⅞	3V2
WL-6420	W	7.0	85	10	20	12.5	30	9	-750	2	240	13.2	20	13¾	4⅞	VC5
WL-6421	F	7	85	10	20	10	30	9	-750	2	240	13.2	20	17⅞	4⅞	VC6
WL-6421F	F	7	85	10	20	7.5	30	9	-750	2	240	13.2	20	14½	8⅞	VC5
WL-6422	W	7	85	12.5	30	20	30	12	-400	2.1	200	18.2	90	15½	4⅞	VC6

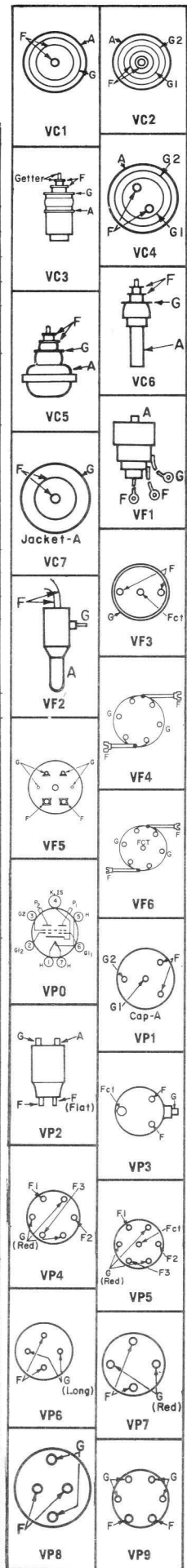




# High Vacuum Amplifiers

continued

TUBE TYPE	COOL	CATHODE			RATINGS (1)			PERFORMANCE						MECHANICAL		
		VOLTS	AMPS.	ANODE KV	INPUT KW	DISS. KW	FREQ. MHz <sup>(2)</sup>	ANODE KV	GRID VOLTS	ANODE AMPS.	DRIVE WATTS	OUT KW	(4) gm or $\mu$	MAX. DAL (2) INCH	MAX. DIAM. (2) INCH	BASE DWG.
WL-6423	F	7	85	12.5	30	12.5	30	12	-400	2.1	200	18.2	90	15 $\frac{3}{4}$	5	VC6
WL-6423F	F	7	85	12.5	30	10	30	12	-400	2.1	200	18.2	90	16	8 $\frac{1}{8}$	VC5
WL-6424	W	7	120	12.5	40	20	30	12	-1000	3.3	430	30.6	20	15 $\frac{1}{2}$	4 $\frac{1}{16}$	VC6
WL-6425	F	7	120	12.5	40	12.5	30	12	-1000	3.3	430	30.6	20	15 $\frac{3}{4}$	5	VC6
WL-6425F	F	7	120	12.5	40	11	30	12	-1000	3.3	430	30.6	20	16	8 $\frac{1}{8}$	VC5
WL-6426	W	8	200	12.5	80	40	30	7.5	-850	5.3	7500	33	20	15 $\frac{5}{8}$	4 $\frac{3}{4}$	VC6
WL-6427	F	8	200	12.5	80	20	30	7.5	-850	5.3	7500	33	20	16 $\frac{1}{4}$	5 $\frac{1}{4}$	VC6
WL-6567	W	6	70	12	24	15	50	12	-800	1.94	445	19.3	33	11 $\frac{3}{4}$	3 $\frac{3}{16}$	VC7
WL-6623	F	6	60	5	5	2.5	30	5	-850	1	250	4.1	22	6 $\frac{1}{16}$	4 $\frac{1}{16}$	VF5
WL-6696	W	13	205	16	120	60	30	15	-1600	7	600	80	20	19 $\frac{3}{8}$	6 $\frac{1}{8}$	VC6
WL-6697	F	13	205	16	120	35	30	15	-1600	7	600	80	20	19 $\frac{3}{8}$	6 $\frac{1}{8}$	VC6
WL-6893	A	12.6	0.4	600V	40W	13.5W	125	600V	-45	66mA	0.17	27W	3500	3 $\frac{21}{32}$	1 $\frac{1}{16}$	7CK
WL-6939	A	12.6(8)	0.3	250V	12W	6W	500	180V	-20	55mA	1.2	5W	10500	2 $\frac{5}{8}$	$\frac{7}{8}$	9HL
WL-7007	F	5	180	7.5	20	12	220	7	-300	2.6	720	12	—	11 $\frac{5}{8}$	6	VC4
WL-7203	F	6	2.3	2	—	250W	500	2	-90	0.25	1	0.4	—	2 $\frac{15}{32}$	1 $\frac{1}{8}$	4V1
WL-7215	W	6	60	9.2	18	9	30	9	-1400	2	337	13.6	22	8 $\frac{1}{2}$	3 $\frac{3}{8}$	VP9
WL-7255	W	6	60	9.2	18	9	30	9	-1400	2	337	13.6	22	9 $\frac{1}{2}$	3 $\frac{3}{8}$	VF5
WL-7328A(11)	F	7	245	10	50	20	Note 11	10	-2200	0.5 Min. 8.5 Max.	0	49.5	6	14 $\frac{1}{2}$	10 $\frac{1}{16}$	3V3
WL-7463	F	6	70	12	24	12	60	12	-800	1.94	445	19.3	33	9 $\frac{13}{16}$	11	VC7
WL-7464(11)	W	6	60	8	18	8	Note 11	7.5	-1200	0.3 Min. 2.68 Max.	0	10.8	6	9 $\frac{1}{2}$	3 $\frac{5}{8}$	VP9
WL-7482	V	14.5	450	20	600	200	30	20	-1000	29	6000	440	45	26	11 $\frac{3}{8}$	VC6
WL-7482V	V	14.5	450	20	600	200	30	20	-1000	29	6000	440	45	27 $\frac{1}{2}$	11 $\frac{3}{8}$	VC6
WL-7540(11)	W	5	250	15	70	35	Note 11	12.5	-2800	1 Min. 8 Max.	0	59	5	16	7 $\frac{1}{4}$	VF6
WL-7560	W	14.5	450	20	600	175	30	20	-1000	29	6000	440	45	29 $\frac{1}{2}$	10	VC6
WL-7560V	W	14.5	450	20	600	175	30	20	-1000	29	6000	440	45	36 $\frac{1}{2}$	10	VC6
WL-7565(11)	F	6	60	5	5	2.5	Note 11	7	-1140	0.5 Min. 2.2 Max.	0	7.7	6	6 $\frac{1}{16}$	4 $\frac{1}{16}$	VF5
WL-7604(12)	F	5	8	4	1.5	0.6	60	3.5	-210	0.285	65	755	20	5 $\frac{1}{16}$	2 $\frac{1}{16}$	3V4
WL-7685(12)	F	5	8	4	1.5	0.6	60	4	-550	0.12 Min. 0.64 Max.	0	1550	6.5	5 $\frac{1}{16}$	2 $\frac{1}{16}$	3V4
WL-7748	W	8	150	12.5	80	35	30	12.5	-1300	4.25	970	46.5	20	15	7 $\frac{1}{4}$	3V3
WL-7982(11)	W	7	265	10	75	35	Note 11	10	-2200	0.5 Min. 9.3 Max.	61	65	5.5	15	6 $\frac{7}{8}$	3V3
WL-8032	A	13.5	0.585	600V	67.5W	20W	60	600V	-58	112mA	0.2	52W	7000	3 $\frac{1}{16}$	12 $\frac{3}{32}$	7CK
WL-8045	W	12.6	285	18	270	90	2	16	-1800	13.2	3250	150	20	23 $\frac{3}{8}$	7 $\frac{1}{8}$	3V1
WL-8161/ 3CX2500A3	F	7.5	51.5	6	12	2.5	75	6	-500	2	136	10	22.5	9	4 $\frac{1}{8}$	VC1
WL-8251/ 3CX2500F3	F	7.5	51.5	6	12	2.5	30	6	-500	2	136	10	22.5	9	4 $\frac{1}{8}$	VF1
WL-8298	A	6.75	1.165	600V	67.5W	20W	60	600V	-58	112mA	0.2	52W	7000	3 $\frac{1}{16}$	12 $\frac{3}{32}$	7CK
WL-22759	W	6	60	9.2	18	9	30	9	-1400	2	337	13.6	22	9 $\frac{1}{2}$	3 $\frac{5}{8}$	VF5
WL-22789	W	6	60	9.3	21	9	30	9	-1400	2	337	13.6	22	9 $\frac{1}{2}$	3 $\frac{5}{8}$	VF5
WL-22803	W	13.5	550	22	600	200	15	20	-1400	30	8800	485	35	33 $\frac{3}{8}$	9 $\frac{1}{2}$	3V5
WL-22862	W	12.6	285	18	270	90	2	16	-1800	13.2	3250	150	22	24	8 $\frac{3}{32}$	VF4
WL-22924	V	12.6	285	18	270	100	2	16	-1800	13.2	3250	150	22	25	10	VF4
WL-23063	W	13.5(10)	375	25	1000	375	15	16	-1900	46	17KW	550	22	40	15	3V6
WL-23165	W	11(10)	95	15	150	90	10	15	-1500	6.1	1785	73.5	36	23 $\frac{3}{8}$	8 $\frac{1}{4}$	VP5

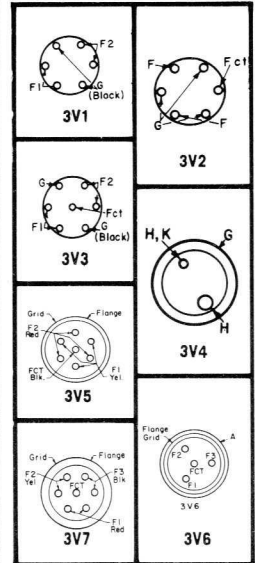




# HIGH VACUUM SWITCH TUBES



TUBE TYPE	COOLING	CATHODE		RATINGS						CUT-OFF (13) VOLTS	MECHANICAL		
		VOLTS	AMP.	ANODE KV	DISS KW	ANODE PK AMP.	CATHODE PK AMP.	PULSE $\mu$ SEC	DUTY FACTOR		MAX. OAL	MAX. DIAM.	BASE DWG
WL-466R	F	13	205	45	35	150	175	1000	0.01	-3200	19 $\frac{7}{8}$ "	6 $\frac{1}{8}$ "	VC6
WL-4852	W	15(10)	390	80	375	1400	1650	500	0.008	-4200	40"	15"	3V6
WL-5682	W	16.5	325	35	120	300	360	1000	0.01	-3200	23 $\frac{1}{4}$ "	8 $\frac{1}{32}$ "	VC3
WL-6293	A	6.3	1.25	2.0 3.5	10W 10W	3 1.4	—	30 200	0.003 0.02	-200	3 $\frac{13}{16}$ "	1 $\frac{23}{32}$ "	7C6
WL-6422	W	7	85	35	20	30	35	1000	0.03	-1000	15 $\frac{1}{2}$ "	4 $\frac{3}{16}$ "	VC6
WL-6423	F	7	85	35	12.5	30	35	1000	0.03	-1000	15 $\frac{3}{4}$ "	5"	VC6
WL-6423F	F	7	85	35	10	30	35	1000	0.03	-1000	16"	8 $\frac{1}{8}$ "	VC5
WL-6424	W	7	120	35	20	36	45	1000	0.03	-3000	15 $\frac{1}{2}$ "	4 $\frac{3}{16}$ "	VC6
WL-6425	F	7	120	35	12.5	36	45	1000	0.03	-3000	15 $\frac{3}{4}$ "	5"	VC6
WL-6425F	F	7	120	35	10	36	45	1000	0.03	-3000	16"	8 $\frac{1}{8}$ "	VC5
WL-6426	W	8	200	45	40	70	85	1000	0.03	-3200	15 $\frac{5}{8}$ "	4 $\frac{3}{4}$ "	VC6
WL-6427	F	8	200	45	20	70	85	1000	0.03	-3200	16 $\frac{1}{4}$ "	5 $\frac{1}{4}$ "	VC6
WL-6696	W	13	205	45	60	150	175	1000	0.01	-3200	19 $\frac{3}{8}$ "	6 $\frac{1}{8}$ "	VC6
WL-6697	F	13	205	45	35	150	175	1000	0.01	-3200	19 $\frac{7}{8}$ "	6 $\frac{1}{8}$ "	VC6
WL-6920	F	11 11.9	285 —	35 35	10 10	100 150	140 200	15 15	0.002 0.002	—	24"	8"	3V1
WL-7328A	F	7.0	245	20	20	88	100	2000	0.01	-6000	14 $\frac{1}{2}$ "	10 $\frac{1}{16}$ "	3V3
WL-7413	W	12(10) 13(10)	103 106	60 60	70(14) 70(14)	150 400	200 500	1000 0.5	0.01 0.0012	-2700	23 $\frac{23}{32}$ "	8 $\frac{1}{4}$ "	VP5
WL-7560	W	14.5	450	50	175	450	550	1000	0.01	-3500	29 $\frac{1}{2}$ "	10"	VC6
WL-7560V	W	14.5	450	50	175	450	550	1000	0.01	-3500	31 $\frac{1}{2}$ "	10"	VC6
WL-7691	F	12(10) 13(10)	103 106	60 60	10 10	150 400	200 500	1000 0.5	0.01 0.0012	-2700	23 $\frac{1}{2}$ "	8 $\frac{1}{4}$ "	VP5
WL-7750	F	8	180	30	8	80	100	1000	0.02	-1800	14 $\frac{3}{8}$ "	8 $\frac{1}{32}$ "	3V3
WL-7982	W	7.0	265	20	35	88	100	2000	0.01	-6000	15"	6 $\frac{7}{8}$ "	3V3
WL 8044	F	8	185	30	20	80	105	1000	0.02	-1800	14 $\frac{1}{2}$ "	10 $\frac{1}{16}$ "	3V3
WL-8045	W	12.6	285	50	90	150	200	2000	0.06	-3000	23 $\frac{7}{8}$ "	7 $\frac{1}{8}$ "	3V1
WL-8461	W	15(10)	200	80	200	600	750	1000	0.01	-3500	33 $\frac{1}{8}$ "	11 $\frac{3}{4}$ "	3V7
WL-23185	W	12.6	285	75	90	150	200	1000	0.01	—	23 $\frac{5}{8}$ "	7 $\frac{3}{8}$ "	3V1



## Notes

- Ratings and Performance are based on CCS Class C Telegraphy service unless otherwise shown.
- Excluding flying leads and protruding side terminals, pipes or handles.
- Highest frequency for full input.
- For triodes, amplification factor ( $\mu$ ) is shown; for tetrodes, beam tubes and pentodes, transconductance (gm) in micromhos is listed.
- Watts output at 500 megahertz.
- Milliwatts output at 3000 megahertz.
- Twin unit tube, Ratings are each unit, Performance for both units.
- Parallel heater connection requires half heater voltage and twice heater current.
- For d-c and single phase a-c. For 2 phase a-c voltage per phase will be half listed value and current per phase will be listed current value.
- Listed values of filament voltage and current are per phase for 3 phase operation.
- Designed for audio and ultra-sonic service, Ratings are single tube Class AB and Performance is for 2 tubes Class AB.
- Ratings and Performance are for Class AB r-f amplifier service.
- For anode current of 1 milliampere maximum at maximum anode voltage.
- For oil immersion, cooling value is 14 kilowatts.

