TUBE HANDBOOK

ALL TYPES

This HANDBOOK of data on all RCA tubes has been compiled to meet the requirements of electronic engineers for tube information which can be kept up-to-date. Its convenient, loose-leaf form permits the revision of data on existing tubes and the addition of data on new tubes as they are made available.

The material is arranged in sections with tabbed separators to facilitate quick reference. The general section contains a table of contents for the complete Handbook, a detailed explanation of tube ratings and typical operating conditions, tube outline drawings, base drawings, and other useful information concerning tubes. The other sections, indexed according to tube classes, contain ratings, characteristics, operating conditions, and curves for the many different tubes in those classes.

The RCA Tube Handbook is especially useful to designers of tube equipment but will prove helpful to anyone having need for concise data on our various tubes. If further data on any tube type are desired, we shall be glad to be of assistance.

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

NOTICE

Service sheets for this Handbook will be sent during the subscription period to the subscriber whose name appears in our records.

In case this Handbook is resold or transferred within any subscription period, we shall be glad to register the change and to send service sheets to the new owner providing he notifies us of the change.

Each of the binders for this Handbook has an identifying serial number at the lower right of the inside back cover. Use of these numbers in correspondence pertaining to this Handbook is requested to facilitate its identification in our records.

In order that the new owner may not miss any of the service sheets, notification for change in registration of ownership of this Handbook identified by serial numbers should be forwarded promptly to

Commercial Engineering
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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RCA TUBE HANDBOOK HB-3

GENERAL SECTION

The information in this section, in general, applies to all classes of RCA tubes. It includes the Index of Contents for all sections, preferred-type lists, discussion of ratings, drawings of bases, caps, and tubes, as well as other general information of interest to the equipment designer.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.

RCA

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Tube types are listed below in numerical-alphabetical-numerical sequence. For each type, an X-mark (or a "-mark) in one of the eight columns headed SECTION indicates the particular section in which that type will be found. The X-marks in the column for any section give the arrangement of the general material and the tube types in that section. The sections are keyed as follows:

C = CATHODE-RAY TUBE SECTION
F = THYRATRON & IGNITRON SECTION
G = GENERAL SECTION
M = MISCELLANEOUS TUBE SECTION
P = PHOTOTUBE SECTION
R = RECEIVING TUBE SECTION
S = SEMICONDUCTOR DEVICE SECTION
T = TRANSMITTING TUBE SECTION

Reference is to front of sheet only unless otherwise indicated

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	"								1-15-44	Metal Tubes *(on back of Metal Tubes—Key to Tube Types)*
	X								11-15-48	Metal Tubes
	X								8-1-42	Outlines: Glass Tubes—Octal Base Types
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	X								2-1-50	3 Terminal Types
	X								12-1-42	3-Pin & 4-Pin Types
	X								12-1-42	4-Pin Types
	X								12-1-42	5-Pin Types
	X								12-1-42	6-Pin Types
	X								3-30-45	6-Terminal Types (No. 6628)
	X								12-1-42	7-Pin Types
	X								12-1-42	8-Pin Types (Dwarf-Shell Octal)
	X								12-1-42	8-Pin Types (Intermed.-Shell Octal)
	X								12-1-42	8-Pin Types (Small-Wafer Octal with Sleeve Assemblies)
	X								11-1-50	8-Pin Types (Long Medium-Shell Octal)
	X								10-1-53	8-Pin Types (Large-Wafer Octal with Sleeve)
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0B2					X				12-30-47	0B2 Data
0C3					X				4-1-44	0C3/VR105 Data
0D3					"				4-1-44	0D3/VR150 Data *(on back of 0C3/VR105 sheet)*
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0Z4, 0Z4-G . . .						X			9-1-38	0Z4, 0Z4-G Tent. Data
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1A5-GT						X			5-1-41	1A5-GT/1A5-G Tent. Data
1A6						X			4-5-37	1A6 Data
1A7-GT						X			1-1-43	1A7-GT/G Data
1AC5						X			9-15-49	1AC5 Tent. Data
						X				Curve 92CM-7261
1AD5						X			9-15-49	1AD5 Tent. Data
						X				Curve 92CM-7251
						X				Curve 92CM-7250
1B3-GT						X			11-15-49	1B3-GT/8016 Data
1B5						X			4-20-38	1B5/25S Data
1C5-GT						X			5-1-41	1C5-GT/1C5-G Tent. Data
1C6						X			2-2-40	1C6 Data
1C7-G						X			5-1-41	1C7-G Data
1C21					X				12-1-42	1C21 Tent. Data
1D5-GP						"			5-1-41	1D5-GP Data *(on 1C7-G sheet)*
1D5-GT						"			5-1-41	1D5-GT Tent. Data *(on back of 1C7-G sheet)*
1D7-G						"			5-1-41	1D7-G Tent. Data *(on back of 1C7-G sheet)*
1D8-GT						X			9-2-41	1D8-GT Data
						X				Curve 92C-6059
1E5-GP						X			12-1-39	1E5-GP Data
1E7-GT						X			11-15-49	1E7-GT Data
1E8						X			9-15-49	1E8 Tent. Data
										Curve 92CM-7165
1F4						X			2-2-40	1F4 Data
1F5-G						"			2-2-40	1F5-G Data *(on 1F4 sheet)*
						X				Curve 92C-4958
1F6						X			2-2-40	1F6 Data
1F7-G						"			2-2-40	1F7-GV Data *(on 1F6 sheet)*
						X				Curve 92C-4888
1G4-GT						X			8-1-42	1G4-GT/G Data
1G5-G						X			2-2-40	1G5-G Data
1G6-GT						X			8-1-42	1G6-GT/G Data
1H4-G						X			4-20-38	1H4-G Data
1H5-GT						X			1-1-43	1H5-GT/G Data
1H6-G						X			4-20-38	1H6-G Data
1J6-GT						X			3-15-48	1J6-GT Tent. Data
1L4						X			6-1-42	1L4 Tent. Data
1L6						X			8-1-53	1L6 Tent. Data
1LA4						X			5-1-41	1LA4 Tent. Data
1LA6						"			5-1-41	1LA6 Tent. Data *(on 1LA4 sheet)*
1LB4						X			10-15-47	1LB4 Data

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1LC6						X			10-15-47	1LC6 Data
1LD5						X			10-15-47	1LD5 Data
1LE3						"			10-15-47	1LE3 Data *(on back of 1LD5 sheet)*
1LG5						X			2-1-49	1LG5 Data
1LH4						X			10-15-47	1LH4 Data
1LN5						"			10-15-47	1LN5 Data *(on back of 1LH4 sheet)*
1N5-GT						X			1-1-43	1N5-GT/G Data
1N34-A							X		8-1-53	1N34-A Tent. Data
1N38-A							X		8-1-53	1N38-A Tent. Data
1N54-A							X		8-1-53	1N54-A Tent. Data
1N55-A							X		8-1-53	1N55-A Tent. Data
1N56-A							X		8-1-53	1N56-A Tent. Data
1N58-A							X		8-1-53	1N58-A Tent. Data
1P5-GT						X			5-1-41	1P5-GT Tent. Data
1P21			X						11-15-49	1P21 Data
			X							Curve 92CM-6456R3
			X							Curve 92CM-7018R1
1P22			X						3-15-48	1P22 Data
			X							Curve 92CM-6585R1
1P28			X						9-1-50	1P28 Data
			X						9-1-50	Outline CE-6264R2
			X							Curve 92CL-6547R2
1P29			X						8-15-47	1P29 Data
			X							Curve 92CM-6472R1
1P37			X						8-15-47	1P37 Data
1P39			X						8-15-47	1P39 Data
1P40			"						8-15-47	1P40 Data *(on 1P39 sheet)*
1P41			X						11-1-50	1P41 Data
			X							Curve 92CM-5217R3
1P42			X						7-3-50	1P42 Data
			X							Curve 92CM-6783R2
1Q5-GT						X			7-1-41	1Q5-GT/1Q5-G Data
1R5						X			5-1-42	1R5 Data
						X				Curve 92C-6098R1
1S4						X			1-30-42	1S4 Data
						X				Curve 92C-6175R1
1S5						X			6-20-47	1S5 Data
1T4						X			12-1-41	1T4 Data
						X				Curve 92C-6357
1T5-GT						X			8-2-43	1T5-GT Data
1T6						X			9-15-49	1T6 Tent. Data
						X				Curve 92CM-7257
						X				Curve 92CM-7259
1U4						X			6-20-46	1U4 Tent. Data
						X				Curve 92CM-6668
1U5						X			6-20-47	1U5 Tent. Data
						X				Curve 92CM-6172R1
1-v						X			2-2-40	1-v Data
1V2						X			11-15-49	1V2 Tent. Data
1X2-A						X			11-1-50	1X2-A Tent. Data

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2A4-G					X				7-1-41	2A4-G Tent. Data
2A5						X			9-2-41	2A5 Data
2A6						"			9-2-41	2A6 Data *(on back of 2A5 sheet)*
2A7						X			11-1-37	2A7 Data
2AP1-A		X							7-1-45	2AP1-A Data 1
		X							7-1-45	Data 2
		X								Curve 92CM-6410R1
2B7						X			12-30-47	2B7 Data
2BP1		X							9-1-50	2BP1 Data
		X							9-1-50	Circuit CE-6777R1
		X								Curve 92CM-6748R1
2BP11		X							9-1-50	2BP11 Data
2C21					X				3-20-43	2C21/1642 Tent. Data
					X					Curve 92CM-6385R1
2C22					X				3-20-43	2C22 Tent. Data
					X					Curve 92C-6437
2C39-A								X	10-1-53	2C39-A Tent. Data 1
								X	10-1-53	Tent. Data 2
								X	10-1-53	Outline CE-8000
								X		Curve 92CM-7998
2C40					X				11-15-45	2C40 Tent. Data
					X					Curve 92CM-6507
2C43					X				11-15-45	2C43 Tent. Data
					X					Curve 92CM-6508
2D21				X					6-15-48	2D21 Data
				X					6-15-48	Curve CE-6534T2
				X						Curve 92CM-6531R1
2E5						X			7-1-41	2E5 Tent. Data
2E24								X	11-1-50	2E24 Data 1
								X	11-1-50	Data 2
								X	11-1-50	Data 3
								X		Curve 92CM-6659R1
2E26								X	6-20-47	2E26 Data 1
								X	2-1-49	Data 2
								X	6-20-47	Outline CE-6607
								X		Curve 92CM-6630
2F21		X							6-20-46	2F21 Tent. Data
		X							6-20-46	Outline CE-6653
2J50					X				1-1-51	2J50 Tent. Data
					X				1-1-51	Coupling CE-7509
					X				1-1-51	Outline CE-7507B
					X					Curve 92CM-7511
2K26					X				11-15-48	2K26 Tent. Data 1
					X				11-15-48	Tent. Data 2
					X				11-15-48	Outline CE-6986VB
					X				11-15-48	Coupling Arrangement CE-7008VB
					X				11-15-48	Curve CE-7003T
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					X				11-15-48	Curves CE-7006T-7007T
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2N33							X		6-1-53	2N33 Tent. Data
2N34							X		6-1-53	2N34 Tent. Data
							X			Curve 92CM-7962
2N35							X		6-1-53	2N35 Tent. Data
							X			Curve 92CM-7959
2V3-G					X				4-3-39	2V3-G Tent. Data
2X2-A					X				6-20-46	2X2-A Data
3A4					X				12-15-44	3A4 Data
					X					Curve 92C-6370
3A5					X				6-1-42	3A5 Tent. Data
					X					Curve 92C-6376
3A8-GT						X			5-1-41	3A8-GT Data
3AP1-A		X							6-20-46	3AP1-A Data
3BP1-A		X							7-1-45	3BP1-A Data 1
		X							7-1-45	Data 2
		X								Curve 92CM-6412R1
3B25								X	7-1-45	3B25 Tent. Data
3B28								X	2-1-52	3B28 Tent. Data 1
								X	2-1-52	Tent. Data 2
3C23				X					5-1-46	3C23 Tent. Data
3C33								X	3-15-48	3C33 Data
								X	12-20-46	Outline CE-6780
3C45				X					9-1-52	3C45 Tent. Data 1
				X					9-1-52	Tent. Data 2
3D22				X					6-15-48	3D22 Data
				X					6-15-48	Outline CE-6569R1
				X						Curve 92CM-6831
3E22								X	12-20-46	3E22 Tent. Data 1
								X	6-20-46	Tent. Data 2
3E29								X	12-20-46	3E29 Data
								X	12-20-46	Circuit CE-6542
3JP1		X							8-1-51	3JP1 Data 1
		X							8-1-51	Data 2
		X								Curve 92CM-7671
3JP7		X							8-1-51	3JP7 Data
3KP1		X							9-15-49	3KP1 Data
		X							9-15-49	Circuit CE-6690R1
		X								Curve 92CM-7191
		X								Curve 92CM-7194
3KP4		X							11-15-48	3KP4 Tent. Data 1
		X							11-15-48	Tent. Data 2
3KP11		X							9-15-49	3KP11 Data
3LF4						X			10-15-47	3LF4 Data
3MP1		X							7-3-50	3MP1 Tent. Data
		X							7-3-50	Outline CE-7488
3Q4						X			5-1-41	3Q4 Tent. Data
						X				Curve 92C-6281
3Q5-GT						"			5-1-42	3Q5-GT/G Data *(on back of 3Q4 curve 92C-6281)*
3RP1		X							5-20-49	3RP1 Tent. Data
		X							5-20-49	Circuit CE-6777
		X								Curve 92CM-7143

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4-65A								X	5-20-49	4-65A Tent. Data 1
								X	5-20-49	Tent. Data 2
								X	5-20-49	Outline CE-7156
								X	5-20-49	Curves CE-7164T-7163T
4-125A								X	11-15-48	4-125A/4D21 Data 1
								X	11-15-48	Data 2
								X	11-15-48	Outline CE-6764
4-250A								X	11-15-48	4-250A/5D22 Tent. Data 1
								X	11-15-48	Tent. Data 2
								X	11-15-48	Outline CE-7075
4-1000A								X	10-1-53	4-1000A Tent. Data 1
								X	10-1-53	Tent. Data 2
								X	10-1-53	Outline CE-7930
4C33								X	5-20-49	4C33 Data
								X	5-20-49	Outline CE-6936
4D21								"		*See 4-125A/4D21*
4E27								X	3-30-45	4E27/8001 Data 1
								X	3-30-45	Data 2
								X		Curve 92CM-6261R1
								X		Curves 92CM-6262T1 & 92CM-6263T1
4E27A								X	5-1-51	4E27A/5-125B Data 1
								X	5-1-51	Data 2
								X		Curve 92CM-7512
4J52					X				10-1-53	4J52 Tent. Data 1
					X				10-1-53	Tent. Data 2
					X				10-1-53	Outline CE-7858-7857B
4X150A								X	1-4-54	4X150A Data 1
								X	1-4-54	Data 2
								X	1-4-54	Data 3
								X	1-4-54	Outline CE-7153R2
								X		Curve 92CM-7152R1
4X500A								X	9-30-48	4X500A Data
								X	9-30-48	Outline CE-7028
5-125B								"		*See 4E27A/5-125B*
5AZ4						X			5-20-49	5AZ4 Data
5ABP1		X							6-1-53	5ABP1 Tent. Data 1
		X							6-1-53	Tent. Data 2
		X							6-1-53	Outline CE-7842
		X								Curve 92CM-7910
5ABP7		X							6-1-53	5ABP7 Data
5ABP11		X							6-1-53	5ABP11 Data
5BP1-A		X							7-1-45	5BP1-A Data 1
		X							7-1-45	Data 2
		X								Curve 92CM-4984R3
5CP1-A		X							10-1-51	5CP1-A Data 1
		X							10-1-51	Data 2
		X							10-1-51	Outline CE-6408R4
		X								Curve 92CM-6821

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5CP11-A		X							4-15-47	5CP11-A Tent. Data
5CP12		X							10-1-51	5CP12 Data
5D22								"		*See 4-250A/5D22*
5FP4-A		X							8-1-51	5FP4-A Data
		X							8-1-51	Outline CE-6362R4
5FP7-A		X							8-1-51	5FP7-A Data
5FP14		X							8-1-51	5FP14 Data
5R4-GY					X				9-30-48	5R4-GY Data
					X				9-30-48	Curves CE-6418T1 - 6415T
5T4						X			2-2-40	5T4 Data
5TP4		X							3-15-48	5TP4 Data
		X							3-15-48	Outline CE-6656R2
5U4-G						X			3-1-51	5U4-G Data 1
						X			3-1-51	Data 2
						X				Curve 92CM-7497
5UP1		X							12-20-46	5UP1 Tent. Data
		X							12-20-46	Circuit CE-6819
		X								Curve 92CM-6808
		X								Curve 92CM-6810
5UP7		X							12-20-46	5UP7 Tent. Data
5UP11		X							12-20-46	5UP11 Tent. Data
5V4-G						X			9-2-41	5V4-G Data
5W4, 5W4-GT .						X			3-20-43	5W4, 5W4-GT/G Data
5WP11		X							2-1-49	5WP11 Tent. Data 1
		X							2-1-49	Tent. Data 2
5WP15		X							6-15-48	5WP15 Tent. Data
		X							6-15-48	Drawing CE-6919
		X								Curve 92CM-6916
5X4-G						"			3-20-43	5X4-G Data *(on back of 5W4 sheet)*
5Y3-G, 5Y3-GT						X			1-1-51	5Y3-G, 5Y3-GT Data 1
						X			1-1-51	Data 2
						X				Curve 92CM-7395
5Y4-G						X			2-2-40	5Y4-G Data
5Z3						"			2-2-40	5Z3 Data *(on 5Y4-G sheet)*
5Z4						X			9-2-41	5Z4 Data
5ZP16		X							3-1-51	5ZP16 Tent. Data
		X							3-1-51	Outline CE-7574
		X								Curve 92CM-7576
6A3						X			5-1-41	6A3 Tent. Data
6A6						X			4-5-37	6A6 Data
6A7						X			7-1-41	6A7 Data
6A7S						X			12-1-41	6A7S Data
6A8, 6A8-G, 6A8-GT						"			12-1-41	6A8, 6A8-G, 6A8-GT Data *(on 6A7S sheet)*
						X				Curve 92C-4521
6AB4						X			5-1-52	6AB4 Data
6AB5						X			4-15-40	6AB5/6N5 Data
6AB7						X			12-1-41	6AB7/1853 Data
						X			4-15-40	Curves 92C-6144, 92C-6145
6AC5-GT						X			5-1-41	6AC5-GT/6AC5-G Data