COOLING CODE = A — RADIATION  
 F — FORCED AIR  
 W — WATER  
 V — VAPOR

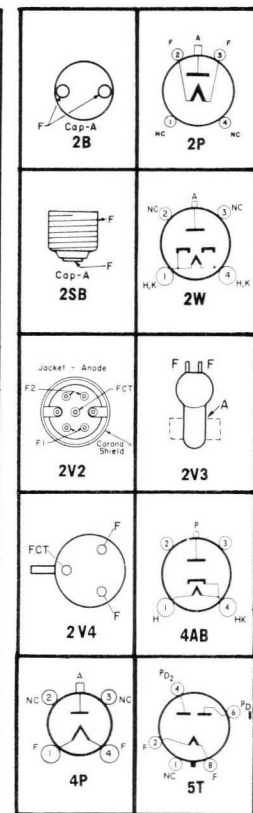


# HIGH VACUUM RECTIFIERS

High vacuum rectifiers are two electrode tubes with heated cathodes. Electrons emitted from the cathode are attracted to the plate when it is positive with respect to the cathode. These electrons form the tube current. High vacuum rectifiers are not very efficient for rectifying large currents, since the space charge increases the tube drop, but in applications involving very high voltages at low currents or a linear characteristic they are necessary. The absence of gas provides very high insulation during the inverse half cycle. Pure tungsten or thoriated tungsten fila-

ments are used to permit short delay periods between the application of filament voltage and plate voltage. High vacuum rectifiers are used in high voltage power supplies for electrostatic precipitation of vapors and dust such as the Precipitron® and high voltage testing of materials, to absorb high voltage inverse pulses such as reflected radar pulses, to permit unidirectional capacitor charging in pulse shaping networks, to produce the high accelerating voltages used in x-ray tubes and any other devices requiring small currents at very high voltages.

TUBE TYPE	NOTE	CATHODE		RATINGS				MECHANICAL		
		VOLTS	AMPS	INVERSE KV	PEAK MA	AVG. MA	DROP (3) VOLTS	MAX. OAL	MAX. DIAM.	BASE DWG.
WL-2X2A	(1)	2.5	1.75	12.5	60	7.5	240	4 $\frac{17}{32}$ "	1 $\frac{1}{16}$ "	4AB
WL-5R4-GYB	(1)	5	2	3100	715	150	123	4 $\frac{1}{4}$ "	1 $\frac{1}{16}$ "	5T
WL-102A	(1)	20.0	19	75	750	120	—	16 $\frac{1}{16}$ "	5 $\frac{1}{8}$ "	2B
WL-399	(2)	10.0	11.5	140	—	50	—	9 $\frac{3}{32}$ "	3 $\frac{3}{16}$ "	2B
WL-456	(1)	11.0	20	140	500	60	1760	19"	5 $\frac{1}{8}$ "	2B
WL-481B	(1)	2.5	5	25	150	30	80 (5)	4 $\frac{7}{8}$ "	1 $\frac{1}{16}$ "	4P
WL-579B	(1)	2.5	6	20	270	25	510	7 $\frac{1}{16}$ "	2 $\frac{1}{16}$ "	2P
WL-613	(1)	11.0	10	140	200	20	1040	19"	5 $\frac{1}{8}$ "	2SB
WL-836	(1)	2.5	5	5	1000	250	1800	6 $\frac{1}{16}$ "	2 $\frac{1}{16}$ "	2W
WL-5575	(1)	20.0	24	150	1000	160	525	25 $\frac{1}{4}$ "	6 $\frac{1}{8}$ "	2B
WL-5576	(1)	20.0	32	150	2500	400	1000	25 $\frac{1}{4}$ "	6 $\frac{1}{8}$ "	2B
WL-5859/5860	(2)	10.0	11.5	140	—	100	—	7 $\frac{7}{8}$ "	2 $\frac{1}{16}$ "	2B
WL-5934	(1)	2.5	6	20	270	25	520	6 $\frac{7}{8}$ "	2 $\frac{1}{16}$ "	4P
WL-5973	(1)	16.0	19.1	75	5000	1000	950	19 $\frac{1}{2}$ "	6 $\frac{1}{8}$ "	2B
WL-7658	(6)	4.0	6.8	125	750	150	900	8"	2 $\frac{1}{16}$ "	2B
WL-8094	(1)	12.0	23	110	10000	650	2500	25 $\frac{1}{4}$ "	6 $\frac{1}{8}$ "	2B
WL-22800	(7)	7	250	50	60A	20A	850	14 $\frac{1}{2}$ "	10 $\frac{1}{16}$ "	2V2
WL-22801	(7)	5	125	30	30A	10A	950	11"	6 $\frac{3}{32}$ "	2V3
WL-22802	(8)	7	250	50	60A	20A	850	15"	8 $\frac{1}{8}$ "	2V2
WL-23095(9)	(8)	9	132	30	—	3.5A	Note 9	12 $\frac{1}{16}$	4 $\frac{5}{8}$ "	2V3
WL-23102/102A	(1)	20	19	75	750	120	1800	16 $\frac{7}{8}$ "	5 $\frac{1}{8}$ "	2B
WL-23178(9)	(8)	16	32	15	—	2A	Note 9	9 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "	2V4



## Notes

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Air cooled.</li> <li>2. Oil cooled for X-ray applications.</li> <li>3. At bogey filament conditions and peak current.</li> <li>4. Excluding leads.</li> <li>5. Measured at 30 ma.</li> </ul> | <ul style="list-style-type: none"> <li>6. Oil cooled.</li> <li>7. Forced air cooled.</li> <li>8. Water cooled.</li> <li>9. Control diode.</li> </ul> |
|--|--|

# COLD CATHODE GAS-FILLED TUBES



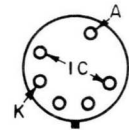
Cold cathode glow tubes have two or three electrodes and an inert gas fill. One popular type of two electrode tube is the voltage regulator tube. This type maintains a constant voltage drop with varying load currents.

The KX-642 provides over-voltage protection for power lines. It shorts out surges due to switching or lightning.

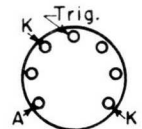
The gas triodes have a starting electrode which, when excited, starts tube conduction at a lower voltage.

## Voltage Regulators

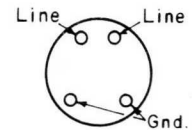
TUBE TYPE	ELECTRICAL				MECHANICAL		
	VOLTS	REGULATED MA	RANGE VOLTS	START VOLTS	MAX. OAL	MAX. DIAM.	DWG. BASE
WL-OA2	150	5 to 30	2	185	2 $\frac{5}{8}$ "	$\frac{3}{4}$ "	5B0
WL-OA2WA	150	5 to 30	2	185	2 $\frac{5}{8}$ "	$\frac{3}{4}$ "	5B0
WL-OA3/VR75	75	5 to 40	5	105	4 $\frac{1}{8}$ "	1 $\frac{1}{16}$ "	4AJ
WL-OB2	105	5 to 30	4	135	2 $\frac{5}{8}$ "	$\frac{3}{4}$ "	5B0
WL-OB2WA	105	5 to 30	4	135	2 $\frac{5}{8}$ "	$\frac{3}{4}$ "	5B0
WL-OB3/VR90	90	5 to 30	5	130	4 $\frac{1}{8}$ "	1 $\frac{1}{16}$ "	4AJ
WL-OC3/VR105	105	5 to 40	2	135	4 $\frac{1}{8}$ "	1 $\frac{1}{16}$ "	4AJ
WL-5651	87	1.3 to 3.5	1.5	103	2 $\frac{5}{8}$ "	$\frac{3}{4}$ "	5B0



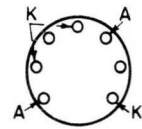
4AJ



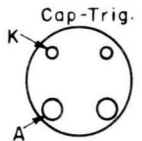
4CK



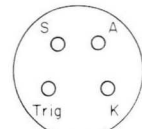
4CP



5B0



GT1



GT2

## Line Protector

TUBE TYPE	RATINGS				MECHANICAL		
	LINE VOLTS	DISCHARGE VOLTS	2 SEC. AMPS.	10 MIN. AMPS.	MAX. OAL	MAX. DIAM.	BASE DWG.
KX-642	230	300 to 500	50	7	4 $\frac{3}{16}$ "	2 $\frac{3}{16}$ "	4CP

## Gas Triodes

TUBE TYPE	ELECTRICAL			MECHANICAL			
	ANODE VOLTS	ANODE MA.	TRIGGER VOLTS	COOL	MAX. OAL	MAX. DIAM.	BASE DWG.
KU-618	440	15	300	air	5 $\frac{3}{4}$ "	2 $\frac{3}{16}$ "	GT2
WL-759	300	4	165	air	4"	1 $\frac{3}{16}$ "	GT1
WL-5823	117	25	105	air	2 $\frac{1}{8}$ "	$\frac{3}{4}$ "	4CK





# Hollow Cathode Spectral Tubes

For Atomic Absorption Spectroscopy

continued



CATHODE MAT'L & TYPES	WINDOW & SIZE			MAX mA	ANALY LINES A
	Note 1	Note 2	Note 3		
<b>Cobalt</b>					
WL-22813	P-A	A	35	2407	
WL-22814	Q-B	A	35	3454	
WL-22928	Q-B	Ne	35	3527	
WL-22953	Q-A	Ne	35	—	
WL-22878	Q-A	A	35	—	
<b>Copper</b>					
WL-22603	P-A	Ne	40	3247	
WL-22606	Q-B	A	40	3274	
WL-22879	Q-A	A	40	—	
WL-23041	Q-B	Ne	40	—	
WL-23042	Q-A	Ne	40	—	
<b>Dysprosium</b>					
WL-22827	Q-B	Ne	25	4046	
WL-22880	Q-A	Ne	25	4187	
<b>Erbium</b>					
WL-22828	Q-B	Ne	25	4008	
WL-22881	Q-A	Ne	25	—	
<b>Europium</b>					
WL-22845	Q-B	Ne	20	4594	
WL-22882	Q-A	Ne	20	4627	
<b>Gadolinium</b>					
WL-22975	P-A	Ne	20	3684	
WL-22985	Q-B	Ne	20	3713	
WL-22986	Q-A	Ne	20	—	
<b>Gallium</b>					
WL-22833	Q-B	Ne	15	2874	
WL-22884	Q-A	Ne	15	4172	
<b>Gold</b>					
WL-22839	Q-B	A	15	2428	
WL-22883	Q-A	A	15	2676	
WL-22935	Q-B	Ne	15	—	
WL-22960	Q-A	Ne	15	—	
<b>Holmium</b>					
WL-22829	Q-B	Ne	20	4054	
WL-22885	Q-A	Ne	20	5983	
<b>Indium</b>					
WL-22867	Q-B	A	20	3040	
WL-22915	Q-A	A	20	—	
WL-22996	Q-B	Ne	20	—	
<b>Iron</b>					
WL-22602	P-A	A	40	2483	
WL-22820	P-A	Ne	40	3720	
WL-22611	Q-B	A	40	—	
WL-22886	Q-A	A	40	—	
WL-22810	Q-B	Ne	40	—	
WL-22887	Q-A	Ne	40	—	
<b>High Purity Iron</b>					
WL-22837	Q-B	Ne	35	2483	
WL-22888	Q-A	Ne	35	3720	
<b>Lanthanum</b>					
WL-22846	Q-B	A	20	4015	
WL-22889	Q-A	A	20	3574	
WL-23049	Q-B	Ne	20	3928	

CATHODE MAT'L & TYPES	WINDOW & SIZE			MAX mA	ANALY LINES A
	Note 1	Note 2	Note 3		
<b>Lead</b>					
WL-22838	Q-B	A	15	2170	
WL-22890	Q-A	A	15	2833	
WL-22927	Q-B	Ne	15	2614	
WL-22952	Q-A	Ne	15	—	
<b>Lithium (See Note) (Natural)</b>					
WL-22825	P-A	A	30	6708	
WL-23060	P-A	Ne	30	—	
<b>Lithium-6 (See Note)</b>					
WL-22830	P-A	Ne	30	6708	
WL-22925	P-A	A	30	—	
<b>Lithium-7 (See Note)</b>					
WL-22831	P-A	Ne	30	6708	
WL-22926	P-A	A	30	—	
<b>Lutetium</b>					
WL-23009	Q-B	Ne	20	3081	
WL-23010	Q-A	Ne	20	—	
<b>Magnesium</b>					
WL-22609	Q-B	A	20	2852	
WL-22891	Q-A	A	20	2025	
WL-22968	Q-B	Ne	20	2659	
WL-22951	Q-A	Ne	20	—	
<b>Manganese</b>					
WL-22608	Q-B	A	35	2795	
WL-22876	Q-A	A	35	2801	
WL-22815	P-A	A	35	—	
WL-22936	Q-B	Ne	35	—	
WL-22961	Q-A	Ne	35	—	
<b>Mercury</b>					
WL-22847	Q-B	A	15	2537	
WL-22892	Q-A	A	15	—	
<b>Molybdenum</b>					
WL-22805	Q-B	A	35	3133	
WL-22893	Q-A	A	35	3170	
WL-22937	Q-B	Ne	35	—	
WL-22962	Q-A	Ne	35	—	
<b>Neodymium</b>					
WL-22979	Q-B	Ne	20	4925	
WL-22980	Q-A	Ne	20	—	
<b>Nickel</b>					
WL-22605	P-A	A	40	2320	
WL-22663	Q-B	A	40	3415	
WL-22894	Q-A	A	40	—	
WL-22819	Q-B	Ne	40	—	
WL-22895	Q-A	Ne	40	—	
<b>Niobium (Columbium)</b>					
WL-22858	Q-B	Ne	30	4059	
WL-22912	Q-A	Ne	30	4080	
<b>Palladium</b>					
WL-22857	Q-B	A	30	2448	
WL-22911	Q-A	A	30	2476	
WL-22969	Q-B	Ne	30	3404	
WL-22970	Q-A	Ne	30	—	