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6AC7						X			12-1-41	6AC7/1852 Data
						X				Curve 92C-6146R1
6AD7-G						X			9-2-41	6AD7-G Data
						X				Curve 92C-6153
6AF4						X			10-1-53	6AF4 Data
						X				Curve 92CM-7756
						X				Curve 92CM-7759R1
6AF6-G						X			12-15-44	6AF6-G Data
6AG5						X			12-1-43	6AG5 Data
						X				Curve 92CM-6399R1
6AG7						X			11-1-52	6AG7 Data 1
						X			11-1-52	Data 2
						X			11-1-52	Curves CE-6035T1-6036T1
6AH4-GT						X			8-1-53	6AH4-GT Tent. Data
6AH6						X			11-15-49	6AH6 Tent. Data
						X				Curve 92CM-7339
6AK5						X			3-30-45	6AK5 Tent. Data
						X				Curve 92CM-6504
6AK6						X			10-1-43	6AK6 Tent. Data
						X				Curve 92C-6449
6AL5						X			11-1-50	6AL5 Data
						X				Curve 92CM-6561
6AL7-GT						X			2-1-49	6AL7-GT Data
						X			2-1-49	Typical Circuits 92CS-7169
6AQ5						X			5-1-52	6AQ5 Data
6AQ6						X			6-30-44	6AQ6 Tent. Data
						X				Curve 92CM-6552
6AQ7-GT						X			5-1-50	6AQ7-GT Data
6AR5						X			5-20-49	6AR5 Data
6AS5						X			3-15-48	6AS5 Tent. Data
						X				Curve 92CM-6921R1
6AS6					X				2-1-50	6AS6 Tent. Data
					X					Curve 92CM-7401
					X					Curve 92CM-7408
					X					Curve 92CM-7404
6AS7-G						X			11-15-49	6AS7-G Data
						X				Curve 92CM-6618
6AT6						X			1-2-46	6AT6 Tent. Data
						X				Curve 92CM-6610
6AU5-GT						X			2-1-50	6AU5-GT Tent. Data
						X			2-1-50	Circuit CE-7358R2A
						X				Curve 92CM-7355
6AU6						X			6-20-47	6AU6 Data
						X				Curve 92CM-6611
						X				Curve 92CM-6623
						X				Curve 92CM-6854
6AV5-GT						X			4-1-53	6AV5-GT Tent. Data
						X				Curve 92CM-7941
6AV6						X			10-15-47	6AV6 Tent. Data
6AX4-GT						X			9-1-52	6AX4-GT Tent. Data
6AX5-GT						X			2-1-50	6AX5-GT Tent. Data 1
						X			2-1-50	Tent. Data 2
						X				Curve 92CM-7382

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						Section				
6B4-G						X			5-1-41	6B4-G Tent. Data
6B5						''			5-1-41	6B5 Tent. Data *(on 6B4-G sheet)*
6B6-G						X			7-1-41	6B6-G Data
6B7						X			12-30-47	6B7 Data
						X				Curve 92CM-4880
6B8						X			9-2-41	6B8 Data
						X				Curve 92C-4660
6B8-G						X			12-30-47	6B8-G Data
6BA6						X			1-2-46	6BA6 Tent. Data
						X				Curve 92CM-6609
						X				Curve 92CM-6620
6BA7						X			9-30-48	6BA7 Tent. Data
						X				Curve 92CM-6982R1
						X				Curve 92CM-6980R2
6BC5						X			9-1-50	6BC5 Tent. Data
						X				Curve 92CM-7528
6BD6						X			2-1-50	6BD6 Tent. Data
6BE6						X			1-2-46	6BE6 Tent. Data
						X				Curve 92CM-6625
						X				Curve 92CM-6601
6BF5						X			10-1-53	6BF5 Tent. Data
6BF6						X			11-1-52	6BF6 Data
6BG6-G						X			11-1-50	6BG6-G Data
						X			6-20-47	Outline CE-6758
						X				Curve 92CM-6775R1
6BH6						X			12-30-47	6BH6 Tent. Data
						X				Curve 92CM-6892
						X				Curve 92CM-6893
6BJ6						X			6-20-47	6BJ6 Tent. Data
						X				Curve 92CM-6867
						X				Curve 92CM-6870
6BL7-GT						X			10-1-53	6BL7-GT Data
6BQ6-GT						X			5-1-52	6BQ6-GT Data
						X				Curve 92CM-7459
6BQ7						X			5-1-51	6BQ7 Tent. Data
						X			5-1-51	Circuits CE-7643-7644
						X				Curve 92CM-7538
						X				Curve 92CM-7550
6BQ7-A						X			11-1-52	6BQ7-A Tent. Data
						X			11-1-52	Circuits CE-7643-7644
						X				Curve 92CM-7538R1
						X				Curve 92CM-7550R1
6C4						X			6-1-42	6C4 Tent. Data
						X				Curve 92C-6378
6C5, 6C5-GT ..						X			3-20-43	6C5, 6C5-GT/G Data
						X				Curve 92C-4511
6C6						X			6-15-48	6C6 Data
6C8-G						X			12-1-41	6C8-G Data
6CB6						X			2-1-50	6CB6 Tent. Data
						X				Curve 92CM-7375
6CD6-G						X			2-1-50	6CD6-G Tent. Data
						X			2-1-50	Circuit CE-7405R1
						X				Curve 92CM-7393

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6N5						"				*See 6AB5/6N5*
6N6-G						X			12-1-39	6N6-G Tent. Data
6N7, 6N7-GT . .						X			6-1-42	6N7, 6N7-GT/G Data
						X				Curve 92C-4611
6P5-GT						"			12-1-42	6P5-GT/G Data *(on back of 6N7 curve 92C-4611)*
6Q7, 6Q7-G, 6Q7-GT						X			12-1-41	6Q7, 6Q7-G, 6Q7-GT Data
						X				Curve 92C-4522R2
6R7, 6R7-GT . .						X			12-1-43	6R7, 6R7-GT/G Data
6S4						X			2-1-50	6S4 Tent. Data
						X				Curve 92CM-7373
6S7, 6S7-G						X			2-2-40	6S7, 6S7-G Data
6S8-GT						X			8-29-47	6S8-GT Tent. Data
						X				Curve 92CM-6876
6SA7, 6SA7-GT						X			1-1-43	6SA7, 6SA7-GT/G Data
						X				Curve 92C-4993
						X				Curve 92C-4989
6SB7-Y						X			4-1-46	6SB7-Y Tent. Data 1
						X			4-1-46	Tent. Data 2
						X				Curve 92CM-6635
6SC7						X			3-15-41	6SC7 Data
6SF5, 6SF5-GT .						X			5-1-41	6SF5, 6SF5-GT Data
6SF7						X			12-1-41	6SF7 Tent. Data
						X				Curve 92C-6256
6SG7						X			5-1-42	6SG7 Tent. Data
						X				Curve 92C-6248R2
6SH7						X			6-1-42	6SH7 Tent. Data
						X				Curve 92C-6395
6SJ7, 6SJ7-GT .						X			6-15-48	6SJ7, 6SJ7-GT Data
						X				Curve 92CM-4939R1
						X				Curve 92CM-6444R1
						X				Curve 92CM-6409R1
6SK7, 6SK7-GT						X			12-1-42	6SK7, 6SK7-GT/G Data
						X				Curve 92C-4938
6SL7-GT						X			7-1-41	6SL7-GT Tent. Data
6SN7-GT						X			4-1-44	6SN7-GT Data
6SQ7, 6SQ7-GT						X			12-1-43	6SQ7, 6SQ7-GT/G Data
						X				Curve 92C-6310
6SR7						X			4-15-40	6SR7 Tent. Data
6SS7						X			5-1-41	6SS7 Tent. Data
6ST7						X			12-1-41	6ST7 Tent. Data
6SZ7						X			4-1-46	6SZ7 Tent. Data
6T7-G						X			12-1-41	6T7-G Data
6T8						X			2-1-49	6T8 Data
						X				Curve 92CM-7063
6U5						X			9-2-41	6U5/6G5 Data
6U7-G						X			9-2-41	6U7-G Data
						X				Curve 92C-6121

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7E6						X			9-30-48	7E6 Data
7E7						X			9-30-48	7E7 Data
7F7						X			12-30-47	7F7 Data
7F8						X			12-30-47	7F8 Data
7G7						X			12-30-47	7G7 Data
7H7						X			12-30-47	7H7 Data
7J7						X			12-30-47	7J7 Data
7JP1		X							1-1-51	7JP1 Tent. Data 1
		X							1-1-51	Tent. Data 2
7JP4		X							9-2-47	7JP4 Tent. Data
		X							9-2-47	Outline CE-6667
		X								Curve 92CM-6888
7K7						X			5-20-49	7K7 Data
7L7						X			10-15-47	7L7 Data
7MP7		X							10-1-51	7MP7 Data
		X							10-1-51	Outline CE-7438R3
7MP14		X							10-1-51	7MP14 Data
7N7						"			10-15-47	7N7 Data *(on back of 7L7 sheet)*
7NP4		X							6-1-53	7NP4 Tent. Data 1
		X							11-1-50	Tent. Data 2
		X							11-1-50	Outline CE-7476B
		X								Curve 92CM-7515
7Q7						X			5-1-41	7Q7 Tent. Data
7QP4		X							1-1-51	7QP4 Tent. Data
		X							1-1-51	Outline CE-7524A
		X								Curve 92CM-7529
7R7						X			10-15-47	7R7 Data
7S7						X			12-30-47	7S7 Data
7TP4		X							2-1-52	7TP4 Tent. Data
		X							2-1-52	Outline CE-7691
		X								Curve 92CM-7688
7V7						X			6-15-48	7V7 Data
7VP1		X							11-1-52	7VP1 Tent. Data 1
		X							11-1-52	Tent. Data 2
7W7						"			6-15-48	7W7 Data *(on back of 7V7 sheet)*
7WP4		X							7-1-52	7WP4 Tent. Data 1
		X							7-1-52	Tent. Data 2
		X							7-1-52	Outline Notes CE-7731
		X								Curve 92CM-7515
7X7						X			3-15-48	7X7 Data
7Y4						X			12-30-47	7Y4 Data
7Z4						"			12-30-47	7Z4 Data *(on back of 7Y4 sheet)*
8D21								X	9-30-48	8D21 Data 1
								X	9-30-48	Data 2
								X	9-30-48	Data 3
								X	9-30-48	Outline Details CE-6687V2B
								X		Curve 92CM-6989
9C21								X	10-15-47	9C21 Data 1
								X	10-15-47	Data 2
								X		Curve 92CM-6457
								X		Curve 92CM-6458
								X		Curve 92CM-6462

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9C22								X	10-1-51	9C22 Data 1
								X	10-1-51	Data 2
								X	10-1-51	Outline CE-6447R2-6519
9C25								X	8-15-46	9C25 Tent. Data 1
								X	5-20-49	Data 2
								X	8-15-46	Outline CE-6750
								X		Curve 92CM-7269
								X		Curve 92CM-7234
10BP4		X							3-15-48	10BP4 Data
		X							10-15-47	Outline CE-6663R2A
		X								Curve 92CM-6675R2
10BP4-A		X							5-1-50	10BP4-A Data
		X							5-1-50	Outline CE-6663R3A
		X							5-1-50	Curve CE-7448
		X								Curve 92CM-7454
10FP4-A		X							8-1-51	10FP4-A Tent. Data
		X							8-1-51	Outline CE-7629
10KP7		X							9-30-48	10KP7 Tent. Data
		X							9-30-48	Outline CE-6932
10SP4		X							7-1-52	10SP4 Tent. Data
		X							7-1-52	Outline CE-7729
		X								Curve 92CM-7773
10-Y								X	12-20-46	10-Y Data
12A6					X				5-1-42	12A6 Tent. Data
					X					Curve 92C-6327
12A7						X			8-2-43	12A7 Data
12A8-GT						"			8-2-43	12A8-GT/G Data *(on 12A7 sheet)*
12AH7-GT						"			8-2-43	12AH7-GT Data *(on back of 12A7 sheet)*
12AL5						X			6-20-47	12AL5 Tent. Data
12AQ5						X			8-1-53	12AQ5 Tent. Data 1
						X			8-1-53	Tent. Data 2
12AT6						"			6-20-47	12AT6 Data *(on back of 12AL5 sheet)*
12AT7						X			2-1-49	12AT7 Tent. Data
						X				Curve 92CM-7056
12AU6						"			2-1-49	12AU6 Data *(on back of 12AT7 Curve 92CM-7056)*
12AU7						X			12-20-46	12AU7 Tent. Data
12AV6						X			10-15-47	12AV6 Data
12AW6						X			4-15-47	12AW6 Tent. Data
						X				Curve 92CM-6855
12AX4-GT						X			9-1-52	12AX4-GT Tent. Data
12AX7						X			9-15-47	12AX7 Tent. Data
						X				Curve 92CM-6879
12AY7					X				4-1-53	12AY7 Tent. Data
					X					Curve 92CM-7861
12BA6						X			11-1-52	12BA6 Data
12BA7						"			11-1-52	12BA7 Data *(on 12BA6 sheet)*
12BD6						"			11-1-52	12BD6 Data *(on 12BA6 sheet)*
12BE6						"			11-1-52	12BE6 Data *(on 12BA6 sheet)*
12BF6						"			11-1-52	12BF6 Data *(on 12BA6 sheet)*
12BH7						X			5-1-52	12BH7 Tent. Data
						X				Curve 92CM-7742

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	INDEX									
				CONTENTS						
	Section									
12C8						X			9-15-49	12C8 Data
12DP7-B		X							9-1-52	12DP7-B Tent. Data
		X							9-1-52	Outline CE-6375R5
12F5-GT						"			9-15-49	12F5-GT Data *(on 12C8 sheet)*
12H6						"			9-15-49	12H6 Data *(on 12C8 sheet)*
12J5-GT						"			9-15-49	12J5-GT Data *(on 12C8 sheet)*
12J7-GT						"			9-15-49	12J7-GT Data *(on back of 12C8 sheet)*
12K7-GT						"			9-15-49	12K7-GT Data *(on back of 12C8 sheet)*
12K8						"			9-15-49	12K8 Data *(on back of 12C8 sheet)*
12KP4-A		X							8-1-51	12KP4-A Tent. Data
		X							8-1-51	Outline CE-7630
12L8-GT					X				10-1-43	12L8-GT Data
12LP4		X							9-15-49	12LP4 Tent. Data
		X							9-15-49	Outline CE-7276
		X								Curve 92CM-7310
12LP4-A		X							5-1-50	12LP4-A Data
		X							5-1-50	Outline CE-7276R2
		X								Curve 92CM-7453
12Q7-GT						"			9-15-49	12Q7-GT Data *(on back of 12C8 sheet)*
12S8-GT						X			9-15-49	12S8-GT Data
12SA7, 12SA7-GT						"			9-15-49	12SA7, 12SA7-GT Data *(on 12S8-GT sheet)*
12SC7						"			9-15-49	12SC7 Data *(on 12S8-GT sheet)*
12SF5, 12SF5-GT						"			9-15-49	12SF5, 12SF5-GT Data *(on 12S8-GT sheet)*
12SF7						"			9-15-49	12SF7 Data *(on back of 12S8-GT sheet)*
12SG7						"			9-15-49	12SG7 Data *(on back of 12S8-GT sheet)*
12SH7						"			9-15-49	12SH7 Data *(on back of 12S8-GT sheet)*
12SJ7, 12SJ7-GT						"			9-15-49	12SJ7, 12SJ7-GT Data *(on back of 12S8-GT sheet)*
12SK7, 12SK7-GT						X			10-1-53	12SK7, 12SK7-GT Data
12SL7-GT						"			10-1-53	12SL7-GT Data *(on 12SK7 sheet)*
12SN7-GT						"			10-1-53	12SN7-GT Data *(on 12SK7 sheet)*
12SP7		X							8-1-51	12SP7 Tent. Data
		X							8-1-51	Outline CE-7598
12SQ7, 12SQ7-GT						"			10-1-53	12SQ7, 12SQ7-GT Data *(on 12SK7 sheet)*
12SR7						"			10-1-53	12SR7 Data *(on back of 12SK7 sheet)*
12SW7					X				6-20-46	12SW7 Tent. Data
12SX7-GT					X				6-20-46	12SX7-GT Tent. Data
					X					Curve 92CM-6782