CATHODE MAT'L & TYPES	WINDOW & SIZE			MAX mA	ANALY LINES A
	Note 1	Note 2	Note 3		
<b>Phosphorus</b>					
WL-22989	Q-B	Ne	20	—	
WL-22990	Q-A	Ne	20	—	
<b>Platinum</b>					
WL-22851	Q-B	A	30	2659	
WL-22896	Q-A	A	30	—	
<b>Potassium</b>					
WL-22863	P-A	Ne	25	7665	4044
<b>Praseodymium</b>					
WL-22981	Q-B	Ne	20	4951	
WL-22982	Q-A	Ne	20	5133	
<b>Rhenium</b>					
WL-22942	Q-B	Ne	30	3460	
WL-22967	Q-A	Ne	30	3465	
<b>Rhodium</b>					
WL-22850	Q-B	A	30	3435	
WL-22897	Q-A	A	30	3692	
WL-22997	Q-B	Ne	30	—	
<b>Rubidium</b>					
WL-22824	P-A	Ne	30	7800	
WL-23046	Q-B	Ne	30	—	
<b>Samarium</b>					
WL-22818	Q-B	Ne	30	3951	
WL-22899	Q-A	Ne	30	4760	
<b>Selenium</b>					
WL-22843	Q-B	A	15	1960	
WL-22898	Q-A	A	15	2040	
WL-22938	Q-B	Ne	15	—	
WL-22963	Q-A	Ne	15	—	
<b>Silicon</b>					
WL-22832	Q-B	A	20	2516	
WL-22900	Q-A	A	20	—	
WL-22939	Q-B	Ne	20	—	
WL-22964	Q-A	Ne	20	—	
<b>Silver</b>					
WL-22806	Q-B	A	20	3281	
WL-22901	Q-A	A	20	3383	
<b>Sodium</b>					
WL-22864	P-A	A	25	5890	
WL-23059	P-A	Ne	25	3302	
<b>Strontium</b>					
WL-22835	P-A	Ne	30	4607	
<b>Tantalum</b>					
WL-22859	Q-B	A	30	3311	
WL-22913	Q-A	A	30	—	
WL-22971	Q-B	Ne	30	—	
WL-22972	Q-A	Ne	30	—	
<b>Tellurium</b>					
WL-22842	Q-B	A	15	2143	
WL-22902	Q-A	A	15	2386	
WL-22940	Q-B	Ne	15	—	
WL-22965	Q-A	Ne	15	—	
<b>Terbium</b>					
WL-22848	Q-B	Ne	30	4319	
WL-22903	Q-A	Ne	30	4338	



# Hollow Cathode Spectral Tubes

For Atomic Absorption Spectroscopy

continued

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA	ANALY LINES A
	Note 1	Note 2			
<b>Thorium</b>					
WL-23027	Q-B	Ne	30	—	—
WL-23028	Q-A	Ne	30	—	—
<b>Thulium</b>					
WL-23007	Q-B	Ne	20	4094	—
WL-23008	Q-A	Ne	20	4105	—
<b>Tin</b>					
WL-22822	Q-B	A	15	2863	—
WL-22904	Q-A	A	15	—	—
WL-22941	Q-B	Ne	15	—	—
WL-22966	Q-A	Ne	15	—	—
<b>Titanium</b>					
WL-22991	Q-B	Ne	25	3643	—
WL-22992	Q-A	Ne	25	3998	—

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA	ANALY LINES A
	Note 1	Note 2			
<b>Tungsten</b>					
WL-22844	Q-B	Ne	35	4009	—
WL-22905	Q-A	Ne	35	4294	—
WL-22849	Q-B	A	35	—	—
WL-22906	Q-A	A	35	—	—
<b>Uranium</b>					
WL-22826	Q-B	Ne	30	5027	—
WL-22907	Q-A	Ne	30	5915	—
<b>Vanadium</b>					
WL-22856	Q-B	A	35	3184	—
WL-22910	Q-A	A	35	3855	—
WL-22973	Q-B	Ne	35	—	—
WL-22974	Q-A	Ne	35	—	—

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA	ANALY LINES A
	Note 1	Note 2			
<b>Ytterbium</b>					
WL-22983	Q-B	A	20	3988	—
WL-22984	Q-A	A	20	—	—
<b>Yttrium</b>					
WL-22976	P-A	Ne	20	4077	—
WL-22987	Q-B	Ne	20	4102	—
WL-22988	Q-A	Ne	20	—	—
<b>Zinc</b>					
WL-22607	Q-B	A	18	2139	—
WL-22908	Q-A	A	18	3076	—
WL-22811	Q-B	Ne	18	—	—
WL-22909	Q-A	Ne	18	—	—
<b>Zirconium</b>					
WL-22860	Q-B	A	30	—	—
WL-22914	Q-A	A	30	—	—
WL-22998	Q-B	Ne	30	—	—

## MULTIPLE ELEMENT TYPES

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA
	Note 1	Note 2		
<b>Ca-Mg-AL</b>				
WL-22604	Q-B	A	20	—
WL-22871	Q-A	A	20	—
WL-22930	Q-B	Ne	20	—
WL-22955	Q-A	Ne	20	—
<b>Ba-Ca-Sr</b>				
WL-23034	P-A	Ne	25	—
<b>Ca-Mg-Al-Li</b>				
WL-23035	Q-B	Ne	18	—
WL-23036	Q-A	A	18	—
<b>Fe-Cu-Mn</b>				
WL-23106	Q-B	Ne	35	—

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA
	Note 1	Note 2		
<b>Cr-Fe-Mn-Ni</b>				
WL-23108	Q-B	Ne	30	—
<b>Cu-Zn-Pb-Sn</b>				
WL-23109	Q-B	Ne	12	—
<b>As-Ni</b>				
WL-23116	Q-B	Ne	20	—
<b>Au-Ni</b>				
WL-23117	Q-B	Ne	15	—
<b>In-P</b>				
WL-23118	Q-B	Ne	20	—
<b>Cu-Ga</b>				
WL-23119	Q-B	Ne	20	—

CATHODE MAT'L & TYPES	WINDOW & SIZE		GAS FILL	MAX mA
	Note 1	Note 2		
<b>Se-Ni</b>				
WL-23130	Q-B	Ne	15	—
<b>Cu-Mn</b>				
WL-23131	Q-B	Ne	35	—
<b>Cu-Pb-Zn-Ag</b>				
WL-23132	Q-B	Ne	15	—
<b>Ba-Ca-Sr-Mg</b>				
WL-23133	Q-B	Ne	25	—
<b>Cu-Zn-Fe-Mn</b>				
WL-23134	Q-B	Ne	15	—
<b>Cu-Zn-Mo</b>				
WL-23135	Q-B	Ne	15	—

## NOTES

### 1. WINDOW CHARACTERISTICS

P = Pyrex (70% transmission at 3050 Å)  
 Q = Quartz (75% transmission at 2200 Å)  
 A = 1½ inch diameter window  
 B = 1 inch diameter window

### 2. GAS FILL

A = Argon gas fill      Ne = Neon gas fill

### 3. CURRENT RATING

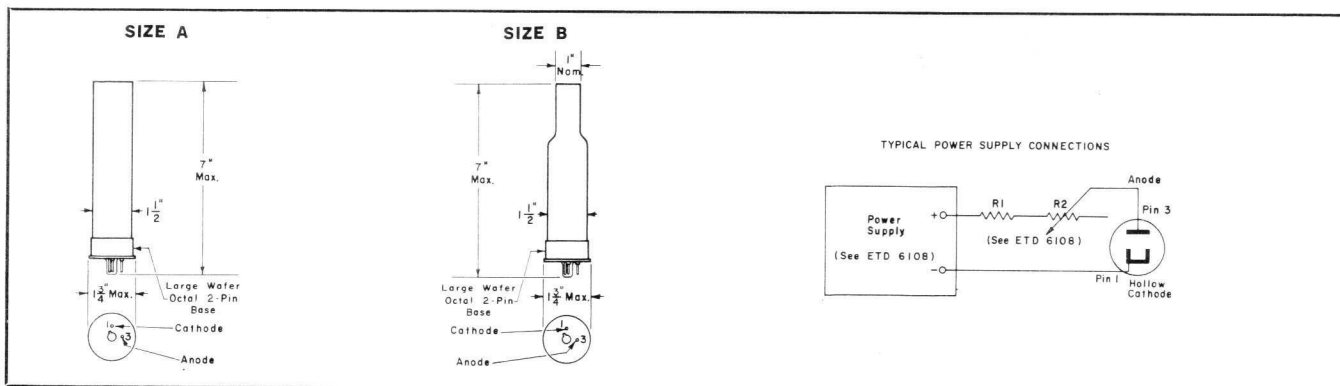
The current rating shown is the maximum permissible figure and does not represent typical operation. For optimum performance and life, a tube should be operated at the lowest current consistent with the desired output characteristics.

### LITHIUM CAUTION

Output from a Lithium cathode tube with neon fill will experience second-order interference from the Ne-3355 line. However, operation with any one of the listed Corning Glass sharp-cutoff filters will eliminate the interference and is to be preferred over the argon-filled tube.

Corning Glass Filters which Eliminate Ne-3355 Line

CS 2-58	CS 2-60	CS 2-62	CS 3-66	CS 3-68
CS 2-59	CS 2-61	CS 2-63	CS 3-67	CS 3-69



Phototubes conduct electricity when light strikes the photocathode. Variations in light intensity produce variations in current conducted. Vacuum types have a linear response to light intensity whereas gas filled types are more sensitive to light changes. Photomultiplier types have internal current amplification by auxiliary electrodes called dynodes. They have, therefore, larger signal output than the gas and vacuum types. Phototubes are used in motion-picture-film sound-pickup heads, automatic headlight dimmers, light-operated door openers and burglar alarms. Industrial uses include counting, color matching, sorting, measuring, detecting products at various stages of manufacture, printing press registry and dyestuff process control.

# PHOTOTUBES



## GAS and VACUUM TUBES

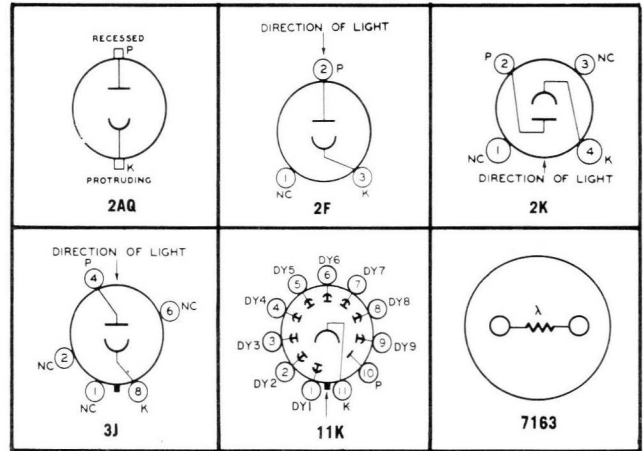
TUBE TYPE	CLASS	RATINGS			CHARACTERISTICS		MECHANICAL		
		ANODE VOLTS	CATHODE $\mu$ AMPS.	TEMP. $^{\circ}$ C	PC NO.	LUM SENS(1)	MAX. OAL	MAX. DIAM.	BASE DWG.
WL-1P39	vac	250	5	75	S-4	45	3 $\frac{1}{16}$ "	1 $\frac{1}{32}$ "	3J
WL-1P40	gas	90	3	100	S-1	135	3 $\frac{1}{16}$ "	1 $\frac{1}{32}$ "	3J
WL-922	vac	500	5	100	S-1	20	1 $\frac{1}{16}$ "	0.89"	2AQ
WL-923	gas	90	3	100	S-1	135	3 $\frac{1}{16}$ "	1 $\frac{1}{32}$ "	2K
WL-927	gas	90	2	100	S-1	125	2 $\frac{3}{32}$ "	0.669"	2F
WL-930	gas	90	3	100	S-1	135	3 $\frac{1}{16}$ "	1 $\frac{1}{32}$ "	3J

## MULTIPLIER PHOTOTUBES

TUBE TYPE	RATINGS			CHARACTERISTICS			MECHANICAL		
	SUPPLY VOLTS	ANODE $\mu$ AMPS.	TEMP. $^{\circ}$ C	PC NO.	LUM SENS	CURRENT AMP.	MAX. OAL	MAX. DIAM.	BASE DWG.
WL-931A(2)	1250	1000	75	S-4	30(3)	110000(4)	3 $\frac{1}{16}$ "	1 $\frac{1}{16}$ "	11K

## PHOTO CONDUCTIVE CELL

TUBE TYPE	MAX. RESPONSE	MAX. WATTS	CHARACTERISTIC RESISTANCE			MAX. HGT.	MAX. DIAM.	BASE DWG.
			@ 10 $^{-2}$ F-C	@ 1 F-C	@ 10 $^{2}$ F-C			
WL-7163	5800 A	0.75	2M $\Omega$	20K $\Omega$	500 $\Omega$	0.9"	1.26"	7163



### Notes

1. Microamperes per lumen measured with an unmodulated light source.
2. 9 stages.
3. Cathode response with 100 volts applied.
4. With 75 volts per stage.

# GAS AND MERCURY VAPOR RECTIFIERS

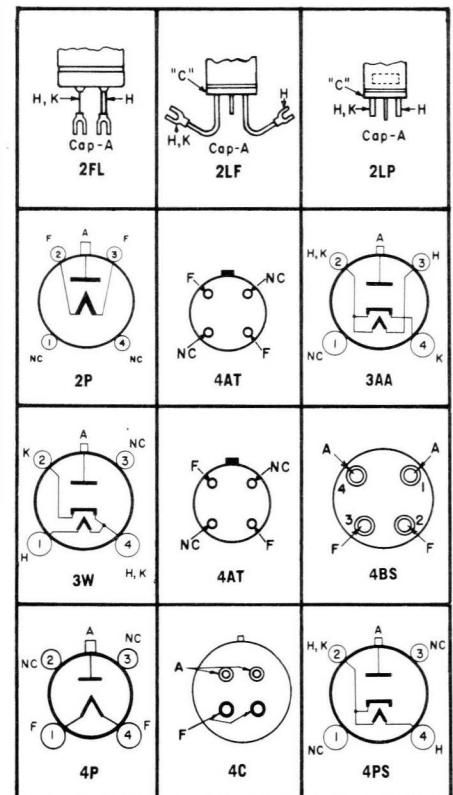
Gas and mercury vapor rectifiers are two electrode tubes with heated cathodes filled with either a low pressure of inert gas or mercury vapor. Mercury-vapor filled types are more sensitive to ambient temperature changes than types filled with inert gas. Current conduction in an atmosphere of gas molecules causes ionization freeing ions which neutralizes the negative space charge. The removal of the space charge lowers the voltage needed to accelerate

electrons from the cathode to the anode. This lower tube drop allows higher currents to be conducted with lower losses than an equivalent vacuum tube. Gas and vapor rectifiers are used in a variety of single and multiple tube circuits to provide operating voltages to large amplifier tubes used in radio broadcasting or industrial heating and in other applications requiring large amounts of current at high voltages.

TUBE TYPE	CATHODE		RATINGS				COOL	MECHANICAL		
	VOLTS	AMPS.	INVERSE VOLTS	PEAK AMP.	AVG. AMP.	DROP VOLTS (2)		MAX. (1) OAL	MAX. DIAM.	BASE DWG.
WL-3B22	2.5	6	725	4.0	1.0	8	air	6"	1 $\frac{1}{32}$ "	4C
WL-3B28	2.5	5	10000	1.0	0.25	10	air	6 $\frac{5}{32}$ "	2 $\frac{1}{16}$ "	4P
WL-4B24	2.5	11.5	725	10.0	2.5	8	air	7 $\frac{1}{2}$ "	2 $\frac{3}{16}$ "	4BS
WL-575A	5.0	10	15000	6.0	1.5	10	air	11 $\frac{1}{16}$ "	3 $\frac{3}{16}$ "	4PS
WL-670	2.5	17	725	25.6	6.3	8	air	8"	2"	4BS
WL-673	5.0	10	15000	10.0	2.5	10	air	11 $\frac{1}{16}$ "	3 $\frac{1}{8}$ "	2P
WL-816	2.5	2	7500	0.5	0.125	15	air	4 $\frac{1}{16}$ "	1 $\frac{1}{16}$ "	4P
WL-857B(3)	5.0	30	22000	40.0	10.0	15	air	19 $\frac{7}{8}$ "	7 $\frac{1}{8}$ "	2FL
WL-866A	2.5	5	10000	1.0	0.25	15	air	6 $\frac{5}{16}$ "	2 $\frac{1}{16}$ "	4P
WL-869B	5.0	19	20000	10.0	2.5	15	air	14 $\frac{7}{8}$ "	5 $\frac{1}{8}$ "	2LP
WL-869BL(3)	5.0	19	20000	10.0	2.5	15	air	14 $\frac{7}{8}$ "	5 $\frac{1}{8}$ "	2LF
WL-872A	5.0	7.5	10000	5.0	1.25	15	air	8 $\frac{1}{2}$ "	2 $\frac{5}{16}$ "	4AT
WL-5558	5.0	4.5	5000	15.0	2.5	15	air	7"	3"	3W
WL-5561	5.0	10	3000	40.0	6.4	15	air	11 $\frac{1}{4}$ "	3 $\frac{3}{16}$ "	3AA
WL-6894	5.0	10	20000	11.5	2.5	25(4)	air	10 $\frac{1}{32}$ "	2 $\frac{5}{8}$ "	4AT
WL-6895	5.0	10	20000	11.5	2.5	25(4)	air	10 $\frac{1}{32}$ "	2 $\frac{5}{8}$ "	2P
WL-6930(3)	2.5	18	1000	77	6.4	9	air	8 $\frac{5}{8}$ "	2 $\frac{1}{16}$ " (5)	2P
WL-7014(6)	2.5	11.5	900	10.0	2.5	10	air	7 $\frac{1}{2}$ "	2 $\frac{1}{16}$ "	4BS
WL-7015(7)	2.5	11.5	900	10.0	2.5	10	air	7 $\frac{1}{2}$ "	2 $\frac{1}{16}$ "	4BS
WL-7016(6)	2.5	17	900	25.6	6.4	10	air	8"	2 $\frac{3}{16}$ "	4BS
WL-7017(7)	2.5	17	900	25.6	6.4	10	air	8 $\frac{5}{8}$ "	2 $\frac{3}{16}$ "	4BS
WL-7018	2.5	7	2000	10.0	2.5	12	air	6 $\frac{3}{8}$ "	2 $\frac{1}{16}$ "	4P
WL-7019	2.5	18	1000	77.0	6.4	9	air	9 $\frac{1}{2}$ "	2 $\frac{3}{16}$ "	2P
WL-7020(8)	2.5	18	1000	77.0	6.4	9	air	9 $\frac{1}{2}$ "	2 $\frac{3}{16}$ "	2P
WL-7659(3)	5.0	16.25	22000	40.0	10.0	15	air	17 $\frac{5}{8}$ "	7 $\frac{1}{2}$ "	2FL
WL-8008	5.0	7.5	10000	5.0	1.25	15	air	8 $\frac{3}{4}$ "	2 $\frac{5}{16}$ "	2P
WL-23029(3)	5.0	30	22000	40.0	10.0	15	air	19 $\frac{7}{8}$ "	7 $\frac{1}{8}$ "	2FL

### Notes

1. Excluding flying leads.
2. Average value at rated current.
3. Flying leads.
4. Max. value at rated peak current.
5. Excluding mounting bracket.
6. Twin units, ratings are per unit.
7. Lug-based, twin units, ratings are per unit.
8. Lug-based.

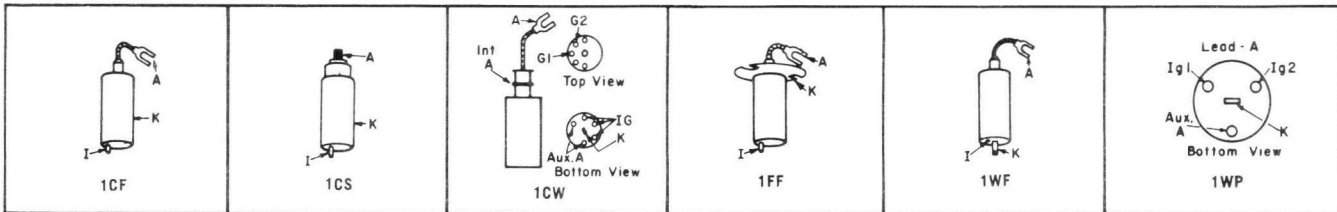




# IGNITRONS

Ignitrons are gas-discharge, pool-type cathode tubes in which current conduction is initiated for each conducting cycle by means of an electrode called an ignitor. The ignitor is a small conical refractory element projecting into the mercury. When a relatively small current is conducted through the ignitor to the mercury, ionization of some mercury molecules in this area takes place. Ignitrons are of the half-wave type and current is conducted only when the anode is positive with respect to the cathode and the ignitor is fired. Control of the average conducted current is accomplished by phase control of the point in the input cycle at which the ignitor is fired. During the non-conducting cycle, ionization in these single-anode tubes is very low; the resulting reduction of shielding necessary to

prevent arc-backs lowers the arc voltage and permits operation at lower supply voltages. Ignitrons therefore have some of the control characteristics of thyratrons and, having a mercury-pool cathode, are capable of conducting very large currents. Water cooling of metal envelopes is used on most types to further increase current carrying capacity in a compact tube. Provision is made on some of the tube shells to connect thermostats for tube protection and water saving. Ignitrons are used in resistance welders, frequency-changer resistance welders, power rectifiers, high current switches in controlled fusion equipment, heat control devices for air-frame testing, and any circuit requiring precise control of large amounts of alternating or direct current.



## A.C. WELDER CONTROL IGNITRONS

TUBE TYPE (NOTE 2)	SIZE	MAXIMUM RATINGS								MAX. DIMENSIONS (NOTE 1)		COOLING	BASE DWG.
		RMS LINE VOLTS	DEMAND KVA	CORRES. CURRENT DC AMP.	DEMAND RMS AMP. 500 V. 1-30 CPS	CURRENT DC AMP.	CORRES. DEMAND KVA	MAX. AVG. TIME IN SEC. @ 250 V	@ 500 V	LENGTH	DIAM.		
WL-5550	A	250-600	300	12.1	600	22.4	100	22	11	9 <sup>7</sup> / <sub>8</sub> "	2 <sup>3</sup> / <sub>4</sub> "	Clamp	1 CF
WL-5551A WL-5551A (PC)	B	250-600	600	30.2	1200	56	200	18	9	13"	2 <sup>3</sup> / <sub>4</sub> "	Water	1 WF
WL-5552A WL-5552A (PC)	C	250-600	1200	75.6	2400	140	400	14	7.1	14"	4 <sup>1</sup> / <sub>4</sub> "	Water	1 WF
WL-5553B WL-553B (PC)	D	250-600	2400	192	4800	355	800	11.2	5.6	19 <sup>1</sup> / <sub>2</sub> "	5 <sup>5</sup> / <sub>8</sub> "	Water	1 WF
WL-5554/679	C	2400	1200	75	500 (Note 3)	113	600	1.5 (Note 3)	—	17"	4 <sup>1</sup> / <sub>8</sub> "	Water	1 WP
WL-5555/653B WL-5555A	D	2400	2400	135	1000 (Note 3)	207	1105	1.7 (Note 3)	—	20"	5 <sup>3</sup> / <sub>4</sub> "	Water	1 WP
WL-7669 WL-7669 (PC)	B Coax	250-600	600	30.2	1200	56	200	18	9	13"	3 <sup>1</sup> / <sub>4</sub> "	Water	1 FF
WL-7671 WL-7671 (PC)	C Coax	250-600	1200	75.6	2400	140	400	14	7.1	14 <sup>1</sup> / <sub>4</sub> "	4 <sup>5</sup> / <sub>8</sub> "	Water	1 FF
WL-7681	C 1/2	250-600	1800	113.5	3600	210	600	9.5	7.1	17 <sup>1</sup> / <sub>2</sub> "	4 <sup>1</sup> / <sub>4</sub> "	Water	1 WF

## FREQUENCY CHANGER WELDING CONTROL IGNITRONS

TUBE TYPE (NOTE 2)	SIZE	PEAK INVERSE VOLTS	RATED CURRENTS				MAX. AVG. TIME SECONDS	MAX. DIMENSIONS (NOTE 1)		COOLING	BASE DWG.
			MAX. PEAK AMP.	CORRES. AVG. AMP.	MAX. AVG. AMP.	CORRES. PEAK AMP.		LENGTH	DIAMETER		
WL-5551A WL-5551A (PC)	B	1200 1500	600 480	5 4	22.5 18	135 108	10 10	13"	2 <sup>3</sup> / <sub>4</sub> "	Water	1 WF
WL-5553B WL-5553B (PC)	D	1200 1500	3000 2400	40 32	140 112	840 672	6.25 6.25	19 <sup>1</sup> / <sub>2</sub> "	5 <sup>5</sup> / <sub>8</sub> "	Water	1 WF
WL-5822A	C	1200 1500	1500 1200	20 16	70 56	420 336	6.25 6.25	14"	4 <sup>1</sup> / <sub>4</sub> "	Water	1 WF
WL-7669 WL-7669 (PC)	B Coax	1200 1500	600 480	5 4	22.5 18	135 108	10 10	13"	3 <sup>1</sup> / <sub>4</sub> "	Water	1 FF
WL-7670	—	2500	2000	10	—	—	2	12"	2 <sup>3</sup> / <sub>4</sub> "	Water	1 FF
WL-7681	C 1/2	1200 1500	2250 1800	30 24	105 84	630 502	6.25 6.25	17 <sup>1</sup> / <sub>2</sub> "	4 <sup>1</sup> / <sub>4</sub> "	Water	1 WF





## POWER RECTIFIER IGNITRONS

TUBE TYPE	SIZE	PEAK INVERSE VOLTS	MAXIMUM CURRENT RATINGS		MAXIMUM DIMENSIONS (NOTE 1)		COOLING	BASE DWG.
			PEAK AMP.	CONT. AVG. AMP.	LENGTH	DIAMETER		
WL-5554/679	C	900 2100	900 600	100 75	17"	4 $\frac{1}{8}$ "	Water	1 WP
WL-5555A WL-5555/653B	D	900 2100	1800 1200	200 150	20"	5 $\frac{3}{4}$ "	Water	1 WP
WL-6228	—	20000	900	150	42"	9"	Water	1 CW

## CONTINUOUS DUTY A.C. CONTROL IGNITRONS (NOTE 4)

TUBE TYPE (NOTE 2)	SIZE	MAXIMUM RATINGS								MAX. DIMENSIONS (NOTE 1)		COOLING	BASE DWG.
		RMS LINE VOLTS	DEMAND KVA	CORRES. CURRENT DC AMP.	CONTINUOUS RMS AMP. 2 TUBES	CURRENT DC AMP.	CORRES. DEMAND KVA	MAX. AVG. TIME IN SEC.		LENGTH	DIAM.		
								@ 250 V	@ 500 V				
WL-23011 WL-23011 (PC)	B	250-600	600	30.2	124	56	200	18	9	13"	2 $\frac{3}{4}$ "	Water	1 WF
WL-23012 WL-23012 (PC)	C	250-600	1200	75.6	311	140	400	14	7.1	14"	4 $\frac{1}{4}$ "	Water	1 WF
WL-23013 WL-23013 (PC)	D	250-600	2400	192	788	355	800	11.2	5.6	19 $\frac{1}{2}$ "	5 $\frac{5}{8}$ "	Water	1 WF
WL-23014 WL-23014 (PC)	B Coax	250-600	600	30.2	124	56	200	18	9	13"	3 $\frac{1}{4}$ "	Water	1 FF
WL-23015 WL-23015 (PC)	C Coax	250-600	1200	75.6	311	140	400	14	7.1	14 $\frac{1}{4}$ "	4 $\frac{5}{8}$ "	Water	1 FF
WL-23016	C $\frac{1}{2}$	250-600	1800	113.5	466	210	600	9.5	7.1	17 $\frac{1}{2}$ "	4 $\frac{1}{4}$ "	Water	1 WF
WL-23017	D Coax	250-600	2400	192	788	355	800	11.2	5.6	17 $\frac{1}{2}$ "	5 $\frac{5}{8}$ "	Water	1 FF
WL-23018	C $\frac{1}{2}$ Coax	250-600	1800	113.5	466	210	600	9.5	7.1	15"	5 $\frac{3}{8}$ "	Water	1 FF