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12SY7					X				6-20-46	12SY7 Tent. Data
					X					Curve 92CM-6786
12V6-GT						"			10-1-53	12V6-GT Data *(on back of 12SK7 sheet)*
12X4						"			10-1-53	12X4 Data *(on back of 12SK7 sheet)*
12Z3						X			2-2-40	12Z3 Data
14A4						X			12-30-47	14A4 Data
14A5						"			12-30-47	14A5 Data *(on 14A4 sheet)*
14A7						"			12-30-47	14A7 Data *(on back of 14A4 sheet)*
14AF7						X			11-15-48	14AF7 Data
14B6						"			11-15-48	14B6 Data *(on back of 14AF7 sheet)*
14B8						"			11-15-48	14B8 Data *(on back of 14AF7 sheet)*
14C5						"			11-15-48	14C5 Data *(on back of 14AF7 sheet)*
14C7						X			11-15-48	14C7 Data
14CP4		X							8-1-51	14CP4 Tent. Data
		X								Curve 92CM-7625
		X							8-1-51	Outline CE-7631B
14E6						"			11-15-48	14E6 Data *(on back of 14C7 sheet)*
14E7						"			11-15-48	14E7 Data *(on back of 14C7 sheet)*
14EP4		X							3-1-51	14EP4 Tent. Data 1
		X							3-1-51	Tent. Data 2
		X							3-1-51	Outline CE-7554R2B
		X								Curve 92CM-7567
14F7						"			11-15-48	14F7 Data *(on back of 14C7 sheet)*
14F8						"			11-15-48	14F8 Data *(on back of 14C7 sheet)*
14H7						"			11-15-48	14H7 Data *(on back of 14C7 sheet)*
14J7						X			5-1-50	14J7 Data
14N7						"			5-1-50	14N7 Data *(on 14J7 sheet)*
14Q7						"			5-1-50	14Q7 Data *(on 14J7 sheet)*
14R7						"			5-1-50	14R7 Data *(on 14J7 sheet)*
16ADP7		X							2-1-52	16ADP7 Tent. Data
		X							2-1-52	Outline CE-7690
16AP4-A		X							5-1-50	16AP4-A Data
		X							5-1-50	Outline CE-7449A
		X								Curve 92CM-7471
16DP4-A		X							2-1-52	16DP4-A Tent. Data
16GP4		X							7-3-50	16GP4 Tent. Data
		X							2-1-50	Ref.-Line Gauge CE-7391
		X								Curve 92CM-7351R1
16GP4-A		X							7-1-52	16GP4-A Data
16GP4-B		"							7-1-52	16GP4-B Data *(on 16GP4-A sheet)*
16GP4-C		"							7-1-52	16GP4-C Data *(on 16GP4-A sheet)*
16KP4		"							7-1-52	16KP4 Data *(on back of 16GP4-A sheet)*
16LP4-A		X							2-1-52	16LP4-A Tent. Data
16RP4		X							8-1-51	16RP4 Tent. Data 1
		X							8-1-51	Tent. Data 2
		X							8-1-51	Outline CE-7627B
		X								Curve 92CM-7623
16TP4		X							8-1-51	16TP4 Tent. Data 1
		X							8-1-51	Tent. Data 2
		X							8-1-51	Outline CE-7632B
		X								Curve 92CM-7628

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		X								Curve 92CM-7753
		X							7-1-52	Outline CE-7745R2B
		X								Curve 92CM-7652R1
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		X							7-1-52	Outline CE-7734R1B
		X								Curve 92CM-7755
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19AP4-B		X							9-1-50	19AP4-B Tent. Data
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19J6						X			11-15-48	19J6 Tent. Data
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19X8						"			9-1-52	19X8 Data *(on 19T8 sheet)*
20CP4		X							5-1-51	20CP4 Tent. Data 1
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		X								Curve 92CM-7904
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		X							8-1-53	Tent. Data 2
		X							8-1-53	Outline CE-7944B
		X								Curve 92CM-7958
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		X								Curve 92CM-7713
		X							5-1-52	Outline CE-7646R1B
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25AC5-GT						X			3-20-43	25AC5-GT/G Data
25B5						"			3-20-43	25B5 Data *(on back of 25AC5-GT/G sheet)*
25BQ6-GT						X			5-1-52	25BQ6-GT Data
25C6-G						X			5-1-41	25C6-G Tent. Data
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25L6-GT						X			2-1-50	25L6-GT Data
25S						"				***See 1B5/25S***
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25Z5						X			9-2-41	25Z5 Data
25Z6, 25Z6-GT						X			3-20-43	25Z6, 25Z6-GT/G Data
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					X					Curve 92CM-6788
					X					Curve 92CM-6784
26A7-GT					X				3-30-45	26A7-GT Tent. Data
					X					Curve 92CM-6509
					X					Curve 92CM-6579
26C6					X				6-20-46	26C6 Tent. Data
					X					Curve 92CM-6772
26D6					X				6-20-46	26D6 Tent. Data
					X					Curve 92CM-6789
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27MP4		X							8-1-53	27MP4 Tent. Data 1
		X							8-1-53	Tent. Data 2
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		X							8-1-53	Outline CE-7924B
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35B5						X			12-20-46	35B5 Tent. Data
						X				Curve 92CM-6312R1
35C5						X			3-15-48	35C5 Tent. Data
35L6-GT						X			6-20-47	35L6-GT Data
						X				Curve 92CM-6309
						X				Curve 92CM-6307R1
35W4						X			9-1-50	35W4 Data
						X				Curve 92CM-6615R1
35Y4						X			12-30-47	35Y4 Data
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35Z4-GT						"			6-20-47	35Z4-GT Data *(on back of 35Z3 sheet)*
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37						X			11-1-37	37 Data
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45						X			4-20-38	45 Data
45Z3						X			5-1-41	45Z3 Tent. Data
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50B5						X			1-2-46	50B5 Tent. Data
						X				Curve 92CM-6603
50C5						X			3-15-48	50C5 Tent. Data
50C6-G						X			2-1-50	50C6-G Data
50L6-GT						X			9-2-41	50L6-GT Data
						X				Curve 92CM-6314R1
50X6						X			2-1-50	50X6 Data
50Y6-GT						"			2-1-50	50Y6-GT Data *(on back of 50X6 sheet)*
50Y7-GT						X			2-1-50	50Y7-GT Data
50Z7-G						X			8-2-43	50Z7-G Data
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55						X			6-15-48	55 Data
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57						"			6-15-48	57 Data *(on 55 sheet)*
58						"			6-15-48	58 Data *(on back of 55 sheet)*
59						X			12-20-38	59 Data
						X				Curve 92S-5193R1
70L7-GT						X			12-1-41	70L7-GT Data
						X				Curve 92C-6324
71-A						X			7-1-35	71-A Data
75						X			9-2-41	75 Data
VR75-30										*Superseded by 0A3/VR75*

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77						X			9-2-41	77 Data
						X				Curve 92S-5279
78						X			4-5-37	78 Data & Curve 92S-5248
80						X			2-2-40	80 Data
81						"			2-2-40	81 Data *(on 80 sheet)*
82						X			9-2-41	82 Data
83						"			9-2-41	83 Data *(on back of 82 sheet)*
83-v						"			9-2-41	83-v Data *(on back of 82 sheet)*
84						X			2-2-40	84/6Z4 Data
85						X			6-15-48	85 Data
						X				Curve 92CM-5197R1
89						X			12-20-38	89 Data
						X				Curve 92S-5452
105				X					5-1-46	105 Tent. Data
VR105-30										*Superseded by 0C3/VR105*
117L7-GT/ 117M7-GT						X			5-1-41	117L7-GT/117M7-GT Tent. Data
117N7-GT						"			5-1-41	117N7-GT Data *(on back of 117L7-GT/117M7-GT sheet)*
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						X				Curve 92C-6340
117Z3						X			7-3-50	117Z3 Data
117Z4-GT						X			2-1-49	117Z4-GT Data
117Z6-GT						X			8-2-43	117Z6-GT/G Data
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				X					5-1-46	Curve CE-6698
203-A								X	4-5-37	203-A Data
								X		Curve 92S-5463
207								X	9-30-48	207 Data 1
								X	9-30-48	Data 2
								X	9-30-48	Shell No. 3906 (CE-7020)
								X		Curve 92CM-4551
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								X	5-1-50	Data 2
								X		Curve 92CM-4537
217-C								X	6-20-47	217-C Data
502-A				X					9-30-48	502-A Data
				X					9-30-48	Curves CE-7074T - 7072T
559					X				11-15-45	559 Tent. Data
					X					Curve 92CM-6588
575-A								X	5-1-46	575-A Tent. Data
579-B					X				5-1-46	579-B Tent. Data
627				X					5-1-46	627 Tent. Data
629				X					5-1-46	629 Tent. Data
672-A				X					6-1-48	672-A Tent. Data
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801-A								X	4-15-40	801-A/801 Data
								X	4-15-40	Data 2
802								X	2-2-40	802 Data
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								X	3-20-36	Curves 92C-4604 & 4605
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								X		Curve 92C-4749
804								X	2-2-40	804 Data
								X	2-2-40	Data 2
								X	2-2-40	Data 3
								X		Curve 92C-4562R1
805								X	3-20-36	805 Tent. Data
								X	4-5-37	Data 2
806								X	12-1-43	806 Data 1
								X	12-1-43	Data 2
								X		Curve 92C-4692
807								X	8-1-51	807 Data 1
								X	8-1-51	Data 2
								X	8-1-51	Data 3
								X	2-1-49	Outline CE-4674R2
								X	2-1-49	Curves CE-6247T1-6244T1
								X	2-1-49	Curves CE-6246T1-4689T2
808								X	4-15-47	808 Data
								X	4-15-47	Outline CE-4677R3
								X		Curve 92CM-4678
809								X	12-20-46	809 Data 1
								X	12-20-46	Data 2
								X		Curve 92CM-4836
810								X	12-20-46	810 Data 1
								X	12-20-46	Data 2
								X		Curve 92C-4981
811-A								X	5-20-49	811-A Data 1
								X	5-20-49	Data 2
								X	5-20-49	Outline CE-6905
								X		Curve 92CM-7138
812-A								X	6-15-48	812-A Tent. Data 1
								X	3-1-51	Tent. Data 2
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								X		Curve 92CM-6938
813								X	8-1-51	813 Data 1
								X	5-20-49	Data 2
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								X		Curve 92CM-6205R1
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826								X	8-15-47	826 Data 1
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								X	8-15-44	Data 2
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								X	9-30-48	Data 3
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								X	11-1-52	Outline CE-6397R4B
								X		Curve 92CM-6114R3
830-B								X	3-20-36	830-B Tent. Data
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832-A								X	3-1-51	832-A Data 1
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								X	3-1-51	Curve CE-4910T1
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								X	3-15-48	Data 3
								X		Curve 92CM-6196
834								X	12-1-42	834 Data
								X		Curve 92C-4544
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836								"	12-1-42	836 Data *(on 835 sheet)*
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841								X	4-5-37	841 Data
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								X		Curve 92C-4457
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								X		Curve 92C-4455
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								X	7-1-38	
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								X		Curve 92S-5501
861								X	7-1-38	861 Data
								X	4-18-33	Data 2
								X		Curve 92C-5550
862-A								X	3-30-45	862-A Data 1
								X	3-30-45	Data 2
								X		Curve 92CM-4461R1
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865								X	9-30-36	865 Data
								X	6-15-36	Data 2
								X		Curve 92C-4412
866-A								X	6-30-44	866-A/866 Data
868			X						8-15-47	868 Data
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								X		Curve 92CM-7634
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874					X				8-15-44	874 Data
878					X				1-15-36	878 Data
880								X	5-1-50	880 Data 1
								X	5-1-50	Data 2
								X	5-1-50	Outline CE-6181R1
								X		Curve 92CM-6178R1
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				X					12-15-44	Data 2
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								X	6-20-46	Data 2
								X		Curve 92C-6086
								X		Curve 92C-6063
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								X	6-20-46	Data 2
891								X	2-1-50	891 Data 1
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892-R								X	2-1-50	892-R Data 1
								X	2-1-50	Data 2
893-A								X	3-30-45	893-A Data 1
								X	7-1-45	Data 2
								X	3-26-45	Circuits 92CM-6025R1
893A-R								X	3-30-45	893A-R Data 1
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								X		Curve 92CM-6187R1
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								X	3-30-45	Data 2
								X	2-7-45	Circuits 92CM-4388R3
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918			X						8-15-47	918 Data
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919			X						8-15-47	919 Data
920			X						8-15-47	920 Data
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921			X						6-15-48	921 Data
922			X						8-15-47	922 Data
923			X						8-15-47	923 Data
924			X						6-20-46	924 Data
925			X						8-15-47	925 Data
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926			X						6-15-48	926 Data
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928			X						8-15-47	928 Data
			X							Curve 92CM-6117
929			X						8-15-47	929 Data
930			X						8-15-47	930 Data
			X							Curve 92CM-4806R1
931-A			X						9-1-50	931-A Data
			X						9-1-50	Outline CE-6264R2
			X							Curve 92CL-6459R2
934			X						9-1-50	934 Data
935			X						7-3-50	935 Data
			X							Curve 92CM-6478R1
954					X				6-30-44	954 Data
					X					Curve 92C-4378
955					X				6-30-44	955 Data
					X					Curve 92C-5561R1
956					X				6-30-44	956 Data
					X					Curve 92C-4672R1
957					X				6-30-44	957 Data
958-A					X				6-30-44	958-A Data
					X					Curve 92CM-6334R1
959					X				6-30-44	959 Data
991					X				12-1-39	991 Data
1609					X				1-1-43	1609 Data
					X					Curve 92C-6355
1611					"				1-1-43	1611 Data *(on back of 1609 curve 92C-6355)*
1612					X				1-1-43	1612 Data
1613								X	12-1-43	1613 Data
1614								X	12-20-46	1614 Data 1
								X	12-20-46	Data 2
1616								X	5-1-42	1616 Data
1619								X	8-2-43	1619 Data
								X	8-2-43	Data 2
								X		Curve 92C-4931
								X		Curve 92C-4924
1620					"				1-1-43	1620 Data *(on back of 1612 sheet)*
1621					X				1-1-43	1621 Data
1622					X				8-2-43	1622 Data
1623								X	4-15-40	1623 Data
								X	4-15-40	Data 2
1624								X	1-1-43	1624 Data
								X	1-1-43	Data 2
1625								X	12-15-44	1625 Data
1626								X	3-15-41	1626 Tent. Data
1629					X				6-30-44	1629 Data
1631					X				11-15-45	1631 Data
1632					"				11-15-45	1632 Data *(on 1631 sheet)*
1633					"				11-15-45	1633 Data *(on 1631 sheet)*
1634					"				11-15-45	1634 Data *(on back of 1631 sheet)*
1635					X				4-15-47	1635 Data
					X					Curve 92C-6358
1642					"					*See 2C21/1642*

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1644					X				10-1-43	1644 Data
1654					X				3-15-48	1654 Data
1850-A		X							5-1-51	1850-A Data
		X							5-1-51	Outline CE-4891R3A
		X								Curve 92CM-6404R1
1852						"				*See 6AC7/1852*
1853						"				*See 6AB7/1853*
1945					X				6-20-47	1945 Tent. Data
					X				6-20-47	Outline & Curve CE-6841-6850T
1946					X				6-20-47	1946 Tent. Data
1947					X				6-20-47	1947 Tent. Data
					X					Curve 92CM-6849
1949					X				6-20-47	1949 Tent. Data
					X					Curve 92CM-6851
1950					X				6-20-47	1950 Tent. Data
2050				X					6-15-48	2050 Data
				X					6-15-48	Curve CE-6540T1
				X						Curve 92CM-6274R1
5527		X							4-15-47	5527 Tent. Data
		X							4-15-47	Outline CE-6803
5550				X					5-1-46	5550 Tent. Data
				X					5-1-46	Curves CE-6716 - 6715
5551				X					5-1-46	5551 Tent. Data
				X					5-1-46	Outline CE-6712
5552				X					3-1-51	5552 Data
				X					3-1-51	Outline CE-6711R1
5553				X					5-1-46	5553 Tent. Data
5554				X					5-1-46	5554 Tent. Data
				X					5-1-46	Outline CE-6727
				X					5-1-46	Curves CE-6710 - 6746
5555				X					5-1-46	5555 Tent. Data
				X					5-1-46	Outline CE-6726
5556								X	5-1-46	5556 Tent. Data
								X	5-1-46	Outline & Curve CE-6717-6718
5557				X					5-1-46	5557 Tent. Data
5558								X	4-1-53	5558 Data
								X		Curve 92CM-7856
5559				X					3-1-51	5559 Data
									3-1-51	Curves CE-6704T1-7562T
5560				X					3-1-51	5560 Data
									3-1-51	Curves CE-6705T1-7568T
5561								X	5-1-46	5561 Tent. Data
5563				X					6-20-47	5563 Tent. Data
				X					9-15-49	Curve CE-6842T1
				X						Curve 92CM-7197
				X						Curve 92CM-7267
5581			X						4-15-47	5581 Tent. Data
			X							Curve 92CM-6822
5582			X						6-15-48	5582 Data
			X							Curve 92CM-6823