## CAPACITOR DISCHARGE & CROWBAR IGNITRONS

TUBE TYPE	MAXIMUM RATINGS					MAX. DIMENSIONS (NOTE 1)		COOLING	BASE DWG.
	HOLD-OFF KV	PEAK AMP.	DISCHARGE COULOMBS	REP. RATE PULSES/MIN.	AVERAGE CURRENT AMP.	LENGTH	DIAMETER		
WL-7171	10	35,000	18.6	2	0.6	8 $\frac{7}{16}$ "	2 $\frac{5}{32}$ "	Clamp	1 CS
WL-7703	20	100,000	—	2	—	7"	2 $\frac{7}{32}$ "	Clamp	1 CS
WL-7740	20	35,000	18.6	2	0.6	8 $\frac{7}{8}$ "	2 $\frac{5}{32}$ "	Clamp	1 CS
WL-8306	15	35,000	18.6	2	0.6	8 $\frac{7}{8}$ "	2 $\frac{5}{32}$ "	Clamp	1 CS

## PULSE MODULATOR IGNITRONS (NOTE 5)

TUBE TYPE	MAXIMUM RATINGS			AVG. AMP.	PULSE		BASE DWG.
	FORWARD KV	INVERSE KV	PEAK AMP.		LENGTH $\mu$ SEC.	REP. RATE PPS	
WL-6228	40	0.5	3300	3.8	3.2	360	1 CW

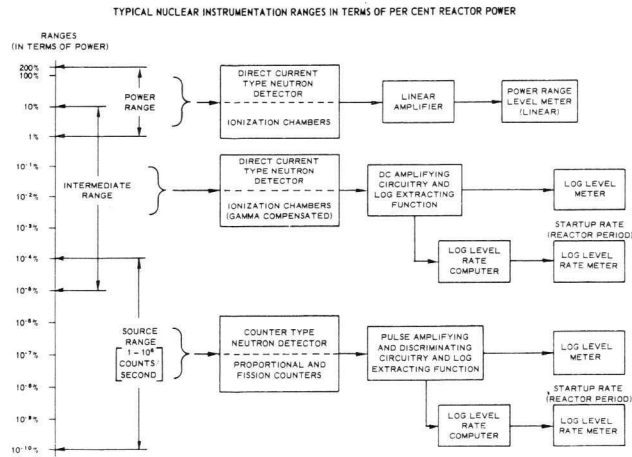
### NOTES

1. Excluding flying leads, water pipes, and on coaxial tubes the mounting flange.
2. Suffix PC indicates plastic-coated tube.
3. At 2400 volts.
4. These tubes use heavy duty ignitors designed for continuous duty.
5. Consult Industrial and Transmitting Tube Development Department for pulse modulator applications. The parameters listed represent a specific application only and substantial increases can be made in some areas.



# NEUTRON & RADIATION DETECTION TUBES

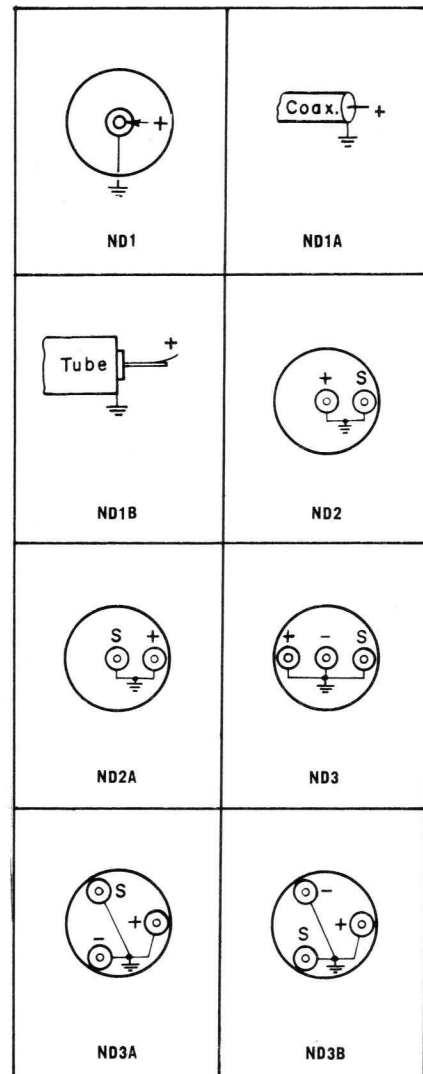
Radiation detection tubes are electronic devices which permit the passage of electrical current between electrodes when exposed to penetrating radiation. A variation of the intensity of radiation causes a corresponding variation in current between the electrodes. The tubes are designed to respond primarily to neutrons of thermal energies. Radiation detection tubes are of three general types: B<sup>10</sup>F<sub>3</sub> (Boron Trifluoride) filled proportional counters, Uranium coated counters or ionization chambers, and B<sup>10</sup> (Boron 10 Isotope) coated ionization chambers. At low levels of neutron flux, the current pulses due to the incident thermal neutrons are comparatively few in number, and therefore do not provide a steady current output. For this reason, in low flux level application, highly sensitive detector tubes, either BF<sub>3</sub> filled or Uranium coated are used in a pulse counting type circuit. The tube output is fed into a suitable amplifier, and pulses, proportional to the number of incident thermal neutrons, are registered on a scalar or rate meter. In applications of detector tubes in pulse counting, those pulses arising due to gamma photons which frequently accompany the neutron flux are sufficiently small that they may normally be biased out by a simple discriminator circuit. Uranium coated and B<sup>10</sup> coated ionization chambers are used in higher neutron flux levels. The tubes are self-integrating, and the output, proportional to the incident thermal neutron flux, is read directly on a d-c current indicating device. The gamma photons, frequently accompanying the neutron flux, usually constitute a very small percentage at high neutron flux levels, and as such contribute insignificantly to the signal current. In applications involving a high gamma flux, however, the compensated ionization chamber may be used. This tube electrically reduces the signal due to gamma flux. This compensation is achieved by having two concentric volumes. One of these is sensitive to neutrons and gamma flux. The other is sensitive to gamma flux only. The effective gamma sensitivity of these volumes is made equal. The output signals from the volumes are combined with opposite polarity and the signals due to gamma flux cancel each other. The effectiveness of this can-



cellation is limited primarily by instrumentation and the reactor characteristics. In application the gamma sensitivity of this tube may thus be reduced by a factor of 100 to 1000. The lower operating limit of the compensated ion chamber is reduced still further by using a guard ring construction. With a guard ring construction, leakage currents, through the insulators due to the applied voltages, flow to ground and not through the signal circuit. Radiation detection tubes are used as laboratory instruments in atomic and nuclear radiation investigations, in the control of reactors, and in health monitoring for personnel protection.

TUBE TYPE	SENS MAT'L.	TYPICAL				MAX. TEMP. °F	MECHANICAL		
		OPERATION	APPLIED VOLTS	SENSITIVITY A/nv	SENSITIVITY CPS/nv		MAX. OAL (1)	MAX. DIAM.	BASE DWG.
WL-6307	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	4.5	250	12 1/8"	1 1/2"	ND1
WL-6307A	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	4.5	300	—	—	ND1
WL-6376A	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter Ion Chamber	300 300 to 1000	— 1.4 x 10 <sup>-13</sup>	0.7 —	300	11 1/16"	2 1/16"	ND1
WL-6377	B <sup>10</sup>	Ion Chamber	300 to 800	4 x 10 <sup>-14</sup>	—	175	23 1/16"	3 3/16"	ND3
WL-5937A	B <sup>10</sup>	Ion Chamber	200 to 1000	4.4 x 10 <sup>-14</sup>	—	300	13 7/8"	3 3/16"	ND2
WL-6938	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	45	175	32 1/2"	7 1/16"	ND1
WL-6941A	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter Ion Chamber	300 300 to 1000	— 2.6 x 10 <sup>-14</sup>	0.2 —	300	11 1/16"	2 1/16"	ND1
WL-6971A	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter Fission Chamber	300 300 to 1000	— 3 x 10 <sup>-14</sup>	0.14 —	300	11 1/16"	2 1/16"	ND1
WL-6998	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	13	225	30 1/2"	1 1/2"	ND1
WL-7087	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	40	175	39 3/4"	5 7/8"	ND1A
WL-7087A	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	40	175	39 3/4"	5 7/8"	ND1A
WL-7186	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter	250 to 400	—	0.001	125	53 3/16"	7/8"	ND1
WL-7187	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter	300	—	0.52	300	11 1/16"	2 1/16"	ND1
WL-7188	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter Fission Chamber	300 300 to 1000	— 1.4 x 10 <sup>-14</sup>	0.07 —	300	11 1/16"	2 1/16"	ND1
WL-7243	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	13	175	15 3/4"	2 1/16"	ND1
WL-7317	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	13	225	29 1/4"	1 1/2"	ND1B
WL-7353	B <sup>10</sup>	Ion Chamber	300 to 800	4 x 10 <sup>-14</sup>	—	175	24 1/4"	3 3/32"	ND3
WL-7429	B <sup>10</sup> F <sub>3</sub>	Proportional Counter	2000	—	40	175	39 3/4"	4 13/16"	ND1A
WL-7469	B <sup>10</sup>	Ion Chamber	300 to 800	4 x 10 <sup>-14</sup>	—	175	23 1/16"	3 3/16"	ND3
WL-7606	B <sup>10</sup>	Ion Chamber	200 to 1000	4.4 x 10 <sup>-14</sup>	—	500	13 1/16"	3 3/16"	ND2
WL-7657	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter	300	—	0.7	500	13 1/16"	3 3/16"	ND2
WL-7741	B <sup>10</sup>	Ion Chamber	300 to 800	4 x 10 <sup>-14</sup>	—	500	23 1/16"	3 3/16"	ND3A
WL-8073	U <sub>3</sub> <sup>235</sup> O <sub>8</sub>	Fission Counter Fission Chamber	300 300 to 1000	— 1.4 x 10 <sup>-13</sup>	0.7 —	300	11 1/16"	2 1/16"	ND1
WL-8074	B <sup>10</sup>	Ion Chamber	300 to 800	4 x 10 <sup>-14</sup>	—	175	23 1/16"	3 3/16"	ND3
WL-8075	B <sup>10</sup>	Ion Chamber	200 to 1000	4.4 x 10 <sup>-14</sup>	—	300	13 7/8"	3 3/16"	ND2
WL-8105	B <sup>10</sup>	Ion Chamber	300 to 800	1.5 x 10 <sup>-14</sup>	—	175	10 3/4"	3 1/2"	ND3B
WL-8137	B <sup>10</sup>	Ion Chamber	300 to 800	1.5 x 10 <sup>-14</sup>	—	175	10 3/4"	3 1/2"	ND2A
WL-8214	B <sup>10</sup>	Ion Chamber	300 to 800	1.5 x 10 <sup>-14</sup>	—	175	10 3/4"	3 1/2"	ND3B
WL-22791	B <sup>10</sup>	Proportional Counter	800	—	10	310	30 1/2"	1 1/2"	ND1
WL-22792	B <sup>10</sup>	Proportional Counter	750	—	3	310	12 7/8"	1 1/2"	ND1
WL-22793	B <sup>10</sup>	Proportional Counter	750	—	4	310	15"	1 1/2"	ND1

**NOTE** 1. Excluding flying leads and coaxial cables.



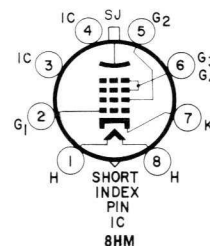
# CAMERA AND STORAGE TUBES



Vidicons are compact, light-weight camera tubes which require simple circuitry and render acceptable performance in most applications. They find wide usage in closed circuit or industrial television (ITV) systems and in film cameras for commercial

television stations. Common applications include industrial surveillance of property and process, remote or magnified observation of medical operations, military surveillance and remote signature check or record survey in financial institutions.

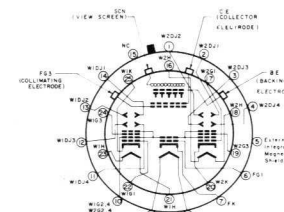
TUBE TYPE	USE	FEATURE	MAX. SJ VOLTS	BASE DWG.	TYPICAL VIDICON OPERATING VOLTS
WL-7290	ITV	Slow-Scan Photoconductor	25	8HM	Heater 6.3 SJ 6 to 70 G4, G3 250 G2 300 G1 (CO) -45 to -100
WL-7735A	ITV	Sensitive, uniform photoconductor	100	8HM	
<b>3" IMAGE DISSECTOR TYPE W1-2311</b>					
3000 TV Line Resolution / Rugged & Reliable					
14 Shade Gray Scale / Simple Circuitry					



# DISPLAY - STORAGE TUBES

Display storage tubes are cathode-ray tubes with the ability to integrate successive increments of a display or repetitive weak signals to form a high-brightness image with duration sufficient to photograph or examine it. Applications range from airborne radar to transient study with sophisticated oscilloscopes.