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5583			X						5-1-51	5583 Data
5584			X						4-15-47	5584 Tent. Data
5588								X	4-15-47	5588 Tent. Data 1
								X	3-1-51	Tent. Data 2
								X	3-1-51	Outline Notes & Mtg. Arrang. CE-6835R1B-6833R1
								X		Curve 92CM-6826
								X		Curve 92CM-6837
5592								X	4-15-47	5592 Tent. Data
								X	4-15-47	Outline CE-6827
								X		Curve 92CM-6838
								X		Curve 92CM-6843
5618								X	10-15-47	5618 Tent. Data 1
								X	10-15-47	Tent. Data 2
								X		Curve 92CM-6881
5651					X				3-15-48	5651 Tent. Data
5652			X						10-1-47	5652 Tent. Data
			X							Curve 92CM-6895
5653			X						9-15-47	5653 Tent. Data
5654					X				1-1-53	5654 Tent. Data
5671								X	9-15-49	5671 Data 1
								X	1-4-54	Data 2
								X	9-1-50	Outline CE-6897R1
								X		Curve 92CM-6899
5675					X				2-1-50	5675 Tent. Data
					X				1-1-51	Outline CE-7340R1
5690					X				4-1-53	5690 Tent. Data 1
					X				4-1-53	Tent. Data 2
					X					Curve 92CM-7797
					X					Curve 92CM-7895
					X					Curve 92CM-7795
					X					Curve 92CM-7796
5691					X				3-15-48	5691 Tent. Data
					X				3-15-48	Outline
					X					Curve 92CM-6913
5692					X				3-15-48	5692 Tent. Data
					X					Curve 92CM-6257
5693					X				3-15-48	5693 Tent. Data
					X				3-15-48	Outline
					X					Curve 92CM-6920R1
					X					Curve 92CM-6443R1
					X					Curve 92CM-4937R1
5696				X					2-1-49	5696 Tent. Data
				X						Curve 92CM-7044
				X					2-1-49	Curves CE-7047T - 7052T
5713								X	9-30-48	5713 Tent. Data
								X	9-30-48	Outline CE-6939
								X		Curve 92CM-6942
5718					X				4-1-53	5718 Tent. Data 1
					X				4-1-53	Tent. Data 2
					X				4-1-53	Tent. Data 3
					X					Curve 92CM-7850

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5719					X				6-1-53	5719 Tent. Data 1
					X				6-1-53	Tent. Data 2
					X				6-1-53	Tent. Data 3
					X					Curve 92CM-7926
5726					X				9-1-52	5726 Tent. Data 1
					X				9-1-52	Tent. Data 2
5734					X				11-15-48	5734 Tent. Data
					X				11-15-48	Outline CE-7036
					X					Curve 92CM-7059
5751					X				10-1-53	5751 Tent. Data 1
					X				10-1-53	Tent. Data 2
					X					Curve 92CM-7947
5762								X	8-1-53	5762/7C24 Data 1
								X	8-1-53	Data 2
								X	8-1-53	Data 3
								X	8-1-53	Data 4
								X		Curve 92CM-7084R1
								X		Curve 92CM-7082
5763								X	8-1-53	5763 Data 1
								X	8-1-53	Data 2
								X		Curve 92CM-7160
5770								X	9-15-49	5770 Tent. Data 1
								X	2-1-49	Tent. Data 2
								X	2-1-49	Outline CE-7070
5771								X	2-1-49	5771 Tent. Data 1
								X	5-20-49	Tent. Data 2
								X	2-1-49	Outline CE-7088
								X		Curve 92CM-7098
5786								X	2-1-49	5786 Tent. Data 1
								X	2-1-49	Tent. Data 2
								X	2-1-49	Tent. Data 3
								X	2-1-49	Mounting CE-7117
								X		Curve 92CM-6593R1
5794					X				5-20-49	5794 Tent. Data
					X				1-1-51	Outline CE-7140R1
5814					X				6-1-53	5814 Tent. Data 1
					X				6-1-53	Tent. Data 2
					X					Curve 92CM-7939
5819			X						7-3-50	5819 Tent. Data
			X						7-3-50	Outline CE-7232R1
			X							Curve 92CL-7258R2
5820		X							2-1-52	5820 Data 1
		X							9-15-49	Tent. Data 2
		X							9-15-49	Outline CE-6878
5822				X					2-1-52	5822 Tent. Data
5823					X				9-15-49	5823 Tent. Data 1
					X				9-15-49	Tent. Data 2
					X					Curve 92CM-7282
5825					X				9-15-49	5825 Tent. Data
					X				9-15-49	Outline CE-7176
5826		X							2-1-52	5826 Data 1
		X							5-1-50	Tent. Data 2

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5831								X	5-1-50	5831 Tent. Data 1
								X	5-1-50	Tent. Data 2
								X	5-1-50	Outline CE-7432A
								X	5-1-50	Drawing CE-7443
5840					X				6-1-53	5840 Tent. Data 1
					X				6-1-53	Tent. Data 2
					X				6-1-53	Tent. Data 3
					X					Curve 92CM-7892
5876					X				7-3-50	5876 Tent. Data 1
					X				7-3-50	Tent. Data 2
5879					X				1-1-53	5879 Data
					X					Curve 92CM-7439
					X					Curve 92CM-7440
5890					X				5-1-50	5890 Tent. Data
					X				5-1-50	Outline CE-7431
5893					X				2-1-52	5893 Tent. Data 1
					X				2-1-52	Tent. Data 2
					X				2-1-52	Tent. Data 3
					X					Curve 92CM-7609R1
					X					Curve 92CM-7483
5915					X				9-1-50	5915 Tent. Data 1
					X				9-1-50	Tent. Data 2
					X					Curve 92CM-7499
5946								X	3-1-51	5946 Tent. Data 1
								X	3-1-51	Tent. Data 2
5963					X				9-1-50	5963 Tent. Data
					X					Curve 92CM-7493
5964					X				9-1-50	5964 Tent. Data
					X					Curve 92CM-7495
6012				X					7-1-52	6012 Tent. Data
				X					7-1-52	Outline CE-7635
				X						Curve 92CM-7747
6026					X				8-1-51	6026 Tent. Data
					X					Curve 92CM-7640
6073					X				5-1-52	6073 Tent. Data
6074					X				5-1-52	6074 Tent. Data
6080					X				8-1-53	6080 Data 1
					X				8-1-53	Data 2
					X				8-1-53	Base CE-8011
6082					X				8-1-53	6082 Data 1
					X				8-1-53	Data 2
6101					X				10-1-53	6101 Tent. Data 1
					X				10-1-53	Tent. Data 2
					X				10-1-53	Tent. Data 3
					X					Curve 92CM-8033
6146								X	1-4-54	6146 Data 1
								X	1-4-54	Data 2
								X	1-4-54	Data 3
								X	1-4-54	Data 4
								X		Curve 92CM-8145
								X		Curve 92CM-7707R1
								X		Curve 92CM-7711R1
								X		Curve 92CM-7712

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6159								X	5-1-52	6159 Tent. Data
6161								X	7-1-52	6161 Tent. Data 1
								X	7-1-52	Tent. Data 2
								X	7-1-52	Tent. Data 3
								X	7-1-52	Tent. Data 4
									7-1-52	Outline Notes & Gauges
								X		(CE-7704B-7705)
								X		Curve 92CM-7771
6166								X	7-1-52	6166 Tent. Data 1
								X	7-1-52	Tent. Data 2
								X	7-1-52	Tent. Data 3
								X	7-1-52	Outline CE-7716
								X		Curve 92CM-7728
								X	7-1-52	Curves CE-7744T-7743T
								X		Curve 92CM-7738
								X	7-1-52	Curves CE-7740T-7739T
								X		Curve 92CM-7730
								X	7-1-52	Curves CE-7746T-7752T
								X		Curve 92CM-7751
6173					X				7-1-52	6173 Tent. Data
					X				7-1-52	Outline CE-7696
					X					Curve 92CM-7727
6181								X	7-1-52	6181 Tent. Data 1
								X	7-1-52	Tent. Data 2
								X	7-1-52	Tent. Data 3
								X	7-1-52	Outline CE-7754R2
								X		Curve 92CM-7767
								X	7-1-52	Curves CE-7768T-7769T
6198		X							9-1-52	6198 Tent. Data
		X							9-1-52	Outline CE-7772
		X								Curve 92CM-7783R1
		X							9-1-52	Curves CE-7820T-7819TV
6199			X						11-1-52	6199 Tent. Data 1
			X						11-1-52	Tent. Data 2
			X							Curve 92CM-7255R3
			X							Curve 92CM-7814
6211					X				1-1-53	6211 Tent. Data
					X					Curve 92CM-7822
					X					Curve 92CM-7824R1
6217			X						11-1-52	6217 Tent. Data 1
			X						11-1-52	Tent. Data 2
6293								X	10-1-53	6293 Tent. Data 1
								X	10-1-53	Tent. Data 2
								X		Curve 92CM-8012
								X	10-1-53	Curves CE-8017T—8016T
8000								X	12-20-46	8000 Data 1
								X	12-20-46	Data 2
								X		Curve 92CM-6212
8001								"		*See 4E27/8001*
8003								X	7-1-41	8003 Tent. Data
								X	7-1-41	Tent. Data 2

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8005								X	6-15-48	8005 Data 1
								X	5-20-49	Data 2
								X	6-15-48	Outline CE-6283R2
								X		Curve 92C-6279
8008								X	8-1-42	8008 Tent. Data
8012-A								X	11-15-45	8012-A Data 1
								X	11-15-45	Data 2
								X		Curve 92CM-6346
8013-A					X				6-1-43	8013-A Tent. Data
8016						"				*See 1B3-GT/8016*
8020					X				5-1-46	8020 Tent. Data
8025-A								X	11-15-45	8025-A Data 1
								X	11-15-45	Data 2
9001					X				10-1-43	9001 Data
					X					Curve 92C-6291
9002					X				10-1-43	9002 Data
9003					X				10-1-43	9003 Data
					X					Curve 92C-6289
9004					X				12-1-42	9004 Tent. Data
					X					Curve 92C-6383
9005					X				12-1-42	9005 Tent. Data
					X					Curve 92C-6384
9006					X				10-1-43	9006 Data

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	X							3-1-54	Bases: 9-Pin Types
		X							Phosphor P22 Characteristic (92CM-7969R2)
1X2-B						X		3-1-54	1X2-B Tent. Data
3A3						X		3-1-54	3A3 Tent. Data
6AN8						X		3-1-54	6AN8 Tent. Data
						X			Curve 92CM-8209
						X			Curve 92CM-8206
6AU4-GT						X		3-1-54	6AU4-GT Tent. Data
6BC7						X		3-1-54	6BC7 Tent. Data
6BD4						X		3-1-54	6BD4 Tent. Data
						X		3-1-54	Circuit & Curve CE—8071R1-8068T
6BL7-GT						X			6BL7-GT Curve 92CM-8133
6BY6						X		3-1-54	6BY6 Tent. Data
						X			Curve 92CM-8140
						X			Curve 92CM-8138
12AT7						X		3-1-54	12AT7 Data
15GP22		X						3-1-54	15GP22 Tent. Data 1
		X						3-1-54	Tent. Data 2
		X						3-1-54	Outline CE-8072R1B
		X							Curve 92CM-8067
FG-67				"					*See 5728/FG-67*
1949					X			3-1-54	1949 Data
1950					X			3-1-54	1950 Data
5728				X				3-1-54	5728/FG-67 Tent. Data
				X				3-1-54	Outline & Curve CE—6701R3-7965T
				X				3-1-54	Curves CE—8107T-8102T
6197					X			3-1-54	6197 Tent. Data
					X				Curve 92CM-8150
					X				Curve 92CM-8149
6263					X			3-1-54	6263 Tent. Data 1
					X			3-1-54	Tent. Data 2
					X			3-1-54	Outline CE-7999B
					X				Curve 92CM-8103
					X			3-1-54	6264 Tent. Data 1
					X			3-1-54	Tent. Data 2
					X				Curve 92CM-8105
6326		X						3-1-54	6326 Tent. Data 1
		X						3-1-54	Tent. Data 2
		X							Curve 92CM-8119
6328			X					3-1-54	6328 Tent. Data
			X					3-1-54	Circuit CE-8127
			X						Curve 92CM-8029
			X						Curve 92CM-7667R1
6342			X					3-1-54	6342 Tent. Data 1
			X					3-1-54	Tent. Data 2
			X						Curve 92CM-8125
			X						Curve 92CL-8123
DELETIONS									
1B5/25S						X		4-20-38	1B5/25S Data
1H4-G						X		4-20-38	1H4-G Data
1H6-G						X		4-20-38	1H6-G Data
6L5-G						X		4-20-38	6L5-G Data
6Z7-G						X		9-1-38	6Z7-G Tent. Data
19						X		4-20-38	19 Data
30						X		4-20-38	30 Data

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DELETIONS (Cont'd)										
35						X		11-1-37	35	Data
37						X		11-1-37	37	Data
39/44						X		11-1-37	39/44	Data
46						X		7-1-38	46	Data
59						X		12-20-38	59	Data
						X				Curve 92S-5193R1
89						X		12-20-38	89	Data
						X				Curve 92S-5452
559					X			11-15-45	559	Tent. Data
					X					Curve 92CM-6588
1644	•				X			10-1-43	1644	Data

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	X								5-3-54	Supplementary Index-Contents (S54-2)
	X								5-3-54	Bases: 1 Terminal Types - Caps 1
	X								5-3-54	1 Terminal Types - Caps 2
	X								5-3-54	1 Terminal Types - Caps 3
	X								5-3-54	1 Terminal Types - Caps 4
		X							5-3-54	Features of Fluorescent Screens
			X						5-3-54	Phototube Classification Chart
			"						5-3-54	Definitions of Phototube Terms (on back of Phototube Class. Cht.)
								X	5-3-54	Trans.-Tube Ratings vs Frequency 3
3A2						X			5-3-54	3A2 Tent. Data
3E29								X	5-3-54	3E29 Data 1
								X	5-3-54	Data 2
								X		Curve 92CM-7927
6AL5						X			5-3-54	6AL5 Data
6AS8						X			5-3-54	6AS8 Tent. Data
						X				Curve 92CM-8206
6BA6						X			5-3-54	6BA6 Data
6BE6						X			5-3-54	6BE6 Data
12AL5						X			5-3-54	12AL5 Data
12AQ5						X			5-3-54	12AQ5 Tent. Data 2
12AT6						"			5-3-54	12AT6 Data (on back of 12AQ5 sheet)
5763								X	5-3-54	5763 Data 1
								X	5-3-54	Data 2
5786								X	5-3-54	5786 Data 1
5819			X						5-3-54	5819 Data 1
			X							Data 2
			X							Curve 92CL-7258R3
6181								X	5-3-54	6181 Data 1
6417								X	5-3-54	6417 Data
6448								X	5-3-54	6448 Tent. Data 1
								X	5-3-54	Tent. Data 2
								X	5-3-54	Tent. Data 3
								X	5-3-54	Outline CE-8256A
								X	5-3-54	Outline CE-8256C
								X	5-3-54	Gauge CE-8254
								X		Curve 92CM-8252
								X		Curve 92CM-8247
								X		Curve 92CM-8245
DELETIONS										
1C6						X			2-2-40	1C6 Data
1E5-GP						X			12-1-39	1E5-GP Data
1F4						X			2-2-40	1F4 Data
1F5-G						"			2-2-40	1F5-G Data (on 1F4 sheet)
						X				Curve 92C-4958
1F6						X			2-2-40	1F6 Data
1F7-GV						"			2-2-40	1F7-GV Data (on 1F6 sheet)
						X				Curve 92C-4888
1G5-G						X			2-2-40	1G5-G Data
1T5-GT						X			8-2-43	1T5-GT Data
2C22					X				3-20-43	2C22 Tent. Data
					X					Curve 92C-6437
6D8-G						X			2-2-40	6D8-G Data
12Z3						X			2-2-40	12Z3 Data
38						X			4-3-39	38 Data

RCA PREFERRED TUBE TYPES

FOR NEW EQUIPMENT DESIGN

This list of Preferred Tube Types is presented to assist equipment manufacturers in formulating their plans for future production of electronic equipment. It is based on a careful survey of the needs of the engineering and manufacturing fields.

The soundness of the Preferred Tube Program, first introduced by RCA in January, 1940, has been proven with the passing years.

By using Preferred Tube Types, electronic-equipment manufacturers can reduce manufacturing costs for the following reasons:

1. LOWER INITIAL COST OF TUBES

- a. We can manufacture more efficiently for stock.
- b. Our production rate on preferred types is more uniform because of smaller demand for other types.

2. MORE PROFIT THROUGH BETTER DELIVERIES

- a. Fewer tube types mean better deliveries and insure continuous production of electronic equipment.

3. IMPROVED QUALITY OF PRODUCT FROM LONGER PRODUCTION RUNS

- a. Tube operator acquires more skill working on one type for a considerable length of time.
  Such skill results in better quality which means less cost to equipment manufacturers on their production line because of fewer stoppages.

4. STANDARDIZATION OF FEWER TUBE TYPES

- a. Permits standardizing fewer accessory parts, such as capacitors, resistors, etc.
- b. Results in purchasing and stocking economies.

5. CUSTOMER SATISFACTION

- a. Purchasers of electronic equipment equipped with Preferred Type Tubes will have greater satisfaction, we believe, because these fast-moving types can be regularly stocked and will, therefore, be easier to obtain for renewal purposes.

This list, of course, is subject to change resulting from technological advances in tube design and application. When such changes become necessary, they will be incorporated in revised issues of this list.

RCA PREFERRED TUBE TYPES

Miniature Types are shown in italics

VACUUM TYPES FOR RF AND AF POWER APPLICATIONS

Values shown are Unmodulated Class C Ratings for Continuous Commercial Service

TYPE	CLASS	MAXIMUM INPUT POWER vs FREQUENCY						UNITS
		1.6	7.5	15	25	50	75	Mc
5763•	Beam	15	15	15	15	15	15	watts
2E24•	Beam	30	30	30	30	30	30	watts
2E26•	Beam	30	30	30	30	30	30	watts
832-A•	Beam□	36	36	36	36	36	36	watts
807•	Beam	60	60	60	60	50	40	watts
6146•	Beam	67.5	67.5	67.5	67.5	67.5	63	watts
829-B•	Beam□	120	120	120	120	120	120	watts
812-A•	Triode	175	175	175	175	160	130	watts
811-A•	Triode	175	175	175	175	160	130	watts
8005•	Triode	240	240	240	240	195	–	watts
4X150A	Tetrode	250	250	250	250	250	250	watts
813•	Beam	360	360	360	360	300	–	watts
6161	Triode	400	400	400	400	400	400	watts
8000•	Triode	500	500	500	500	400	300	watts
4-125A/ 4D21	Tetrode	500	500	500	500	500	500	watts
5786	Triode	1.5	1.5	1.5	1.5	1.5	1.5	kw
833-A•	Triode	1.8	1.8	1.8	1.75	1.5	1.2	kw
6181	Tetrode	2.5	2.5	2.5	2.5	2.5	2.5	kw
5762	Triode	8.7	8.7	8.7	8.7	8.3★	7.9★	kw
889R-A	Triode	16	16	16	16	12	9.6	kw
6166	Tetrode	18	18	18	18	17.8†	17.7†	kw
892	Triode	30	22.5	17	–	–	–	kw
5771	Triode	67.5	60	60	60	45	–	kw
5671	Triode	100	100	90	80	–	–	kw
5770	Triode	150	150	150	135	–	–	kw

□ Twin Type – Input values per tube for push-pull operation.

• Type may be operated at higher ratings in Intermittent Commercial and Amateur Service (ICAS) as given in published data for each type.

★ For Television Picture Service over the range of 54 Mc. to 216 Mc., the CCS maximum rated input power is 6.5 kw.

† For Television Picture Service over the range of 54 Mc. to 216 Mc., the CCS maximum rated input power is 22 kw.

THYRATRONS

2D21, 672-A, 2050, 5560, 5563, *5696*, 6012

IGNITRONS

5551, 5552, 5553, 5822

RECTIFIERS⊕

2X2-A, 3B28, 5R4-GY, 673, 857-B, 866-A, 869-B, 8008

⊕ For additional vacuum-type rectifiers, see listing of types for Receiver Applications.

RCA PREFERRED TUBE TYPES

Miniature Types are shown in italics

VACUUM TYPES FOR RF AND AF POWER APPLICATIONS (Cont'd)

Values shown are Unmodulated Class C Ratings for Continuous Commercial Service

UNITS	MAXIMUM INPUT POWER vs FREQUENCY					CLASS	TYPE
Mc	110	175	220	450	900		
watts	15	15	–	–	–	Beam	*5763*●
watts	30	20	–	–	–	Beam	2E24●
watts	30	20	–	–	–	Beam	2E26●
watts	36	36	34	–	–	Beam□	832-A●
watts	–	–	–	–	–	Beam	807●
watts	56	47	–	–	–	Beam	6146●
watts	120	120	114	–	–	Beam□	829-B●
watts	–	–	–	–	–	Triode	812-A●
watts	–	–	–	–	–	Triode	811-A●
watts	–	–	–	–	–	Triode	8005●
watts	250	250	250	250	–	Tetrode	4X150A
watts	–	–	–	–	–	Beam	813●
watts	400	400	400	400	400	Triode	6161
watts	–	–	–	–	–	Triode	8000●
watts	500	470	390	–	–	Tetrode	4-125A/ 4D21
kw	1.5	1.5	–	–	–	Triode	5786
kw	–	–	–	–	–	Triode	833-A●
kw	2.5	2.5	2.5	2.5	2.5	Tetrode	6181
kw	7.3★	6.1★	4.5★	–	–	Triode	5762
kw	–	–	–	–	–	Triode	889R-A
kw	17.2†	16.5†	16	–	–	Tetrode	6166
kw	–	–	–	–	–	Triode	892
kw	–	–	–	–	–	Triode	5771
kw	–	–	–	–	–	Triode	5671
kw	–	–	–	–	–	Triode	5770

SMALL TYPES FOR INDUSTRIAL AND COMMUNICATION SERVICES

HOME ENTERTAINMENT TYPES OF SPECIAL INTEREST*		VACUUM TYPES FOR CRITICAL APPLICATIONS		TYPES FOR REGULATOR SERVICE	GLOW DISCHARGE TRIODE
6AK6	6L6-G	1620		*OA2*	*5823*
6AQ6	6SC7	5690	"Special Red" Types (5690, 5691, 5692, 5693)	*OB2*	
6BJ6	6SL7-GT	5691		*5651*	
6C4	*12AX7*▲	5692		6080	
		5693			
		5879			

* Also see types for AM, FM, & TV Receivers.

▲ Tapped heater, for 6.3-volt or 12.6-volt operation.

RCA

RCA PREFERRED TUBE TYPES

Miniature Types are shown in italics

TYPES FOR AM AND FM BROADCAST RECEIVER APPLICATIONS

RECTIFIERS and DIODE DETECTORS	CONVERTERS	AMPLIFIERS, OSCILLATORS, & MIXERS					OUTPUT AMPLIFIERS
		Triodes		Pentodes			
		Twin	With Diodes	Sharp Cutoff	Remote Cutoff	With Diode	
	_1R5_			_1U4_	_1T4_	_1U5_	_3S4_
							_3V4_
5U4-G	_6BE6_		_6AV6_	_6AU6_	_6BA6_		_6AQ5_
5Y3-GT	_6X8_			_6CB6_			6K6-GT
_6AL5_							6V6-GT
_6X4_							
_35W4_	_12BE6_	_12AU7_▲	_12AV6_		_12BA6_		_35C5_
							_50C5_

TYPES FOR TELEVISION RECEIVER APPLICATIONS

RF TUNER TUBES	AMPLIFIERS				DEFLECTION OSCILLATORS	SOUND & VIDEO DETECTOR
	IF	Video	Audio	Deflection		
_6AF4_*	_6AU6_	_6AU6_	_6AQ5_	_6S4_	6SN7-GT	_6AL5_
_6BQ7-A_*	_6BQ7-A_	_6CL6_	_6AV6_	6BQ6-GT		
_6J6_	_6CB6_		6K6-GT	6CD6-G		
_6X8_			6V6-GT	6W6-GT		
					_12AU7_▲	
					_12BH7_▲	

RECTIFIERS		DAMPER TUBE	CONTROL CIRCUITS✤
High-Voltage	Low-Voltage		
1B3-GT	5U4-G	6AX4-GT	_6AU6_
		6W4-GT	6SN7-GT
			_12AU7_▲
			_12BH7_▲

* For UHF.

▲ Tapped heater, for 6.3-volt or 12.6-volt operation.

✤ Including synchronizing functions, AGC, etc.

RCA PREFERRED TUBE TYPES

Miniature Types are shown in italics

C-R OSCILLOGRAPH TYPES

P1 SCREEN	P7 SCREEN	P11 SCREEN	P14 SCREEN	P16 SCREEN
2BP1		2BP11		
		3KP11		
3JP1*	3JP7*			
3RP1*				
5ABP1	5ABP7*	5ABP11*		
	5FP7-A		5FP14	
5UP1	5UP7	5UP11		
		5WP11↑		
				5ZP16●
	7MP7		7MP14	
	10KP7			
	12SP7			
	16ADP7			

↑ Transcriber Type ● Flying-Spot Type

* Post-Deflection Accelerator Type

PHOTOTUBES

SINGLE-UNIT		MULTIPLIER
S1 Response	S4 Response	S4 Response
1P40	1P39	931-A
921		5819
922		6199
927		

CAMERA AND TV STUDIO TYPES

5820	Image Orthicon
6198	Vidicon□
2F21	Monoscope

□ Industrial Type

RCA TUBE TYPES NOT RECOMMENDED FOR NEW EQUIPMENT DESIGN

Certain tube types should be avoided in the design of new equipment because they are approaching obsolescence or have limited or dwindling demand. Such RCA types are listed below for the benefit of equipment designers.

RECEIVING TUBE TYPES

0Z4-G	6A8-G	6K7-G	12A8-GT	42
1A5-GT	6A8-GT	6K7-GT	12AH7-GT	43
1C5-GT	6AB5/6N5	6N7	12J5-GT	45
1D8-GT	6AB7	6Q7	12J7-GT	47
1G6-GT	6AC5-GT	6Q7-GT	12K7-GT	56
1LA4	6AF6-G	6R7	12Q7-GT	57
1Q5-GT	6B8	6S7	12SK7-GT	58
1S4	6C6	6SA7-GT	14B8	70L7-GT
1T5-GT	6C8-G	6SB7-Y	14C5	71-A
1-v	6D6	6SF7	14H7	75
5T4	6F5	6SK7-GT	24-A	76
5W4-GT	6F5-GT	6SQ7-GT	25A6	77
5X4-G	6F6-G	6SS7	25W4-GT	78
5Y3-G	6F7	6ST7	25Z5	80
5Y4-G	6G6-G	6SZ7	25Z6	83-v
5Z3	6H6-GT	6U5	26	84/6Z4
6A3	6J7-GT	6U7-G	27	117N7-GT
6A7	6J8-G	6X5	35Z4-GT	117P7-GT
6A8	6K7	7E7	41	117Z6-GT

TRANSMITTING TUBE TYPES

10-Y	801-A	842	861	1619
203-A	803	843	862-A	1623
207	804	846	865	1624
211	830-B	849	893-A	1626
217-C	838	851	893A-R	8012-A
800	841	860	898-A	

CATHODE-RAY TUBE TYPES

2AP1-A	10FP4-A	16KP4	16TP4	905-A
3AP1-A	12KP4-A	16LP4-A	16WP4-A	908-A
3KP4	14CP4	16RP4	902-A	913
5BP1-A	16DP4-A			

(continued on next page)

RCA TUBE TYPES NOT RECOMMENDED FOR NEW EQUIPMENT DESIGN

PHOTOTUBES

923 924

THYRATRONS

629 885

MISCELLANEOUS

2A4-G	2V3-G	874
2C21/1642	559	878
2C22	864	1634

INTERCHANGEABILITY LIST

POWER TUBES, RECTIFIER TUBES, THYRATRONS, IGNITRONS, VOLTAGE REGULATORS, PHOTOTUBES, CATHODE-RAY TUBES, AND SPECIAL TYPES

Where an RCA Type Number is followed by an asterisk (*), this type is not directly interchangeable, but is in the same general class.

TYPE NUMBER	RCA NUMBER	TYPE NUMBER	RCA NUMBER
CE-1 A/B,C,D	868, 918	CE-23 A/B,C,D	923
CE-1V A/B,C,D	917*, 919*	PJ-23	868
1P32	927*	RK-23	802*
CE-2 A/B,C,D	930*, 1P40*	RK-23A	802*
2AP1	2AP1-A	CE-25 A/B,C,D	927
2B4	885	HY-25	809*
2E25	2E24*	RK-25	802
2X2/879	2X2-A	RK-25B	802
3AP1	3AP1-A	RK-27	806*
3B27	836*	FG-27A	5559*
3BP1	3BP1-A	CE-28 A/B,C,D	928
3C21	838*	RK-28	803
4C21	211*	RK-28A	803
4C22	8005*	CE-29 A/B,C,D	929, 1P39
4D21	4-125A/4D21	CE-30 A/B,C,D	930, 1P40
CE-5 A/B,C,D	927*	RK-30	800
5BP1	5BP1-A	HY-30Z	809*
5CP1	5CP1-A	CE-31	919*
5CP7	5CP7-A	FG-32	5558
5HP1-A	5BP1-A●	RK-33	2C21/1642
		CE-34	934*
6Q5-G	884	35G	808*
7GP4	7JP4	35T	808*
PJ-8	5556	CE-36 A/B,C,D	927*
G-9	868	RK-36	806*
CE-11V A/B,C,D	917	RK-37	808*
RK-11	1623	RK-38	806*
HV-12	806*	RK-39	807
RK-12	809*	HY-40	812-A*
G-15-F	927*	HY-40Z	811*
FG-17	5557	T-40	812-A*
CE-20	927	TZ-40	811*
FV-20	8000*	CE-41	921
RK-20A	804	RK-41	807*
T-20	1623*	CE-42	922
TV-20	810*	RK-44	837
TZ-20	809*	RK-45	837*
CE-21 A/B,C,D	920	RK-46	804*
CE-22 A/B,C,D	924*	RK-47	814
PJ-22	917*	RK-48A	813*

(continued on following page)

● Except in high-altitude service.

INTERCHANGEABILITY LIST

TYPE NUMBER	RCA NUMBER	TYPE NUMBER	RCA NUMBER
SR-50	917*	T-125	810*
R51A	927	HF-130	211*
HY-51B	830-B*	143D	2X2A*
HY-51Z	838*	GL-146	805*
RK-51	830-B*	VR150-30	OD3/VR150
SR-51	926*	150P	803*
RK-52	811*	150T	806*
53AWB	927*	TW-150	810*
SR-53	917*	152TH	806*
HK-54	808*	152TL	806*
T-55	8005*	GL-152	805*
FG-57	5559	HK-154	808*
HY-57	812-A*	T-155	806*
RK-57	805	C-200	810*
RK-58	838	HF-200	8000*
R58A	927*	T-200	806*
58AWB	927*	C-201	805*
R59A	868, 918	C-202	805*
59D	929*	HD-203 AC	805*
CE-60	917*	HF-203H	8003
R60A	920	T-203Z	838*
HY-60	807*	211B	211*
SK-60	868*	211C	835*
HY-61/807	807	HD-211C	805*
R61A	930	211D	211*
R61BV	929*	211E	835*
RK-63	806*	HF-211H	8003*
SK-63	918*	212E	849*
R64AV	925*	WE-214E	217-A*
RK-64	807*	WE-220C	892*
FG-67	1904	Z-225	866-A*
HY-69	1624*	CE-225	4B26/2000*
V-70D	8005*	CE-226	4B26/2000
R71A	930*, 1P40*	WE-231D	864*
R71AV	925*	FG-235A	5552
71D	929*	FG-238B	5555
VR75-30	OA3/VR75	241B	833-A*
FP-85	8020*	242C	211*
R85A	928*	WE-249A	866-A*
FG-95	5560	T-249B	866-A*
HF-100	810*	250TH	806*
100TH	810*	250TL	806*
100TL	8000*	HF-250	806*
FG-104	5561	WE-252A	842*
VR105-30	OC3/VR105	HK-254	810*
ZB-120	838*		

(continued on following page)

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

INTERCHANGEABILITY LIST

TYPE NUMBER	RCA NUMBER
WE-254B	865*
WE-255B	869-B*
HK-257B	4E27/8001
FG-258A	5553
HF-258B	866-A*
FG-259B	5554
260A	860*
HF-261A	835*
264 A,B	864*
266B	857-B*
WE-266C	857-B*
267B	872-A*
WE-268A	801-A*
FG-271	5551
WE-271A	843*
WT-272	5557
WE-274 A,B	5R4-GY*
276A	835*
282A	850*
WE-284 A,D	845*
WE-287A	5557*
WE-289A	4B26/2000
WE-298A	862-A*
WT-294	OD3/VR150
WE-295A	203A
HF-300	806*
UE-303A	203-A
T-303C	8000*
UE-303U	8000
UE-304A	204-A*
WE-304B	834
F-307A	207
WE-307A	837*
CE-309	5557
UE-310	801-A*
CE-311	3C23
UE-311	211
UE-311C	835
UE-311CH	8000*
UE-311 T,CT	8003*
UE-312E	849*
315A	673*
UE-317C	217-C
WE-319A	872-A*
WE-321A	673*
WE-322A	803
WE-331	805*
WE-341AA	891-R*
UE-342B	211
C-350	807*
353A	872-A*
HK-354 C,D,E,F	806*
WE-356A	808*
WE-357A	833-A*
F-357A	857-B*
F-363A	892*
F-367A	673*
375-A	575-A
F-376A	835*
393A	3C23*
FJ-401	1P29
GL-415	5550
GL-451	8020
UE-468	8000*
WL-463	806*
WL-471	8003*
WL-630	2050
WL-631	5559
WL-632A	5560
KU-634	677
WL-651/656	5552
WL-652/657	5551
WL-653B	5555
WL-655/658	5553
672	672-A
WL-679	5554
WL-681/686	5550
NL-715	5557
WL-734	917*
WL-735	868
WL-741	923*
T-756	809*
801	801-A
UE-812H	8005*
T-814	806*
T-822	806*
825	1623*
829	829-B
829-A	829-B
832	832-A
833	833-A

(continued on following page)

INTERCHANGEABILITY LIST

TYPE NUMBER	RCA NUMBER	TYPE NUMBER	RCA NUMBER
C-833	833-A	UE-938	838
848	891*	UE-942	842*
C-849-A	833-A*	UE-949	849
C-849-H	833-A*	UE-966A	866-A
857	857-B	UE-967	5557
F-857A	857-B*	UE-972A	872-A
861-A	861*	UE-975A	575-A
862	862-A	1642	2C21/1642
863	892*	1802-P1	5BP1-A
866	866-A	1803-P4	12AP4
866-A/866	866-A	1804-P4	9AP4
866-B	866-A*	1811-P1	7CP1
869-A	869-B	1847	5527*
872	872-A	1849	1850-A
872-A/872	872-A	1850	1850-A
C-872	872-A*	1899	2F21*
F-872B	872-A	2000	4B26/2000
879	2X2-A	2051	2050
889	889-A	2501-A3	3AP1-A*
893	893-A	2501-C3	908-A*
902	902-A	2525A5	5BP1-A
UE-905	805	5514	811*
905	905-A	5516	2E24*
906-P1	3AP1-A	7193	2C22*
908	908-A	8001	4E27/8001
UE-911CH	835*	8014-A	6C24*°
914	914-A	8016	1B3-GT/8016
931	931-A	189049	4B26/2000
		289416D	4B26/2000

° When operated under 8014-A conditions, can replace 8014-A.