TUBE TYPE	WL-4363	WL-5047	WL-5308	WL-7268A	WL-22662	UNITS
Max. Diameter (Incl. Shield)	5¼	5¼	4¼	5¼	5¼	Inches
Max. Length	16	15	11	16	15	Inches
Min. Useful Screen Dia.	4	4	3	4	4	Inches
No. of Write Guns	2	1	1	2	1	—
Type of Focus	ES	ES	ES	ES	ES	—
Type of Deflection	ES	ES	ES	ES	ES	—
Min. Storage Time	30	10	30	15	60	Seconds
Min. Writing Speed	4 x 10 <sup>4</sup>	4 x 10 <sup>5</sup>	1 x 10 <sup>4</sup>	4 x 10 <sup>4</sup>	4 x 10 <sup>5</sup>	Inches/Second
Max. Erase Time	50	50	100	50	75	Milliseconds
Viewing Screen Voltage	10	10	8	10	10	Kilovolts
Min. Brightness	1500	1000	1200	2200	1000	Foot-Lamberts
Min. Resolution	50	90	50	70	50	Lines/Inch
Special Features		High Resolution	Compact, High Deflection Sensitivity		Long Storage Time	



**WL-4363**  
**WL-7268A**

**WL-22662**

**INDEX OF LEADS**

**12 Lead Group**

- White/Black... D3
- White/Red... D4
- Orange... G2, G4 (W)
- Green... G1 (F)
- Yellow... Heater (F)
- White/Yellow... Heater, Cathode(F)
- White/Green... D1
- White/Orange... D2
- Black... Shield Ground
- Light Blue... G2, G3(F) Collimator
- Red... G4(F) Collector
- Violet... Backing Electrode

**5 Lead Group**

- Brown... Heater (W)
- White... G1 (W)
- Gray... Cathode (W)
- White/Blue... G3 (W)
- White/Brown... Heater (W)

**WL-5308**

**INDEX OF LEADS**  
(10 LEAD GROUP)

**Lead Electrode**

- DV3
- DV4
- G2, G4 (W)
- G1 (F)
- NC
- Heater (F)
- Heater (F) & Cathode (F)
- DV1
- DV2
- Ground for Shield

**(5 LEAD GROUP)**

**Lead Electrode**

- Heater (W)
- G1 (W)
- Cathode (W)
- G3 (W)
- Heater (W)

**WL-5047**



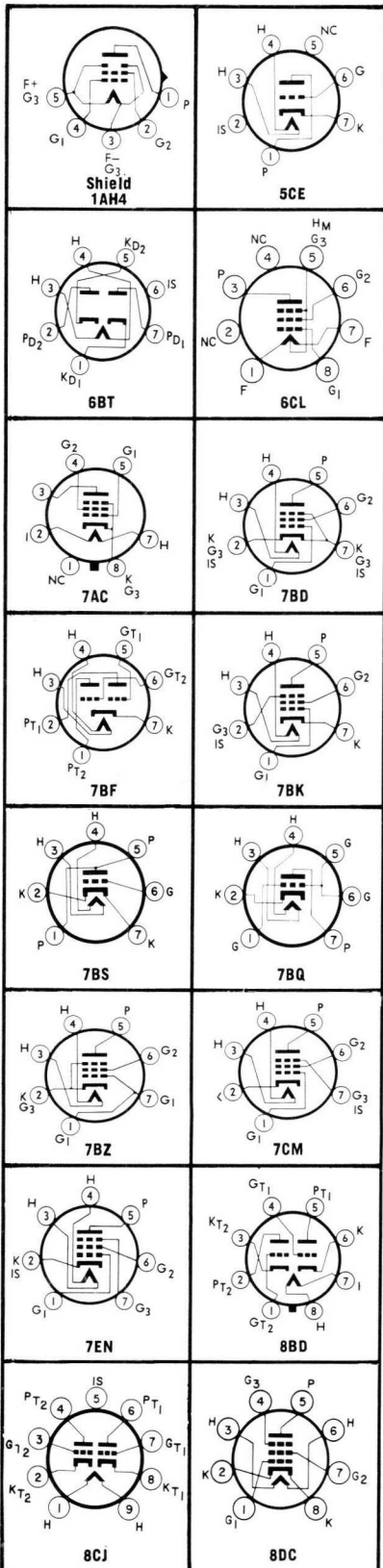
# INDUSTRIAL RECEIVING TUBES

## APPLICATION CLASSES FOR INDUSTRIAL RECEIVING TUBES

Industrial Receiving tubes serve as low-level amplifiers, mixers, detectors, gating or coincidence tubes, oscillators and relay drivers in military and industrial equipment. These tubes may incorporate one or more of the following premium design features for improved reliability: 1. rugged structure, 2. performance stabilization by burn-in or seasoning, 3. maintenance of peak emission during prolonged cutoff operation, 4. more uniform characteristics, 5. long heater life with heater cycling, and 6. low internal noise.

Special Purpose Tubes are used in industrial process control, military and commercial communication and electronic computing equipment.

This group of types, although no longer used in new industrial equipment designs, is made available for maintenance because of their previous popularity. All of these types have been updated to the latest design techniques and new materials to



TUBE TYPE	NOTE	TUBE CLASS	CATHODE		TYPICAL USE	PLATE VOLTS	PLATE MA.	G1 V OR RK	G2 VOLTS
			VOLTS	AMP.					
WL-6AS6	(1)	pentode	6.3	0.175	class A amp.	120	5.2	—2	120
WL-6AS7GA	(2)	twin triode	6.3	2.5	d-c amp.	135	125	250	—
WL-6J4		high-mu triode	6.3	0.4	UHF amplifier	150	15	100	—
WL-12AY7	(3)	twin triode	12.6	0.15	class A amp.	250	3	—4	—
WL-5636	(1)	pentode	6.3	0.15	gated amplifier	100	5.3	150	100
WL-5654	(4)	pentode	6.3	0.175	class A amp.	120	7.5	—2	120
WL-5678		pentode	1.25	0.05	class A amp.	67.5	1.8	0	67.5
WL-5687	(3)	twin triode	12.6	0.45	class A amp.	250	12	—12.5	—
WL-5691	(2)	twin triode	6.3	0.6	class A amp.	250	2.3	—2	—
WL-5692	(2)	twin triode	6.3	0.6	class A amp.	250	6.5	—9	—
WL-5693	(4)	pentode	6.3	0.3	class A amp.	250	3	—3	100
WL-5718		med-mu triode	6.3	0.15	class A amp.	100	8.5	150	—
WL-5726/6AL5W/6097	(2)	twin diode	6.3	0.3	rectifier	peak inverse plate voltage: 360 volts max peak plate current: 60 mA max			
WL-5751	(3)	twin triode	12.6	0.175	class A amp.	250	1	—3	—
WL-5814A	(3)	twin triode	12.6	0.175	class A amp.	250	10.5	—8.5	—
WL-5824		beam pentode	25	0.3	class A amp.	135	61	—22	135
WL-5879	(4)	pentode	6.3	0.15	class A amp.	250	1.8	—3	100
WL-5881		beam pentode	6.3	0.9	class A amp.	350	53	—18	250
WL-5886	(5)	pentode	1.25	0.01	characteristics	12	0.006	—2	4.5
WL-5902		beam pentode	6.3	0.45	class A amp.	110	30	270	110
WL-5963	(3)	twin triode	12.6	0.15	class A amp.	67.5	8.5	0	—
WL-5964	(2)	twin triode	6.3	0.45	class A amp.	100	9.5	50	—
WL-5965	(3)	twin triode	12.6	0.225	class A amp.	150	8.5	220	—
WL-6072	(3)	twin triode	12.6	0.175	class A amp.	250	3	—4	—
WL-6080	(2)	twin triode	6.3	2.5	d-c amp.	135	125	250	—
WL-6112	(2)	twin triode	6.3	0.3	class A amp.	100	0.8	1500	—
WL-6136	(4)	pentode	6.3	0.3	class A amp.	250	10.6	68	150
WL-6189	(3)	twin triode	12.6	0.15	class A amp.	250	10.5	—8.5	—
WL-6197		pentode	6.3	0.65	class A amp.	250	30	—3	150
WL-6201	(3)	twin triode	12.6	0.15	class A amp.	250	10	200	—
WL-6205		pentode	6.3	0.15	class A amp.	100	7.5	150	100
WL-6336A	(2)	twin triode	6.3	5	d-c amplifier	190	185	200	—
WL-6350	(3)	twin triode	12.6	0.3	class A amp.	150	11	—5	—
WL-6386		twin triode	6.3	0.35	class A amp.	100	9.6	200	—
WL-6397	(7)	pentode	2.5	0.0625	class A amp.	125	7.25	—7.5	125
WL-6550		beam pentode	6.3	1.6	class A amp.	400	87	—16.5	225
WL-6660/6BA6	(6)	pentode	6.3	0.3	class A amp.	250	11	68	100
WL-6661/6BH6	(4)	pentode	6.3	0.15	class A amp.	250	7.4	100	150
WL-6662/6BJ6	(6)	pentode	6.3	0.15	class A amp.	250	9.2	80	100
WL-6663/6AL5	(2)	twin diode	6.3	0.3	rectifier	peak inverse plate voltage: 275 volts max peak plate current: 60 mA max			
WL-6664/6AB4		triode	6.3	0.15	class A amp.	250	10	200	—
WL-6669/6AQ5		beam pentode	6.3	0.45	class A amp.	250	45	—12.5	250
WL-6676/6CB6A	(4)	pentode	6.3	0.3	class A amp.	125	13	56	125
WL-6677/6CL6		pentode	6.3	0.65	class A amp.	250	30	—3	150
WL-6678/6U8A		triode pentode	6.3	0.45	class A triode amp. pentode	150	18	56	—
WL-6679/12AT7	(3)	twin triode	12.6	0.15	class A amp.	250	10	200	—
WL-6680/12AU7	(3)	twin triode	12.6	0.15	class A amp.	250	10.5	—8.5	—
WL-6681/12AX7	(3)	twin triode	12.6	0.15	class A amp.	250	1.2	—2	—
WL-6922	(2)	twin triode	6.3	0.3	class A amp.	90	12	120	—
WL-6954	(1)	pentode	6.3	0.3	gated amplifier	150	5.8	—1	150
WL-7730	(3)	twin triode	12.6	0.15	class A amp.	250	10.5	—8.5	—
WL-7732	(4)	pentode	6.3	0.3	class A amp.	250	8.5	200	150
WL-9002		med-mu triode	6.3	0.15	class A amp.	250	6.3	—7	—

## OUTLINES

NO.	OAL	DIAM.	BASE	NO.	OAL	DIAM.	BASE
2-1	1 1/2"	3/8"	Press	8-1	2 5/8"	1 5/16"	Octal
3-8	1 5/8"	3/8"	Button	9-11	3 3/8"	1 3/2"	Octal
5-1	1 3/4"	3/4"	Min.	9-37	2 7/8"	1 3/2"	Octal
5-2	2 5/8"	3/4"	Min.	11-A	4 1/4"	1 1/16"	Octal
5-3	2 5/8"	3/4"	Min.	12-16	4 1/4"	1 1/16"	Octal
6-1	1 3/4"	7/8"	Min.	12-43	4 1/4"	1 1/16"	Octal
6-2	2 3/8"	7/8"	Min.	16-A	5 1/8"	2 1/16"	Octal
6-3	2 5/8"	7/8"	Min.				



# INDUSTRIAL RECEIVING TUBES

continued



provide better reliability than was possible when they were originally introduced.

- II Premium types designed specifically for applications involving greater shock and vibration environments. Designs are built for greater mechanical strength and rated for long life and reduced spread of characteristics.
- III Designed primarily for computer service where on-off control applications with long periods of cutoff operation involved.

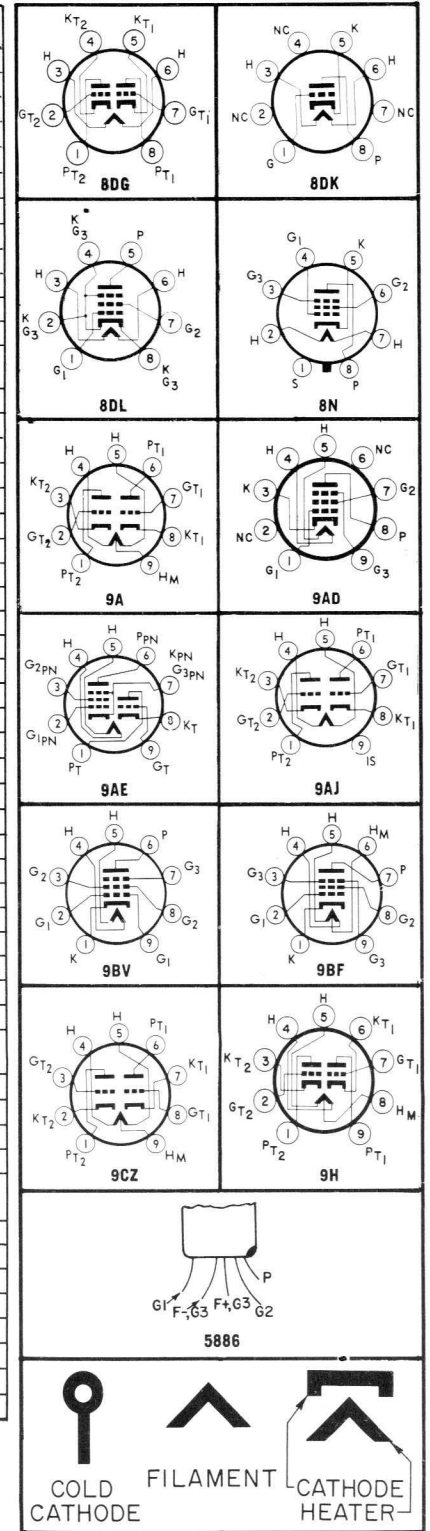
IV Special audio output beam power tubes.

V Specifically designed for mobile communications equipment to withstand variations in supply voltage and cycling conditions.

VI Types designed particularly for the instrumentation market for long life stability and low cathode interface are prime requirements.

VII Designed especially for audio amplifiers where, hum, noise and microphonics are critical.