Where a "type to be replaced" carries a multiple designation incorporating a 5500-series number, that type can be directly replaced by the RCA type having the same 5500-series number. For example: the 5557/FG-17, as well as the FG-17, is directly replaceable by the RCA-5557. Likewise, the 5552/651/656, as well as the WL-651/656, is directly replaceable by the RCA-5552.

DEFINITIONS ■

Amplification Factor (μ) is a special case of mu-factor. It is the ratio of the change in plate voltage to a change in control-electrode voltage under the conditions that the plate current remains unchanged and that all other electrode voltages are maintained constant. It is a measure of the effectiveness of the control-electrode voltage relative to that of the plate voltage upon the plate current. The sense is usually taken as positive when the voltages are changed in opposite directions. As most precisely used, the term amplification factor refers to infinitesimal changes. 1E62

Class A Amplifier:* An amplifier in which the grid bias and the alternating grid voltages are such that plate current in a specific tube flows at all times. 1E69

The ideal class A amplifier is one in which the alternating component of the plate current is an exact reproduction of the form of the alternating grid voltage, and the plate current flows during the 360 electrical degrees of the cycle. The characteristics of a class A amplifier are low efficiency and output.

Class AB Amplifier:* An amplifier in which the grid bias and alternating grid voltages are such that plate current in a specific tube flows for appreciably more than half but less than the entire electrical cycle. 1E70

The characteristics of a class AB amplifier are efficiency and output intermediate to those of a class A and a class B amplifier. The idle plate current and attendant dissipation may be made substantially less than is possible with class A amplifiers. This amplifier has been called class A prime.

■ Definitions taken from the 1933 Report of the Standards Committee of the I.R.E. are followed by the definition number in the report.

* To denote that grid current does not flow during any part of the input cycle, the suffix 1 may be added to the letter or letters of the class identification. The suffix 2 may be used to denote that grid current flows during some part of the cycle.

DEFINITIONS

(continued from preceding page)

Class B Amplifier:* An amplifier in which the grid bias is approximately equal to the cutoff value so that the plate current is approximately zero when no exciting grid voltage is applied and so that plate current in a specific tube flows for approximately one half of each cycle when an alternating grid voltage is applied. 1E71

The ideal class B amplifier is one in which the alternating component of plate current is an exact replica of the alternating grid voltage for the half cycle when the grid is positive with respect to the bias voltage, and the plate current flows during 180 electrical degrees of the cycle. The characteristics of a class B amplifier are medium efficiency and output.

Class C Amplifier:* An amplifier in which the grid bias is appreciably greater than the cutoff value so that the plate current in each tube is zero when no alternating grid voltage is applied, and so that plate current in a specific tube flows for appreciably less than one half of each cycle when an alternating grid voltage is applied. 1E72

Class C amplifiers find application where high plate-circuit efficiency is a paramount requirement and where departure from linearity between input and output is permissible. The characteristics of a class C amplifier are high plate-circuit efficiency and high power output.

Control-Grid—Plate Transconductance (g_m) is the name for the plate-current-to-control-grid-voltage transconductance. This is ordinarily the most important transconductance and is commonly understood when the term "transconductance" is used. 1E56

Formerly it was known as mutual conductance. See definition of Transconductance.

Conversion Transconductance (g_c) is the quotient

* See preceding page.

(continued from preceding page)

of the magnitude of a single beat-frequency component ($f_1 + f_2$) or ($f_1 - f_2$) of the output-electrode current by the magnitude of the control-electrode voltage of frequency f_1, under the conditions that all direct electrode voltages and the magnitude of the electrode alternating voltage f_2 remain constant and that no impedances at the frequencies f_1 or f_2 are present in the output circuit. As most precisely used, the term refers to infinitesimal changes. 1E60

When the performance of a frequency converter is determined, conversion transconductance is used in the same way as transconductance is used in single-frequency amplifier computations.

Deflection Factor of a cathode-ray oscillograph tube is the reciprocal of the deflection sensitivity. 3E11

Deflection Sensitivity of a cathode-ray oscillograph tube is the quotient of the displacement of the electron beam at the place of impact by the change in the deflecting field. It is usually expressed in millimeters per volt applied between the deflecting electrodes or in millimeters per gauss of the deflecting magnetic field. 3E10

Direct Capacitance between two electrodes in a multielectrode tube is the ratio of the charge placed on either electrode to its resulting change in potential above the other electrode when all remaining (n-2) electrodes are at the potential of the first electrode, the charge placed on the second electrode being equal to the sum of the charges placed on all the other electrodes.

Electrode Current is the current passing to or from an electrode through the vacuous space. 1E39

The terms grid current, anode current, plate current, etc., are used to designate currents passing to or from these specific electrodes.

Electrode Dissipation is the power dissipated in the

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form of heat by an electrode as a result of electron and/or ion bombardment. 1E46

Electrode Voltage is the voltage between an electrode and a specified point of the cathode. 1E40

The terms grid voltage, anode voltage, plate voltage, etc., are used to designate the voltage between these specific electrodes and the cathode.

Gas Amplification Factor of a phototube is the factor of increase in the sensitivity of a gas phototube due solely to the ionization of the contained gas. For a gas phototube having a structure such as to permit saturation to occur at a voltage (approximately 25 volts) less than that causing appreciable ionization, the gas amplification factor at a specified operating voltage is the ratio of the sensitivity measured at that voltage to the sensitivity measured at the saturation voltage. 4E5

Grid Driving Power is the average product of the instantaneous value of the grid current and of the alternating component of the grid voltage over a complete cycle. This comprises the power supplied to the biasing device and to the grid. 1E42

Input Capacitance of a vacuum tube is the sum of the direct capacitances between the control grid and the cathode and such other electrodes as are operated at the alternating potential of the cathode. This is not the effective input capacitance, which is a function of the impedances of the associated circuits. 1E67

Modulation Factor in an amplitude-modulated wave is the ratio of half the difference between the maximum and minimum amplitudes to the average amplitude.

In linear modulation the average amplitude of the envelope is equal to the amplitude of the unmodulated wave, provided there is no zero-frequency com-

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(continued from preceding page)

ponent in the modulating signal wave (as in telephony). For modulating signal waves having unequal positive and negative peaks, positive and negative modulation factors may be defined as the ratios of the maximum departures (positive and negative) of the envelope from its average value to its average value. (See Percentage Modulation.) 1T-39

Mu-Factor (μ-factor) is the ratio of the change in one electrode voltage to the change in another electrode voltage, under the conditions that a specified current remains unchanged and that all other electrode voltages are maintained constant. It is a measure of the relative effect of the voltages on two electrodes upon the current in the circuit of any specified electrode. As most precisely used, the term μ-factor refers to infinitesimal changes. 1E61

Output Capacitance of a vacuum tube is the sum of the direct capacitances between the output electrode (usually the plate) and the cathode and such other electrodes as are operated at the alternating potential of the cathode. This is not the effective output capacitance, which is a function of the impedances of the associated circuits. 1E68

Peak Forward Plate Voltage is the maximum instantaneous plate voltage in the direction in which the tube is designed to pass current. 1E43

Peak Inverse Plate Voltage is the maximum instantaneous plate voltage in the direction opposite to that in which the tube is designed to pass current. 1E44

Peak Plate Current is the maximum instantaneous plate current passing recurrently through the tube in the direction of normal current flow.

Percentage Modulation is the modulation factor expressed in per cent. 1T-40

Plate Resistance is the quotient of the alternating

DEFINITIONS

(continued from preceding page)

plate voltage by the in-phase component of the alternating plate current, all other electrode voltages being maintained constant. This is the effective parallel resistance and is not the real component of the electrode impedance. As most precisely used, the term refers to infinitesimal amplitudes.

Sensitivity of a phototube is basically defined as the quotient of the current through the tube by the radiant flux received by the cathode. The term "radiant flux" includes both visible radiation (light) and invisible infra-red and ultra-violet radiation. When stated in accordance with this basic definition, sensitivity is usually given in terms of microamperes per microwatt of radiant flux.

For convenience, sensitivity is frequently stated in terms of visible radiation only, and is then known as Luminous Sensitivity. When so stated, it is usually expressed in terms of microamperes per lumen of light flux, and depends on the color of the light or the spectral distribution of the radiant flux used to excite the phototube.

2870 Tungsten Sensitivity is the luminous sensitivity when the incident luminous flux is produced by a tungsten-filament lamp at a color temperature of 2870 degrees Kelvin.

When a phototube is used under steady illumination, its luminous sensitivity is known as Static Luminous Sensitivity. This is defined as the direct anode current produced by the light flux divided by the incident light flux of constant value.

When the light input to a phototube varies, as at audio frequency in sound reproduction, the luminous sensitivity is identified as Dynamic Sensitivity, and may be conveniently defined as the quotient of the amplitude of variation in anode current to the amplitude of variation in light input.

In high-vacuum phototubes, the dynamic sensitivity is ordinarily independent of frequency. In gas phototubes, the dynamic sensitivity falls off at the higher frequencies because there is a time lag between the current component produced by the secondary electrons resulting from excited atoms and positive ions arriving at the cathode. As the phase difference between these two components increases with increasing frequency of light variation, the net current variation decreases with consequent reduction in sensitivity. In the application of gas phototubes to audio frequencies, this effect is relatively unimportant but can be compensated for, if desired, in the design of the associated amplifier.

In the design of equipment utilizing phototubes, consideration should always be given to the effect of the time constant of the circuit consisting of the phototube and its associated load in reducing the performance capability of the phototube with increasing frequency.

Transconductance from one electrode to another is the quotient of the in-phase component of the alternating current of the second electrode by the alternating voltage of the first electrode, all other electrode voltages being maintained constant. As most precisely used, the term refers to infinitesimal amplitudes. 1E55

Tube Voltage Drop in a gas or vapor-filled tube is the plate voltage during the conducting period. 1E45

TUBE RATINGS

AND THEIR SIGNIFICANCE

A rating is a designation, as established by definite standards, of an operating limit of a tube. Tubes are rated by either of two systems, i.e., the "absolute maximum" system or the "design-center maximum" system. Of the two, the absolute maximum system is the older and dates back to the beginning of tubes. With either system, each maximum rating for a given tube type must be considered in relation to all other maximum ratings for that type, so that no one maximum rating will be exceeded in utilizing any other maximum rating. For convenience in referring to these two systems, the former will hereinafter be called the "absolute system," and the latter, the "design-center system."

In the **absolute system,*** the maximum ratings shown for each type thus rated are limiting values above which the serviceability of the tube may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual condition of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

The equipment should be designed to operate the filament or heater of each tube type at rated normal value for full-load operating conditions under average voltage-supply conditions. Variations from this normal value due to voltage-supply fluctuation or other causes, should not exceed ±5 per cent unless otherwise specified by the tube manufacturer.

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* Types rated according to the **absolute system** have no identification on their data pages issued prior to April 1, 1942. Sheets issued after that date carry the statement "Maximum Ratings Are Absolute Values" preceding the ratings.

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In the **design-center system**** adopted by the receiving-tube industry late in 1939, the maximum ratings shown for each type thus rated are working design-center maximums. The basic purpose underlying this system is to provide satisfactory average performance in the greatest number of equipments on the premise that they will not be adjusted to local power-supply conditions at time of installation. In the setting up of design-center ratings, consideration has been given to three important kinds of power supply commonly in use, i.e., a-c and d-c power lines, storage battery with connected charger, and dry batteries.

In the case of a-c or d-c power lines, the maximum ratings for tubes rated according to the design-center system have been chosen so that the tubes will give satisfactory performance at these maximum ratings in equipment operated from power-line supplies whose normal voltage including normal variations fall within ±10 per cent of a specified center value. In other words, it is basic to the design-center system of ratings for tubes operated from power-line supplies that filaments or heaters as well as positive- and negative-potential electrodes may have to operate at voltages differing as much as ±10 per cent from their rated values. It also recognizes that equipment may occasionally be used on power-line supplies outside the normal range, but since such extreme cases are the exception, they should be handled by adjustment made locally.

The choice of ±10 per cent takes care of voltage differences in power lines in the U.S.A. where surveys have shown that the voltages delivered fall within ±10 per cent of 117 volts. Therefore, satisfactory performance from tubes rated according to the design-center system will ordinarily be obtained

** Types rated according to the **design-center system** are identified on their data pages either by a large star in the index corner or by the statement "Maximum Ratings Are Design-Center Values" preceding the ratings. This statement is used on sheets issued since April 1, 1942.

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(continued from preceding page)

anywhere in the U.S.A. in equipment designed so that the design-center maximum ratings are not exceeded at a line-voltage-center value of 117 volts. While 117 volts represents present-day conditions, the design-center system permits the utilization of a new line-center value as new surveys may indicate the necessity for such a change.

In the case of storage-battery-with-charger supply or similar supplies, the normal battery-voltage fluctuation may be as much as 35 per cent or more. This fluctuation imposes severe operating conditions on tubes. Under these conditions, latitude for operation of tubes is provided for by the stipulation that only 90 per cent of the design-center maximum values of plate voltages, screen-supply voltages, dissipations, and rectifier output currents is never exceeded for a terminal potential at the battery source of 2.2 volts per cell. While a tube's operating voltages in this service will at times exceed the maximum values, satisfactory performance with probable sacrifice in life will be obtained.

In the cases of dry-battery supply and rectified a-c supply for 1.4-volt tubes, recommended design practice is given in RMA Standard M8-210.

RMA Standard M8-210 (Jan. 8, 1940 Rev. 11-40) is reproduced here for the convenient reference of design engineers with permission of the Engineering Department of the Radio Manufacturers Association. Although worded to cover only receiving tubes, it can be applied to any tube having design-center-system ratings.

* * *

It shall be standard to interpret the ratings on receiving types of tubes according to the following conditions:

1. CATHODE—The heater or filament voltage is given as a normal value unless otherwise stated. This means that transformers or resistances in the heater or filament circuit should be designed to operate the heater or filament at rated value for full-load operating conditions under average supply-voltage conditions. A reasonable amount of leeway is incorporated in the cathode design so that moderate fluctuations of heater or filament voltage downward will not cause marked falling off in response; also, moderate voltage fluctuations upward will not reduce the life of the cathode to an unsatisfactory degree.

A. 1.4-Volt Battery Tube Types—The filament power supply may be obtained from dry-cell batteries, from storage batteries, or from a power line. With dry-cell battery supply, the filament may be connected either directly across a battery rated at a terminal potential of 1.5 volts, or in series with the filaments of similar tubes across a power supply consisting of dry cells in series. In either case, the voltage across each 1.4-volt section of filament should not exceed 1.6 volts. With power-line or storage-battery supply, the filament may be operated in series with the filaments of similar tubes. For such operation, design adjustments should be made so that, with tubes of rated characteristics, operating with all electrode voltages applied and on a normal line voltage of 117 volts or on a normal storage-battery voltage of 2.0 volts per cell (without a charger) or 2.2 volts per cell (with a charger), the voltage drop across each 1.4-volt section of filament will be maintained within a range of 1.25 to 1.4 volts with a nominal center of 1.3 volts. In order to meet the recommended conditions for operating filaments in series from dry-battery, storage-battery, or power-line sources it may be necessary to use shunting resistors across the individual 1.4-volt sections of filament.

B. 2.0-Volt Battery Tube Types—The 2.0-volt line of tubes is designed to be operated with 2.0 volts across the filament. In all cases the operating voltage range should be maintained within the limits of 1.8 volts to 2.2 volts.

2. POSITIVE POTENTIAL ELECTRODES — The power sources for the operation of radio equipment are subject to variations in their terminal potential. Consequently, the maximum ratings shown on the tube-type data sheets have been established for certain Design Center Voltages which experience has shown to be representative. The Design Center Voltages to be used for the various power supplies together with other rating considerations are as given below:

A. AC or DC Power Line Service in U.S.A.—The design center voltage for this type of power supply is 117 volts. The maximum ratings of plate voltages, screen-supply voltages, dissipations, and rectifier output currents are design maximums and should not be exceeded in equipment operated at a line voltage of 117 volts.

B. Storage-Battery Service—When storage-battery equipment is operated without a charger, it should be designed so that the published maximum values of plate voltages, screen-supply voltages, dissipations, and rectifier output currents are never exceeded for a terminal potential at the battery source of 2.0 volts per cell. When storage-battery equipment is operated with a charger, it should be designed so that 90% of the same maximum values is never exceeded for a terminal potential at the battery source of 2.2 volts.

C. "B"-Battery Service—The design center voltage for "B" batteries is the normal voltage rating of the battery block, such as 45 volts, 90 volts, etc. Equipment should be designed so that under no condition of battery voltage will the plate voltages, the screen-supply voltages, or dissipations ever exceed the recommended respective maximum values shown in the data for each tube type by more than 10%.

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D. Other Considerations

a. Class A_1 Amplifiers—The maximum plate dissipation occurs at the "Zero-Signal" condition. The maximum screen dissipation usually occurs at the condition where the peak-input signal voltage is equal to the bias voltage.

b. Class B Amplifiers—The maximum plate dissipation theoretically occurs at approximately 63% of the "Maximum-Signal" condition, but practically may occur at any signal voltage value.

c. Converters—The maximum plate dissipation occurs at the "Zero-Signal" condition and the frequency at which the oscillator-developed bias is a minimum. The screen dissipation for any reasonable variation in signal voltage must never exceed the rated value by more than 10%.

d. Screen Ratings—When the screen voltage is supplied through a series voltage-dropping resistor, the maximum screen voltage rating may be exceeded, provided the maximum screen dissipation rating is not exceeded at any signal condition, and the maximum screen voltage rating is not exceeded at the maximum-signal condition. Provided these conditions are fulfilled, the screen-supply voltage may be as high as, but not above, the maximum plate voltage rating.

3. TYPICAL OPERATION — For many receiving tubes, the data show typical operating conditions in particular services. These typical operating values are given to show concisely some guiding information for the use of each type. They are not to be considered as ratings, because the tube can be used under any suitable conditions within its rating limitations.

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TUBE RATINGS

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RECEIVING TUBES

The ratings of all receiving tubes currently used in new equipment are set up according to the design-center system. Older and obsolescent types of receiving tubes still have absolute maximum ratings because these types are used only for renewal purposes and, therefore, design-center values are of no practical value. **Receiving-tube types rated on the design-center system are identified in the Receiving-Tube Section either by a large star in the index corner of each data page or by the statement "Maximum Ratings Are Design-Center Values" preceding the ratings on each data page.**

TRANSMITTING TUBES

The ratings of transmitting tubes grouped in the Transmitting-Tube Section are on the basis of the absolute system. This system enables the transmitter design engineer to choose his design values so as to obtain maximum performance within the tube ratings. Such design procedure has been considered practical for large transmitters where adequate controls are usually incorporated in the design, and ordinarily an experienced operator is present to make any necessary adjustments.

The maximum ratings given for each transmitting type on its data pages apply only when the type is operated at frequencies lower than some specified value which depends on the design of the type. As the frequency is raised above the specified value, the radio-frequency currents, dielectric losses, and heating effects increase rapidly. Most types can be operated above their specified maximum frequency provided the plate voltage and plate input are reduced in accordance with the information given in the table "Transmitting-Tube Ratings vs Operating Frequency" in the front part of the Transmitting-Tube Section.

For certain air-cooled transmitting tubes, two sets of absolute maximum values are shown to meet diversified design requirements. One set is designated as CCS (Continuous Commercial Service) ratings, while the other is called ICAS (Intermittent Commercial and Amateur Service) ratings.

Continuous Commercial Service is defined as that type of service in which long tube life and reliability of performance under continuous operating conditions are the prime consideration. To meet these requirements, the CCS ratings have been established.

Intermittent Commercial and Amateur Service is defined to include the many applications where the transmitter design factors of minimum size, light weight, and maximum power output are more important than long tube life. These various factors have been taken into account in establishing the ICAS ratings.

Under the ICAS classification are such applications as the use of tubes in amateur transmitters, and the use of tubes in equipment where transmissions are of an intermittent nature. The term "intermittent" is used to identify operating conditions in all applications other than amateur in which no operating or "on" period exceeds 5 minutes and every "on" period is followed by an "off" or standby period of at least the same or greater duration.

ICAS ratings are considerably higher than CCS ratings. They permit the handling of greater power, but tube life under ICAS conditions, of course, is reduced. However, the transmitter designer may very properly decide that a small tube operated with ICAS ratings better meets his requirements than a larger tube operated with CCS ratings. Although such use involves some sacrifice in tube life, the period over which tubes will continue to give satisfactory performance in intermittent service can be extremely long depending on the exact nature of the service.

See RTMA Rel. Rev. Pg 9 v 1953-1

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The choice of tube operating conditions best fitted for any particular application should be based on a careful consideration of all pertinent factors.

RECTIFIER TUBES

Rectifier tubes used principally in receiving equipment are rated according to the design-center system, while those used primarily in transmitting and laboratory equipment are rated according to the absolute system. The method of identifying which rating system is used for any rectifier tube in this Handbook is the same as that for other tubes in the particular section of the Handbook in which data for the rectifier tube are given.

The ratings of rectifier tubes are based on fundamental limitations in the operation of the tubes themselves, and in general include the following: maximum peak inverse plate voltage, maximum peak plate current, and maximum d-c output current.

Maximum peak inverse plate voltage is the highest instantaneous plate voltage which the tube can withstand recurrently in the direction opposite to that in which it is designed to pass current. For mercury-vapor tubes and gas-filled tubes, it is the safe top value to prevent arc-back in the tube operating within the specified temperature range.

In determining peak inverse plate voltage on a rectifier tube in a particular circuit, the equipment designer should remember that the relations between peak value of inverse plate voltage, rms value of input voltage, and average value of output voltage, depend largely on the characteristics of the particular rectifier circuit and the power supply. Furthermore, the presence of transients, such as line surges and keying surges, or waveform distortion, may raise the actual inverse plate voltage to a peak higher than that calculated for sine-wave voltages. Therefore, the **actual** inverse plate voltage on a rectifier tube should never exceed the maximum peak inverse plate voltage rating for that tube. The peak inverse plate voltage may be determined with an electronic peak voltmeter of the self-contained battery type.

In single-phase, full-wave rectifier circuits with sine-wave input and pure resistance load, the peak inverse plate voltage is approximately 1.4 times the rms value of the plate-to-plate voltage supply. In single-phase, half-wave circuits with sine-wave input and pure resistance load, the peak inverse plate voltage is approximately 1.4 times the rms value of the plate voltage supply, but with condenser input to filter, the peak inverse plate voltage may be as high as 2.8 times the rms value of the plate voltage supply.

Maximum peak plate current is the highest instantaneous plate current that a tube can safely carry recurrently in the direction of normal current flow. The safe value of this peak current in hot-cathode types of rectifier tubes is a function of the electron emission available and the duration of the pulsating current flow from the rectifier tube in each half-cycle.

The value of peak plate current in a given rectifier circuit is largely determined by filter constants. If a large choke is used at the filter input, the peak plate current is not much greater than the load current; but if a large condenser is used at the filter input, the peak current may be many times the load current. In order to determine accurately the peak plate current in any rectifier circuit, the designer should measure it with a peak-indicating meter or use an oscillograph.

Maximum d-c output current is the highest average plate current which can be handled continuously by a rectifier tube. Its value for any rectifier tube type is based on the permissible plate dissipation of that type. Under operating conditions involving a rapidly

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repeating duty cycle (steady load), the average plate current may be measured with a d-c meter. In the case of certain mercury-vapor tubes where the load is fluctuating, it is necessary to determine the average current over the time interval specified on the data pages for these types.

In addition to the above ratings for rectifier tubes, other ratings may be set up for a rectifier tube when the service in which the tube is to be used makes such ratings essential for satisfactory performance. Such ratings are: maximum surge plate current, and maximum heater-cathode potential.

Maximum surge plate current is the highest value of abnormal peak currents of short duration that should pass through the rectifier tube under the most adverse conditions of service. This value is intended to assist the equipment designer in a choice of circuit components such that the tube will not be subjected to disastrous currents under abnormal service conditions approximating a short circuit. This surge-current rating is not intended for use under normal operating conditions because subjecting the tube to the maximum surge current even only once may impair tube life. If the tube is subjected to repeated surge currents, its life will be seriously reduced or even terminated.

Maximum heater-cathode potential is the highest instantaneous value of voltage that a rectifier tube can safely stand between its heater and cathode. This rating is applied to certain rectifier tubes having a separate cathode terminal and used in applications where excessive potential may be introduced between heater and cathode. For convenience, this rating is usually given as a d-c value.

CATHODE-RAY TUBES

The ratings of some cathode-ray tubes are set up on the absolute system while others are set up on the design-center system. Initially, cathode-ray tubes

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were all rated according to the absolute system. With the advent of television which presented design conditions similar to those in the receiving-set field, the method of rating popular types of cathode-ray tubes was changed to the design-center system. More recently, because of procedure standardized by the RMA Cathode-Ray-Tube Committee, newer types of cathode-ray tubes are being rated on the absolute system. **Cathode-ray types rated according to the design-center system are identified in the Cathode-Ray Types Section by a statement to that effect just ahead of the maximum ratings on each data page. The data pages of types rated according to the absolute system have either (1) no identifying statement as to the rating system, or (2) an identifying statement that the ratings are according to the absolute system.**

PHOTOTUBES

The ratings of all phototubes in the Phototube Section are on the absolute maximum basis. This basis enables the designing engineer to choose design values so as to obtain optimum performance within tube ratings. In the case of gas phototubes, the value to which the plate voltage and the plate current can be raised is abruptly limited by ionization effects. If these are allowed to occur, they may ruin the photosurface almost instantly. While phototubes in general might be rated on the design-center basis, such a procedure, with provision for an adequate factor of safety to take care of all conditions of operation, would impose undue limitations on the use of gas phototubes.

MISCELLANEOUS SPECIAL TUBES

The ratings of some of the various tube types grouped in the Miscellaneous-Types Section are according to the design-center system while others are according to the absolute system. **Miscellaneous types rated on the design-center basis are identified**

by a statement to that effect on the data pages or else refer back for ratings to a receiving-tube type whose rating basis is explained under TUBE RATINGS—Receiving Tubes. The data pages of types rated according to the absolute system have either (1) no identifying statement as to the rating system, or (2) an identifying statement that the ratings are according to the absolute system.

CHARACTERISTICS and TYPICAL OPERATING CONDITIONS

In addition to showing the ratings of each tube type, the data pages for many of the types in this Handbook include "characteristics," such as amplification factor, plate resistance, and transconductance, which help to distinguish between the electrical features of the respective types. Usually, the characteristics shown for any type are obtained for that type in class A service: where class A data are given for the type, the characteristics are included with that data for convenience. Based on a large number of tubes of a given type, the values shown for these characteristics are average values.

Range of Characteristics—The equipment designer should bear in mind that individual tubes of a given type may have characteristics values either side of the average values shown for the type. He should also realize that these characteristics change during the life of individual tubes. In designing equipment, therefore, he should allow for the maximum cumulative variation of any characteristic from the average value of that characteristic as shown in the tabulated data for the type. The exact percentage of the variation will be different for different types of tubes depending on the design of the tubes and their intended application, but in general the designer should consider a probable plus or minus variation of not less than 30 per cent.

Furthermore, the equipment designer should recognize the desirability of designing equipment so that the full range of the operating characteristics of tubes will be utilized. If this practice is not followed, he imposes on the equipment user special replacement problems in that the user will have to select tubes suitable for use in the equipment, and may not be able to obtain the full life capability of such tubes.

Typical Operating Values—Also included on the data pages is information on typical operating conditions for most of the various tubes when used in particular services. These typical operating values are intended to show concisely some guiding information for the use of each type. They must not be considered as ratings because each type can, in general, be used under any suitable conditions within its rating limitations. In referring to these values for transmitting tubes, it should be noted that the power output value is not a rating. It is an approximate tube output, i.e., tube input minus plate loss. Circuit losses must be subtracted from tube output in determining useful output.

Datum Point for Electrode Potentials—In the data for any type in the Handbook, the values for grid bias and positive-potential-electrode voltages are given with reference to a specified datum point as follows. For types having filaments heated with d.c., the negative filament terminal is taken as the datum point to which other electrode voltages are referred. For types having filaments heated with a.c., the mid-point (i.e., the center tap on the filament-transformer secondary, or the mid-point on a resistor shunting the filament) is taken as the datum point. For types having equipotential cathodes indirectly heated, the cathode is taken as the datum point.

Grid Bias vs Filament Excitation—If the filament of any type for which data are given on a d-c basis is to be operated with an a-c supply, the given grid

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bias should be increased by an amount approximately equal to one half the rated filament voltage and be referred to the filament mid-point. Conversely, if it is required to use d-c filament excitation on any filament type for which the data are given on an a-c basis, the grid-bias values as given on the data pages should be decreased by an amount approximately equal to one half the rated filament voltage and be referred to the negative filament terminal instead of the mid-point as in a-c operation.

In practice, the necessity for following this rule depends on circuit conditions and operating requirements. If the bias is relatively small compared with the filament voltage and hum is a consideration, adjustment of the grid bias is ordinarily essential. Conversely, if the bias is relatively large compared with the filament voltage, adjustment of the grid bias may be unnecessary.

When filament excitation of tubes used as Audio Amplifiers is changed from d.c to a.c., the grid return should, in general, be shifted to the mid-point of the filament circuit to minimize hum, and the bias adjusted accordingly. When the excitation is changed from a.c. to d.c., bias adjustment depending on the relative values of bias and filament voltage may be required to provide the full signal-handling capability of the tubes.

When filament excitation of tubes used as R-F Amplifiers is changed, bias adjustment is not required unless the change makes the circuit critical as to hum or signal-handling capability. For example, in class C amplifiers, the bias is usually so large in comparison with the filament voltage that adjustment is generally unnecessary.

Grid Current and Driving Power—The typical values of d-c grid current and driving power shown for triodes and tetrodes in class B r-f service and in class C service are subject to variations depending on the impedance of the load circuit. High-impedance load circuits require more grid current and driving power to obtain the desired output. Low-impedance circuits need less grid current and driving power, but plate-circuit efficiency is sacrificed. In comparison, the d-c grid current and driving power shown for beam tubes and pentodes in class B r-f service and in class C service are not as critical to variations in load-circuit conditions. In any event, sufficient grid current should be used so that the stage is "saturated," i.e., so that a small change in grid current results in negligible change in power output. Regardless of the type of tube used, the driving stage should have a tank circuit of good regulation and should be capable of delivering power in excess of the indicated power by a factor of several times.

TYPES OF CATHODES

AND THEIR USE

In electron tubes, a cathode is an electrode which is the primary source of electron or ion emission. There are two broad classes of cathodes, i.e., hot and cold. "Hot cathodes" are defined as cathodes which are heated or otherwise operate at elevated temperature (frequently incandescent) in order to function as emitters. In contrast, "cold cathodes" are defined as cathodes which do not rely on heat or on elevated temperature in order to function as emitters.

HOT CATHODES

Hot cathodes commonly in use in electron tubes are classified as directly heated, indirectly heated, and ionic-heated.

A **directly heated cathode,** or filament-cathode, is a wire or ribbon which is heated by the passage of current through it. It is further classified by identifying the filament material or the electron-emitting material. Such materials in regular use are pure tungsten, thoriated tungsten, and metals coated with alkaline-earth oxides. Each of these materials has distinctive advantages which are utilized in the design of tubes for particular applications.

PURE-TUNGSTEN FILAMENTS are used in certain tubes, especially those for high-voltage transmitting service. Since these filaments must operate at a high temperature of about 2500°C (a dazzling white) to emit sufficient electrons, a relatively large amount of filament power is required. The operating life of these filaments is determined by the rate of tungsten evaporation. Their failure, therefore, occurs through decreased emission or burn-out.

Pure-tungsten filaments give best life performance when they are operated so as to conserve their emitting capability. They are designed with voltage and current ratings in accord with the service expected of the particular tube type. However, in applications where the normal emission at rated voltage is not

TYPES OF CATHODES

(continued from preceding page)

required, the filament can be operated at a somewhat reduced voltage. The extent of the reduction depends on the peak emission requirements of the application as well as on the percentage regulation of the filament voltage. When these are known, the correct operating filament voltage for any tungsten-filament type can be calculated from its filament-emission characteristic. The permissible regulation in transmitters may be checked by reducing the filament voltage (with the transmitter under normal operation) to a value such that reduction in output can just be detected. The filament voltage must then be increased by an amount equivalent to the maximum percentage regulation of the filament-supply voltage and then increased further by approximately 2 per cent to allow for minor variations in emission of individual tubes. It follows that the better the regulation, the less the filament operating voltage and, therefore, the longer the filament life.

It should be noted that a reduction of 5 per cent in the filament voltage applied to tubes with pure-tungsten filaments will approximately double their life. A reduction of 15 per cent will increase the filament life almost tenfold.

During long or frequent standby periods, pure-tungsten-filament tubes may be operated at decreased filament voltage to conserve life. When the average standby time is an appreciable portion of the average duty cycle and is less than 2 hours, it is recommended that the filament voltage of all but the largest types be reduced to 80 per cent of normal; and that for longer periods, the filament power be turned off. For the largest types, such as the 898, it is recommended that the filament voltage be reduced to 80 per cent of normal during standby operation up to 12 hours; and that for longer periods, the filament power be turned off.

For turning on filament power, a filament starter should be used so as to increase the voltage gradually and to limit the high initial rush of current through

TYPES OF CATHODES

(continued from preceding page)

the filament. It is important that the filament current never exceed, even momentarily, a value of more than 150 per cent of normal, unless the tube data specify otherwise. Similarly, as an added precaution, the filament power should be turned off gradually to prevent cooling strains in the filament.