G2 MA.	RP OHMS	GM $\mu$ MHOS	AMP. FACTOR	LOAD OHMS	OUT WATTS	OUT-LINE	BASE DWG.	TUBE TYPE	APPLICATION CLASS
3.5	110000	3200	—	—	—	5-1	7CM	WL-6AS6	I
—	280	7000	2	—	—	12-16	8BD	WL-6AS7GA	I
—	4500	12000	55	—	—	5-2	7BQ	WL-6J4	I
—	—	1750	40	—	—	6-2	9A	WL-12AY7	I
3.6	110000	3200	—	—	—	3-1	8DC	WL-5636	II
2.5	340000	5000	—	—	—	5-1	7BD	WL-5654	II
0.48	1000000	1100	—	—	—	2-1	1AH4	WL-5678	I
—	3000	5400	16	—	—	6-2	9H	WL-5687	II
—	44000	1600	70	—	—	9-37	8BD	WL-5691	II
—	9100	2200	20	—	—	9-37	8BD	WL-5692	II
0.85	2500000	1650	—	—	—	8-1	8N	WL-5693	I
—	4650	5800	27	—	—	3-1	8DK	WL-5718	II
d-c output current: 10 mA max heater-cathode voltage: 360 volts max						5-1	6BT	WL-5726/6AL5W/6097	II
—	58000	1200	70	—	—	6-2	9A	WL-5751	II
—	7700	2200	17	—	—	6-2	9A	WL-5814A	II
2.5	15000	5000	—	1700	4.3	9-11	7AC	WL-5824	I
0.4	2000000	1000	—	—	—	6-2	9AD	WL-5879	VII
2.5	48000	5200	—	4200	11.3	11-A	7AC	WL-5881	I
0.0036	18000000	14	—	—	—	2-1	5886	WL-5886	(5)
2.2	15000	4200	—	3000	1	3-3	8DL	WL-5902	II
—	6600	3200	21	—	—	6-2	9A	WL-5963	III
—	6500	6000	39	—	—	5-2	7BF	WL-5964	III
—	7000	6700	47	—	—	6-2	9A	WL-5965	III
—	25000	1750	44	—	—	6-2	9A	WL-6072	II
—	280	7000	2	—	—	12-43	8BD	WL-6080	II
—	—	1800	70	—	—	3-1	8DG	WL-6112	II
4.3	1000000	5200	—	—	—	5-2	7BK	WL-6136	II
—	7700	2200	17	—	—	6-2	9A	WL-6189	II
7	90000	11000	—	—	—	6-3	9BV	WL-6197	III
—	10900	550	60	—	—	6-2	9A	WL-6201	II
2.4	260000	5000	—	—	—	3-1	8DC	WL-6205	II
—	—	13500	2.7	—	—	16-A	8BD	WL-6336A	II
—	3900	4600	18	—	—	6-3	9CZ	WL-6350	III
—	4250	4000	17	—	—	6-1	8CJ	WL-6386	V
1.2	—	1950	—	—	—	3-8	6CL	WL-6397	I
4	27000	9000	—	3000	20	16-A	7AC	WL-6550	IV
4.2	1000000	4400	—	—	—	5-2	7BK	WL-6660/6BA6	V
2.6	140000	4600	—	—	—	5-2	7CM	WL-6661/6BH6	V
3.3	1300000	3600	—	—	—	5-2	7CM	WL-6662/6BJ6	V
d-c output current: 10 mA max heater-cathode voltage: 275 volts max						5-1	6BT	WL-6663/6AL5	V
—	10900	5500	60	—	—	5-2	5CE	WL-6664/6AB4	V
4.5	52000	4100	—	5000	4.5	5-3	7BZ	WL-6669/6AQ5	V
3.7	280000	8000	—	—	—	5-2	7CM	WL-6676/6CB6A	V
7	150000	11000	—	7500	2.8	6-3	9BV	WL-6677/6CL6	V
—	5000	8500	40	—	—	6-2	9AE	WL-6678/6U8A	V
—	10900	5500	60	—	—	6-2	9A	WL-6679/12AT7	V
—	7700	2200	17	—	—	6-2	9A	WL-6680/12AU7	V
—	62500	1600	100	—	—	6-2	9A	WL-6681/12AX7	V
—	—	11500	33	—	—	6-2	9AJ	WL-6922	II
6.6	50000	2050	—	—	—	5-2	7EN	WL-6954	III
—	7700	2200	17	—	—	6-2	9A	WL-7730	VI
2.5	600000	6000	—	—	—	5-2	7CM	WL-7732	VI
—	11400	2200	25	—	—	5-1	7BS	WL-9002	I



### Notes

1. Dual-control pentode.
2. Data is for each unit.
3. Data is for each unit, heaters in parallel connection have half the voltage and twice the current shown.
4. Sharp-cutoff pentode.
5. Electrometer tube.
6. Remote-cutoff pentode.
7. Heaters in parallel connection have half the voltage and twice the current shown.



# VACUUM MEASURING TUBES

Vacuum measuring tubes are designed to become part of an evacuated system. With suitable circuitry, the pressure in that system may be accurately determined. The Bayard-Alpert ionization gauge is used for measurement of very low pressures. The Schulz-Phelps ionization gauge measures pressures up to one atmosphere. The Pirani and thermocouple gauges

are less accurate and measure only the higher pressures, but, their associated circuitry is much simpler.

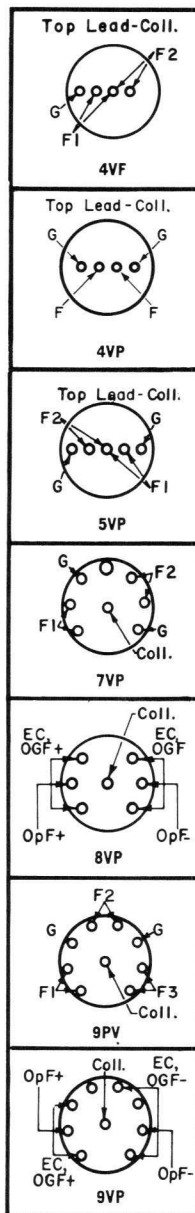
These tubes are used in electron tube and semiconductor device processing control, vacuum deposition, research and rocket altimeter applications.

## Ionization Gauges

TUBE TYPE	TUBE CLASS	RANGE TORR	ELECTRICAL				MECHANICAL				
			FILAMENT		COLL VOLTS	GRID VOLTS	TUBULATION		MAX. OAL (1)	MAX. DIAM.	BASE DWG.
			VOLTS	AMPS.			SIZE	MAT'L.			
WL-5966	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-10</sup>	7	2.5	-30	150	1/2"	Nonex	11 1/2"	3 1/8"	4VF
WL-7676	Schulz-Phelps	5x10 <sup>-1</sup> to 10 <sup>-5</sup>	2	2.25	-60	60	1/2"	Nonex	7 1/4"	1 13/16"	8VP
WL-7903	Schulz-Phelps	5x10 <sup>-1</sup> to 10 <sup>-5</sup>	1.3	2.4	-60	60	1/2"	Pyrex	7 1/4"	1 13/16"	9VP
WL-7904	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	4	1.5	-30	150	1/2"	Pyrex	7 1/4"	1 3/16"	9PV
WL-8057	Bayard-Alpert (3)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Nonex	5 1/4"	4 9/16"	5VP
WL-22612	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	1/2"	Pyrex	11 1/2"	3 1/8"	4VF
WL-22613	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Pyrex	11 1/2"	3 1/4"	4VF
WL-22614	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	1"	Pyrex	11 1/2"	3 3/8"	4VF
WL-22618	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	1/2"	Pyrex	5 3/8"	5 9/16"	4VF
WL-22619	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Pyrex	5 3/8"	5 1/16"	4VF
WL-22620	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	1"	Pyrex	5 3/8"	5 9/16"	4VF
WL-22627	Bayard-Alpert (2)	10 <sup>-3</sup> to 10 <sup>-10</sup>	7	2.5	-30	150	3/4"	Pyrex	8"	2 1/8"	7VP
WL-22637	Bayard-Alpert (3)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Pyrex	6 3/8"	5 9/16"	5VP
WL-22640	Bayard-Alpert (3)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Kovar	6 3/8"	5 1/16"	5VP
WL-22643	Bayard-Alpert (3)	10 <sup>-3</sup> to 10 <sup>-9</sup>	7	2.5	-30	150	3/4"	Pyrex	8"	2 1/8"	7VP
WL-22754	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Nonex	5 1/4"	4 9/16"	5VP
WL-22868	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Pyrex	5 1/4"	4 9/16"	5VP
WL-22869	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Kovar	5 1/4"	4 9/16"	5VP
WL-22923	Schulz-Phelps	5x10 <sup>-1</sup> to 10 <sup>-5</sup>	2	2.25	-60	60	1/2"	Kovar	7 1/4"	1 13/16"	9VP
WL-22947	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Nonex	5 1/4"	4 9/16"	4VP
WL-22948	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Pyrex	5 1/4"	4 9/16"	4VP
WL-22949	Bayard-Alpert (4)	10 <sup>-3</sup> to 10 <sup>-9</sup>	2.5	2.5	-30	150	3/4"	Kovar	5 1/4"	4 9/16"	4VP

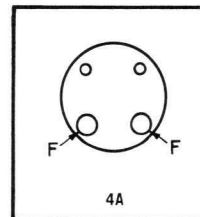
### Notes

1. Excluding flexible leads. Length and diameter describe space to contain tube.
2. Grid outgassed by electron bombardment.
3. Grid outgassed by a-c current conduction.
4. Non-burn-out filament and grid outgassed by a-c current conduction.



## Pirani Tubes

TUBE TYPE	FILAMENT		TUBULATION		RANGE TORR	MAX. OAL	MAX. DIAM.	BASE DWG.
	MAT'L.	AMPS.	SIZE	GLASS				
WL-762	Platinum	0 to 0.3	3/8"	Nonex	1 to 5x10 <sup>-4</sup>	7 15/16"	1 1/16"	4A
WL-765	Platinum	0 to 0.3	5/8"	Nonex	1 to 5x10 <sup>-4</sup>	6 3/4"	1 1/16"	4A
WL-765A	Platinum	0 to 0.3	None	None	1 to 5x10 <sup>-4</sup>	5 1/4"	1 1/16"	4A



# MICROWAVE TUBES AND DEVICES

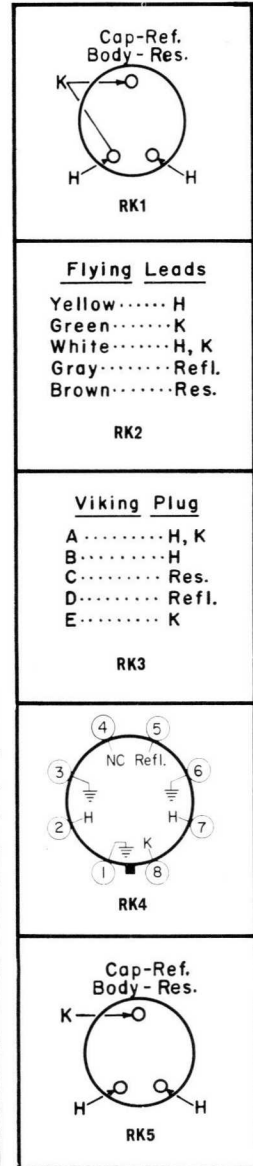


Microwave Tubes and Devices fall in three main categories:  
**Magnetrons:** Magnetrons generate energy in the microwave frequencies by interaction of an electron in a combined electrostatic and magnetic field with integral resonant cavities. They are widely used in radar transmitter, microwave test, altimeter and telemetry instruments.  
**Reflex Klystrons:** Reflex Klystrons generate low-power energy in the microwave

frequencies by electron reflection excitation of an integral resonator. They are used in radar receivers, low-power radar transmitters, telemetry, microwave communications, microwave test equipment and as parametric amplifier pumps.  
**Reference Cavities:** Reference cavities are fixed-frequency, temperature compensated, vacuum-sealed devices used as frequency standards in microwave transmission equipment.

## Reflex Klystrons

TUBE TYPE	ELECTRICAL				MECHANICAL		
	FREQ. GC	OUTPUT MILLIWATTS	BEAM VOLTS	REFL VOLTS	OUTPUT MATES	SIZE (1) L x W x H	BASE DWG.
WL-106	8.1-12.4	180	500	-100 to -600	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-107	7.5-11	180	500	-100 to -600	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-108	12.4-18	120	600	-150 to -600	UG-419/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-109	Note 2	55	300	-150	UG-39/U	2 1/4" x 1 1/4" x 3/4"	RK1
WL-110	12.4-14.5	220	600	-150 to -400	UG-419/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-111	14-17.5	100	600	-200 to -600	UG-419/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-113	7.5-11	180	500	-100 to -600	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-114	8.1-12.4	180	500	-100 to -600	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-115	8.5-10	400	500	-150 to -550	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-116	12.4-14.5	220	600	-150 to -400	UG-419/U	3" x 1 3/4" x 1 3/4"	RK2
WL-117	12.4-18	120	600	-150 to -600	UG-419/U	3" x 1 3/4" x 1 3/4"	RK2
WL-118	14-17.5	100	600	-250 to -600	UG-419/U	3" x 1 3/4" x 1 3/4"	RK2
WL-119	Note 2	450	500	-295	UG-419/U	2 3/8" x 1 5/8" x 1 5/8"	RK2
WL-121	7.5-11	180	500	-100 to -600	UG-39/U	4 1/2" x 1 3/4" x 1 3/4"	RK1
WL-122	8.1-12.4	180	500	-100 to -600	UG-39/U	4 1/2" x 1 3/4" x 1 3/4"	RK1
WL-123	12.4-14.5	220	600	-150 to -400	UG-419/U	4 1/2" x 1 3/4" x 1 3/4"	RK1
WL-124	12.4-18	120	600	-150 to -600	UG-419/U	4 1/2" x 1 3/4" x 1 3/4"	RK1
WL-126	14-17.5	100	600	-250 to -600	UG-419/U	4 1/2" x 1 3/4" x 1 3/4"	RK1
WL-128	8.1-12.4	180	500	-100 to -600	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-129	12.4-18	120	600	-150 to -600	UG-419/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-130	10-11.5	500	500	-100 to -500	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-132	Note 4	725	500	-300	UG-39/U	2 3/8" x 1 5/8" x 1 5/8"	RK2
WL-133	10.5-12.2	200	400	-100 to -600	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-134	8.2-11.5	250	500	-100 to -600	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-135	10.525	100	300	-200	UG-39/U	2 3/8" x 1 5/8" x 1 1/4"	RK2
WL-136	10.6-12.4	200	500	-100 to -500	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-137	9.5-10.9	125	350	-170 to -350	UG-51/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-138	8.5-10	200	350	-60 to -120	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-139	7.5-8.5	400	500	-100 to -500	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-140	9-10.5	450	500	-100 to -500	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-141	13.5	450	600	-450	UG-419/U	3" x 1 3/4" x 1 3/4"	RK1
WL-146	10.525	35	250	-70	UG-39/U	2 1/4" x 1 5/8" x 1 5/8"	RK4
WL-147	10.525	75	300	-200	UG-39/U	2 3/4" x 1 5/8" x 1 1/4"	RK1
WL-148	10.525	75	300	-200	UG-39/U	2 3/4" x 1 5/8" x 1 1/4"	RK5
WL-176	Note 2	55	300	-150	UG-39/U	2 1/4" x 1 1/4" x 3/4"	RK1
WL-177	Note 5	725	500	-315	UG-39/U	2 3/8" x 1 5/8" x 1 5/8"	RK2
WL-186	Note 5	80	300	-320	UG-39/U	2 3/4" x 1 5/8" x 1 5/8"	RK1
WL-187	8.5-10	100	350	-150 to -300	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-188	8.5-10.5	100	350	-100 to -250	UG-39/U	3" x 1 3/4" x 1 3/4"	RK3
WL-189	8.5-10	300	500	-330 to -440	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-191	8.5-10	650	500	-250 to -450	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-6310	8.5-10	85	300	-100 to -200	UG-39/U	3 1/8" x 1 3/4" x 1 3/4"	RK1
WL-6312	8.5-10	85	300	-100 to -200	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-6314	8.5-10.5	160	350	-100 to -200	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-6315	8.5-10	85	300	-100 to -200	UG-39/U	3" x 1 3/4" x 1 3/4"	RK2
WL-6316	8.5-10	22	200	-85 to -150	UG-39/U	3" x 1 3/4" x 1 3/4"	RK3
WL-6780	8.5-10	22	200	-85 to -150	UG-39/U	3" x 1 3/4" x 1 3/4"	RK3
WL-6781	8.5-10	22	200	-85 to -150	UG-39/U	3" x 1 3/4" x 1 3/4"	RK3
WL-6915	8.5-10	85	300	-100 to -200	UG-39/U	3" x 1 3/4" x 1 3/4"	RK3



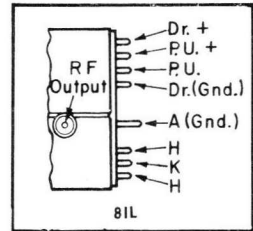


# Microwave Tubes and Devices

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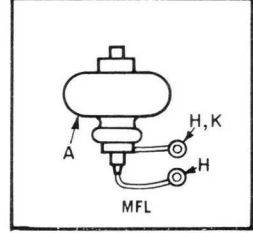
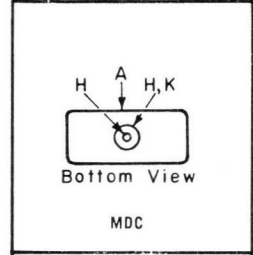
## Magnetrons

TUBE TYPE	FREQ. GC	RATINGS				MECHANICAL		
		PEAK KW	DUTY	ANODE KV	ANODE AMPS.	SIZE (1) L x W x H	OUTPUT MATES	BASE DWG.
WL-6177	4.255-4.37	0.001	CW	0.33	0.035	3 1/4" x 2 1/8" x 3 1/8"	UG-89/U	8IL
WL-6249B	8.5-9.6	250	0.0013	28	25	10 1/4" x 4 1/4" x 9 5/8"	Mod UG-52A/U	MFL
WL-7008	8.5-9.6	230	0.0011	21.5	27.5	7 1/16" x 4 3/4" x 8 1/4"	Mod UG-52A/U	MDC
WL-7111	8.5-9.6	230	0.0011	21.5	27.5	7 1/16" x 5 3/4" x 6 1/4"	Mod UG-52A/U	MDC



## Reference Cavities

TUBE TYPE	FREQ. GC	ELECTRICAL				MECHANICAL		
		LOADED Q	INPUT WATTS	INSERT DB LOSS	SIZE (1) L x W x H	INPUT MATES	OUTPUT MATES	
WL-1Q22	9.250	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-1Q23	9.280	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-1Q24	9.310	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-1Q25	9.375	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-5846	9.280	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-6040	9.308	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	
WL-6041	9.312	1900 to 2400	2	4 to 6	3/4" x 3/4" x 3 1/16"	UG-40/U	UG-40/U	



### Notes

1. Size of space necessary to include entire tube except flying leads.
2. Set at factory to any frequency between 8.5 and 11 GHz.
3. Fixed frequency, trimmable  $\pm 100$  MHz, center frequency between 11 and 14 GHz.
4. Fixed frequency, trimmable  $\pm 150$  MHz, center frequency between 8.5 and 11 GHz.
5. Fixed frequency, trimmable  $\pm 100$  MHz, center frequency between 8.5 and 11 GHz.

# INDUSTRIAL & MILITARY CATHODE RAY TUBES

Industrial & Military Cathode Ray Tubes are structurally similar to Television Picture Tubes. Their common characteristics include a gun which forms electrons emitted from a thermionic cathode into a cylindrical beam, suitable deflection provision for the beam to strike any area of the screen and a phosphor screen which emits light when high-velocity electrons strike it.

The Westinghouse Industrial & Military Cathode Ray Tubes represent a high degree of engineering achievement in the field of display tubes for specialized applications. High resolution guns, special phosphors and improved mechanical design are some of the distinctive features of these tubes. They are designed for service in oscilloscope, radar display, flying-spot scanner, video monitor and computer readout applications.

PHOSPHOR NUMBER	FLUORESCENT COLOR	PHOSPHORESCENT COLOR	PERSISTENCE CLASS	APPLICATIONS
1	Yellowish-Green	Yellowish-Green	Medium	Oscilloscope
2	Yellowish-Green	Yellowish-Green	Med. Short	General Purpose
4	White	White	Med. Short	Television
5	Blue	Blue	Med. Short	High-Speed Photography
7	White	Yellowish-Green	Long	Surveillance Radar
11	Blue	Blue	Med. Short	Photographic Recording
12	Orange	Orange	Long	Fire Control Radar
14	Purplish-Blue	Yellowish-Orange	Medium	Surveillance Radar
15	Green	Green	Short	Flying-Spot Scanning
16	Bluish-Purple (4)	Bluish-Purple (4)	Very Short	High-Speed Flying-Spot Scanning
17	White	Yellow	Long	Surveillance Radar
18	White	White	Medium	Television
19	Orange	Orange	Long	Night Viewed Radar
20	Yellow-Green	Yellow-Green	Med. Short	Photographic Recording
22	Note 5	Note 5	Note 6	Color Television
24	Green	Green	Short	Color TV Flying-Spot Scanning
25	Orange	Orange	Medium	Night Viewed Radar
26	Orange	Orange	Very Long	Surveillance Radar
27	Reddish-Orange	Reddish-Orange	Medium	Color TV Monitor
28	Yellow-Green	Yellow-Green	Long	Surveillance Radar
31	Green	Green	Med. Short	Oscilloscope
32	Purplish-Blue	Yellowish-Green	Long	Surveillance Radar
33	Orange	Orange	Very Long	Surveillance Radar
34	Bluish-Green	Yellow-Green	Very Long	Visual Information Storage

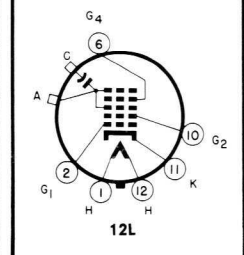
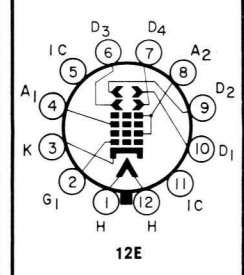
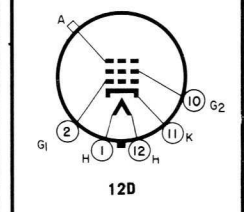
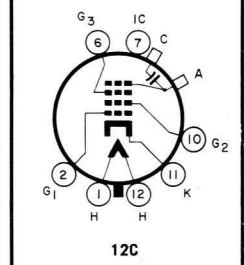
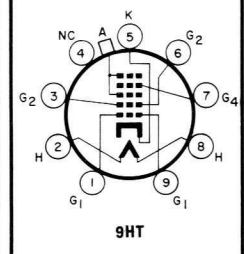
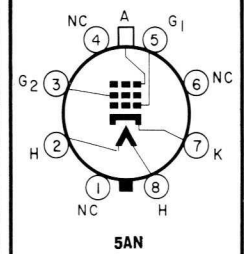


# Industrial & Military Cathode Ray Tubes

continued



TUBE TYPE	BULB				ELECTRICAL					MAX. OAL
	NOTE	FACE RAD.	BASE DWG.	DEFL. ANGLE	ANODE KV	FOCUS VOLTS	GRID 2 VOLTS	GRID 1 VOLTS (1)	LINE WIDTH	
3JP-	3	8"	14J	ES	4	400 to 690	2000	-45 to -75	—	10.188"
3JP-A	3	8"	14J	ES	4	400 to 690	2000	-45 to -75	0.030"	10.188"
3WP-	3	Flat	12T	ES	2	330 to 620	—	-60 to -100	0.026"	11.625"
5CEP-	2	Flat	12Q	42°	10	2070 to 2370	300	-40 to -65	0.0015"	13.5"
5DEP-	3	20"	12E	ES	2	340 to 640	—	-90 max.	0.023"	15.125"
5DKP-	2	24"	5AN	53°	8	Mag.	250	-30 to -75	0.006"	11.5"
5PP-A	3	24"	5AN	53°	5	Mag.	250	-25 to -70	0.010"	11.5"
5UP-	3	20"	12E	ES	2	340 to 640	—	-90 max.	0.023"	15.125"
5WP-	3	Flat	12C	50°	27	4200 to 5400	200	-42 to -98	0.008"	11.812"
5ZP-	2	Flat	12C	40°	27	5544 to 7056	200	-42 to -98	0.0045"	14.75"
7ABP-	3	24"	12M	50°	7	0 to 250	300	-33 to -77	0.012"	13.5"
7ABP-A	2	24"	12M	50°	7	0 to 250	300	-33 to -77	0.012"	13.5"
7AUP-	4	24"	9HT	70°	8	0 to 300	300	-25 to -60	0.012"	8.5"
7BP-A	3	24"	5AN	53°	7	Mag.	250	-25 to -70	—	13.625"
7BP-B	3	24"	5AN	53°	7	Mag.	250	-25 to -70	0.012"	13.625"
7MP-	3	24"	12D	50°	7	Mag.	250	-27 to -63	0.012"	13.125"
7TP-	3	24"	12Q	50°	10	1170 to 1590	200	-18 to -48	0.012"	13.5"
7VP-	3	20"	14R	ES	2.5	670 to 1000	—	-70 max.	0.040"	14.875"
8CP-	3	20"	14J	ES	4	540 to 800	2000	-24 to -56	—	16.875"
8HP-	5	27"	12L	90°	11	0 to 300	300	-28 to -72	0.012"	10.25"

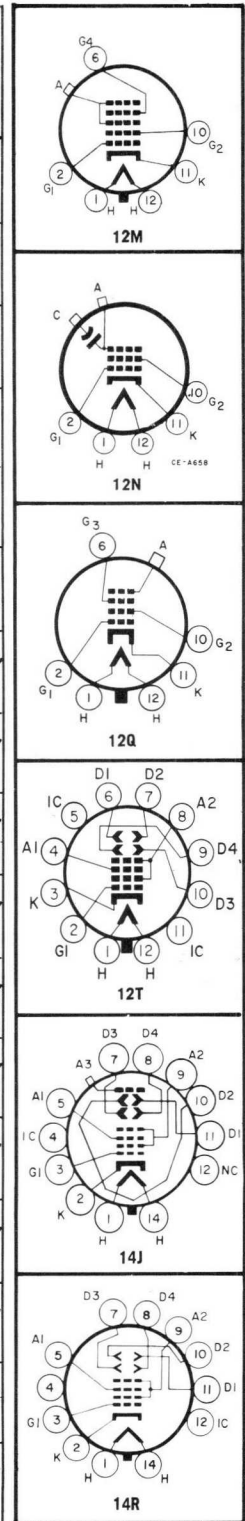




# Industrial & Military Cathode Ray Tubes

continued

TUBE TYPE	NOTE	BULB			ELECTRICAL					MAX. OAL
		FACE RAD.	BASE DWG.	DEFL. ANGLE	ANODE KV	FOCUS VOLTS	GRID 2 VOLTS	GRID 1 VOLTS (1)	LINE WIDTH	
8KP-	5	27"	12M	90°	16	0 to 400	300	-35 to -72	—	12.25"
10KP-A	3	42"	12D	50°	10	Mag.	300	-35 to -72	0.015"	18"
10KP-B	2	42"	12D	50°	10	Mag.	300	-35 to -72	0.015"	18"
10SP-	2	42"	12Q	50°	14	1640 to 2225	200	-18 to -48	0.015"	17"
10UP-A	2	42"	12M	50°	10	-150 to +150	300	-33 to -77	0.015"	18"
10VP-	2	42"	12N	50°	11	Mag.	250	-28 to -72	—	18"
10WP-	3	42"	12M	50°	10	0 to 600	300	-35 to -75	0.015"	17.312"
10WP-A	2	42"	12M	50°	10	0 to 600	300	-35 to -75	0.015"	17.312"
12ABP-	3	40"	12M	55°	10	0 to 300	300	-28 to -72	0.019"	18.375"
12ABP-A	2	40"	12M	55°	10	0 to 300	300	-28 to -72	0.019"	18.375"
12SP-B	2	40"	12D	55°	9	Mag.	250	-27 to -63	0.017"	19.125"
12SP-D	2	40"	12D	55°	9	Mag.	250	-27 to -63	0.015"	19.125"
14WP-	5	24"	12L	90°	12	-50 to +350	300	-28 to -72	—	13.562"
16AKP-	2	56.312"	12M	53°	12	0 to 400	300	-35 to -75	0.025"	22.438"
16ALP-	2	56.312"	12M	53°	12	0 to 400	300	-35 to -75	0.025"	23.938"
17DWP-	5	27"	12L	70°	18	0 to 400	300	-33 to -77	—	19.562"
21EWP-	5	33"	12D	72°	16	Mag.	300	-33 to -75	0.018"	23.812"



### Notes

1. For cutoff.
2. Aluminized screen, round faceplate.
3. Round faceplate.
4. Aluminized screen, round faceplate, 0.9" diameter neck, 6.3 volt — 300 mA heater.
5. Aluminized screen, rectangular faceplate.

Your authorized Westinghouse Industrial and Power Tube distributor has in-depth stock or can readily obtain any of the tube types listed in this catalog.

Take advantage of this local, fast service — when you require top quality electronic tubes specify Westinghouse.





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**Electronic Tube Division  
Elmira, New York**