THORIATED-TUNGSTEN FILAMENTS are now used mainly in certain transmitting and special tubes. Thoriated-tungsten filaments are made from tungsten impregnated with thoria. Due to the presence of thorium, these filaments liberate electrons at a more moderate temperature of about 1700°C (a bright yellow), and are, therefore, much more economical of filament power than are pure-tungsten filaments. The operating life of thoriated-tungsten filaments is ordinarily ended by a decrease in electron emission. Decreased emission, however, may be caused by the accidental application of too high filament, screen, or plate voltage. If the over-voltage has not been continued for a long time, the activity of the filament can often be restored by operating the filament at its normal voltage for 10 minutes or longer without plate, screen, or grid voltage. The reactivation process may be accelerated by raising the filament voltage to not higher than 120 per cent of normal value for a few minutes. This reactivation schedule is often effective in restoring the emission of thoriated-tungsten filaments in tubes which have failed after normal service. Sometimes a few hundred hours of additional life may be obtained after reactivation.

The operating voltage of a thoriated-tungsten filament should, in general, be held to within ±5 per cent of its rated value. However, in transmitting applications where the tube is lightly loaded, the filament may be operated on the low side—as much as 5 per cent below normal voltage. As conditions require, the voltage should be increased gradually to maintain output. Toward the end of life, additional service may be obtained by operating the fila-

TYPES OF CATHODES

(continued from preceding page)

ment above its rated voltage. It should be noted that a tube having a thoriated-tungsten filament should never be operated under emission-limited conditions since this type of operation may overheat the tube and cause permanent loss of emission.

During standby periods in transmitting service, thoriated-tungsten filaments may be operated according to the following recommendations to conserve life. For short standbys of less than 15 minutes duration, the filament voltage of all but the largest types should be reduced to 80 per cent of normal; for longer periods, the filament power should be turned off. For the largest types, such as the 827-R and 861, it is recommended that the filament voltage be reduced to 80 per cent of normal during standby operation up to 2 hours; and that for longer periods, the filament power be turned off.

COATED FILAMENTS are used in receiving tubes, certain transmitting tubes, most mercury-vapor rectifiers, and some special tubes. Coated filaments employ a relatively thick coating of alkaline-earth compounds on a metallic base as a source of electronic emission. The metallic base carries the heating current. These filaments operate at a low temperature of about 800°C (a dull red) and require relatively little power to produce a copious supply of electrons.

For proper performance of these types, rated filament voltage should, in general, be applied at the filament terminals. However, when coated-filament, high-vacuum tubes are used in transmitting service with light loading, the filament voltage may be reduced as much as 5 per cent below normal to conserve life. Then, as conditions require, the voltage should be increased gradually to maintain output. Toward the end of life, the gradual increase may be carried above rated filament voltage to obtain additional service. In the case of gas or vapor tubes, it is important that these types be operated, in general, at rated filament voltage. However, if the line regu-

TYPES OF CATHODES

(continued from preceding page)

lation regularly and consistently does not exceed 1 to 2 per cent, it is practical to reduce the filament voltage slightly (not over 5 per cent) with benefit to tube life.

During standby periods of less than 15 minutes, the filament voltage of quick-heating, high-vacuum types, such as the 1616 and 1624, should be reduced to 80 per cent of normal; for longer periods, the filament power should be turned off. In contrast, the voltage of coated filaments in gas or vapor tubes should not be reduced during standbys except under conditions explained in the preceding paragraph. In general, the filament voltage of small and medium types, such as the 866-A/866 and 872-A/872, should be maintained at normal rated value during standbys up to 2 hours; for longer periods, the filament power should be turned off. For large types, such as the 857-B, the filament voltage should be maintained at normal rated value during standbys up to 12 hours; for longer periods, the filament power should be turned off.

After having given normal service or after having been operated at excessive voltage, coated filaments lose their emission. When such is the case, their usefulness may be considered as terminated.

An **indirectly heated cathode**, or heater-cathode, consists of a heater wire enclosed in a thin metal sleeve coated on the outside with electron-emitting material similar to that used for coated filaments. The sleeve is heated by radiation and conduction from the heater through which current is passed. Useful emission does not take place from the heater wire. An important feature of this kind of cathode construction is that the functions of heating and emission can be independent of each other.

HEATER-CATHODES, or unipotential cathodes as they are frequently called, are used in high-vacuum tubes operating at low plate voltage, such as receiv-

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TYPES OF CATHODES

(continued from preceding page)

ing tubes, low-power transmitting tubes, and small special tubes. They also find application in mercury-vapor tubes and in cathode-ray tubes. Heater-cathodes, like coated filaments, provide a copious supply of electron emission at low cathode temperature (a dull red).

For proper performance of heater-cathode tubes, rated heater voltage should, in general, be applied at the heater terminals. However, when heater-cathode high-vacuum tubes are used in transmitting service and are lightly loaded, the heater voltage may be reduced as much as 5 per cent below normal to conserve life. As conditions require, the voltage should be increased gradually to maintain output. Toward the end of life, the gradual increase may be carried above rated heater voltage to obtain additional service.

During standby periods of less than 15 minutes, the heater voltage of high-vacuum tubes should be maintained at normal rated value; for longer periods, the heater power should be turned off. In the case of vapor or gas tubes, the heater voltage should be maintained at normal during standby periods up to 12 hours; for longer periods, the heater power should be turned off.

An **ionic-heated cathode** is one which liberates electrons when it is subjected to intense positive ion bombardment. The bombardment may be so intense as to raise the temperature of the cathode, frequently causing it to become visibly hot. The ionic-heated cathode in radio tubes has found application in gas rectifiers intended primarily for automobile receiver service.

COLD CATHODES

The designation "cold cathode" is commonly used in referring to those cathodes which emit electrons when they are subjected to bombardment by other electrons, ions, or metastable atoms. Cathodes of

TYPES OF CATHODES

(continued from preceding page)

this type are sometimes designated as secondary-emission cathodes. They are used in certain glow-discharge tubes, and also in multiplier phototubes where they contribute to electron multiplication in the successive dynode stages.

Not customarily referred to as cold cathodes, although they are such, is another group of emitters known as photocathodes. By definition, a **photocathode** is one which emits electrons when it is energized with radiant flux, such as light, infra-red radiation, or ultra-violet radiation. Such cathodes are used in phototubes. When used in gas phototubes, these cathodes not only emit under the influence of radiant flux but also as a result of bombardment and thus become partial secondary-emission cathodes.

Photocathodes are classified according to the spectral response characteristics of their respective photoactive surfaces. The S1 photosurface gives high response to red and near infra-red radiation. The S2 photosurface is similar to the S1 surface but extends somewhat further into the infra-red region. The S3 photosurface has a spectral response characteristic which is closest to that of the eye. The S4 photosurface has exceptionally high response to blue and blue-green radiation with negligible response to red radiation.

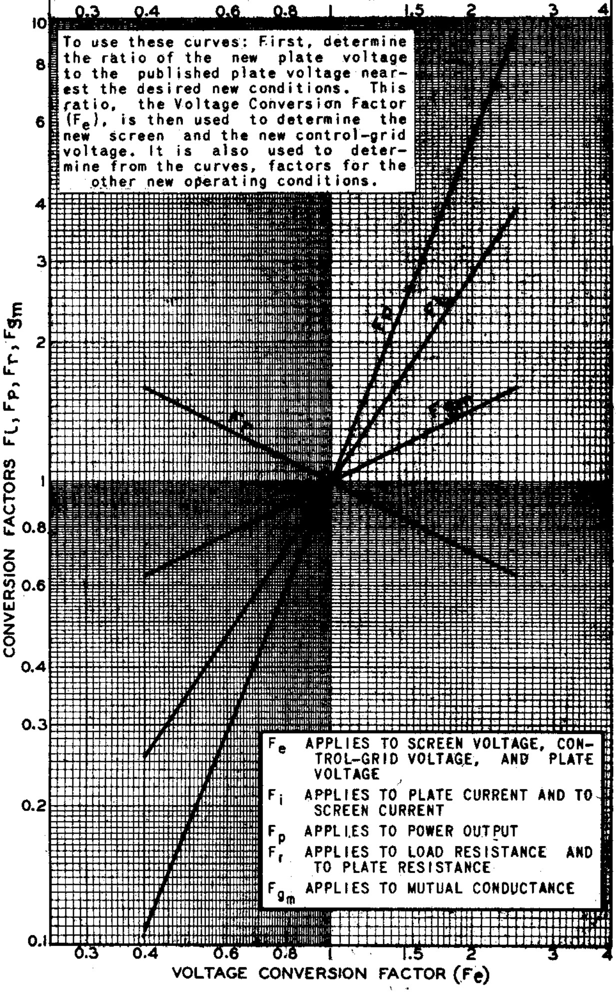
Exposure of photocathodes to intense light, such as direct sunlight, may decrease the sensitivity of the tubes in which they are used, even though there is no voltage applied. The magnitude and duration of the decrease depend on the length of the exposure. Permanent damage to a phototube may result if it is exposed to radiant energy so intense as to cause excessive heating of the cathode.

Cunningham Radiotron

CONVERSION FACTORS

FOR POWER AMPLIFIER TRIODES AND PENTODES

These curves are especially useful for calculating with fair accuracy from published operating conditions, other operating conditions to meet special plate voltage requirements.



JULY 23, 1936

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92S-5499R2

OUTLINES

METAL TUBES

Key to Tube Types

OUTLINES vs TUBE TYPES

MT8B	MT8G	MT8G with Miniature Cap
5W4 6V6 25Z6	6AB7 6SF7 6SS7 12SH7	6K8
5Z4 6X5 1611	6AC7 6SG7 6ST7 12SJ7	6S7
6AG7 12A6 1613	6C5 6SH7 12SA7 12SK7	12K8
6F6 25A6 1621	6J5 6SJ7 12SC7 12SQ7	
6N7 25L6 1632	6SA7 6SK7 12SF5 12SR7	
	6SC7 6SQ7 12SF7 1634	
	6SF5 6SR7 12SG7	

MT8G with Pin Cap	MT8K	MTT8A	MTT8A with Miniature Cap	MT10A
1851	6H6	0Z4	6A8 6Q7	5T4 1619
	12H6		6B8 6R7	6L6 1622
			6F5 12C8	913 1631
			6J7 1612	1614
			6K7 1620	
			6L7	

TUBE TYPES vs OUTLINES

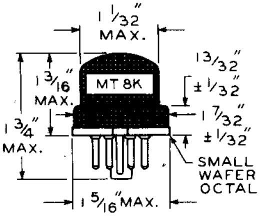
Type	*Outline*	*Type*	*Outline*	*Type*	*Outline*
0Z4	MTT8A	6S7	MT8G (c)	12SF7	MT8G
5T4	MT10A	6SA7	MT8G	12SG7	MT8G
5W4	MT8B	6SC7	MT8G	12SH7	MT8G
5Z4	MT8B	6SF5	MT8G	12SJ7	MT8G
6A8	MTT8A (c)	6SF7	MT8G	12SK7	MT8G
6AB7	MT8G	6SG7	MT8G	12SQ7	MT8G
6AC7	MT8G	6SH7	MT8G	12SR7	MT8G
6AG7	MT8B	6SJ7	MT8G	25A6	MT8B
6B8	MTT8A (c)	6SK7	MT8G	25L6	MT8B
6C5	MT8G	6SQ7	MT8G	25Z6	MT8B
6F5	MTT8A (c)	6SR7	MT8G	913	MT10A
6F6	MT8B	6SS7	MT8G	1611	MT8B
6H6	MT8K	6ST7	MT8G	1612	MTT8A (c)
6J5	MT8G	6V6	MT8B	1613	MT8B
6J7	MTT8A (c)	6X5	MT8B	1614	MT10A
6K7	MTT8A (c)	12A6	MT8B	1619	MT10A
6K8	MT8G (c)	12C8	MTT8A (c)	1620	MTT8A (c)
6L6	MT10A	12H6	MT8K	1621	MT8B
6L7	MTT8A (c)	12K8	MT8G (c)	1622	MT10A
6N7	MT8B	12SA7	MT8G	1631	MT10A
6Q7	MTT8A (c)	12SC7	MT8G	1632	MT8B
6R7	MTT8A (c)	12SF5	MT8G	1634	MT8G
				1851	MT8G (pc)

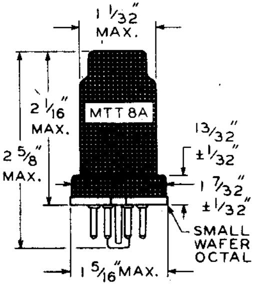
(c) = Miniature Cap
(pc) = Pin Cap

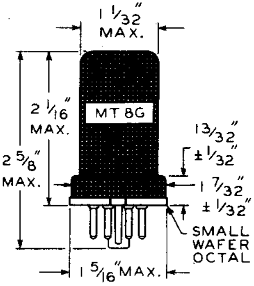
JAN. 15, 1944

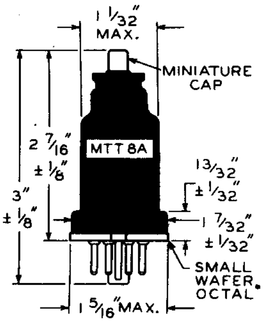
OUTLINES

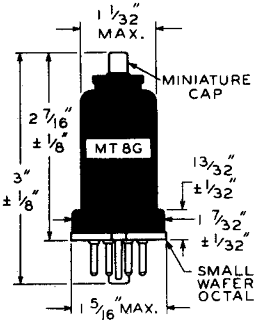
METAL TUBES











← Indicates a change. (continued on next page)

OUTLINES

METAL TUBES

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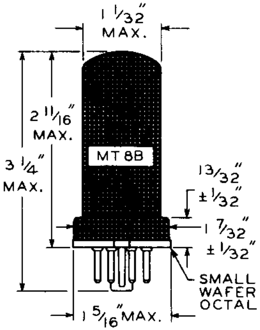
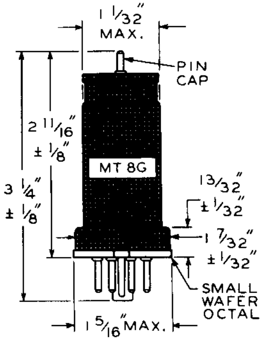
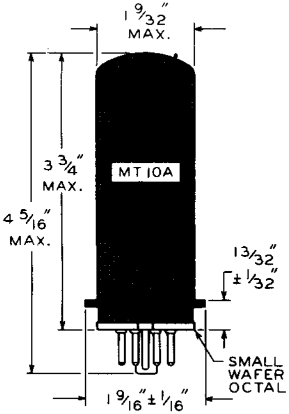
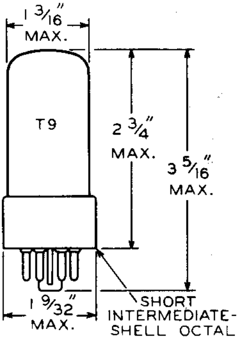


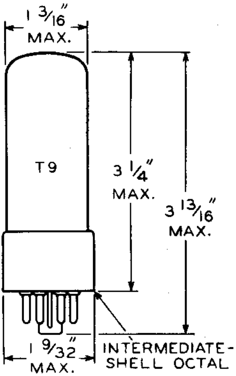


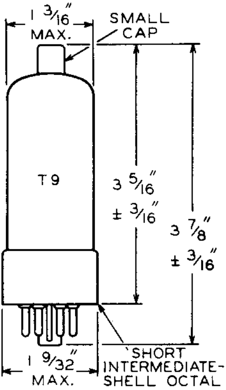


OUTLINES

GLASS TUBES - OCTAL BASE TYPES

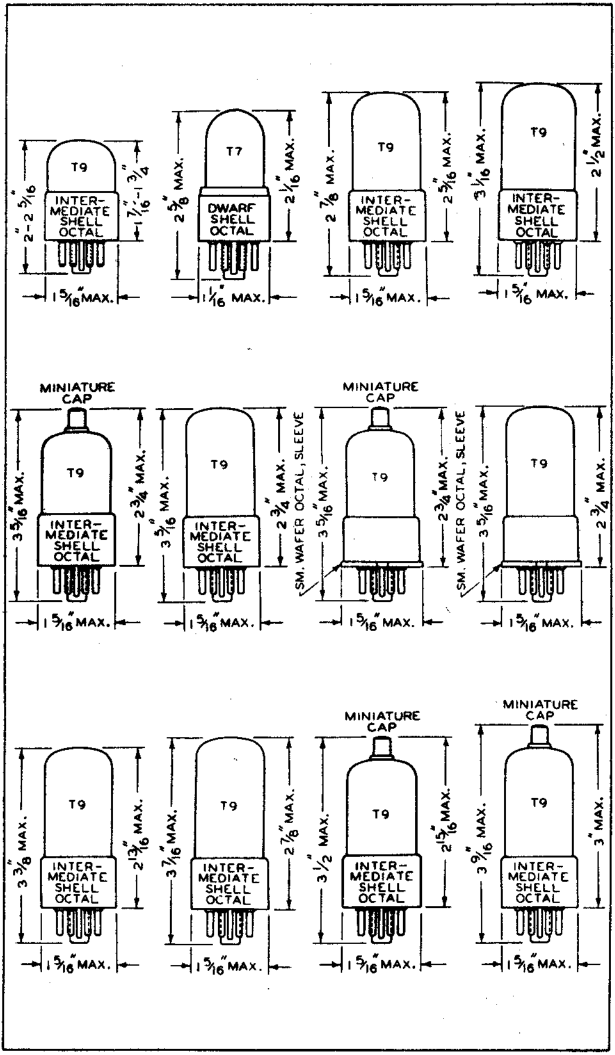






OUTLINES

GLASS TUBES - OCTAL BASE TYPES



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OUTLINES

GLASS TUBES - OCTAL BASE TYPES

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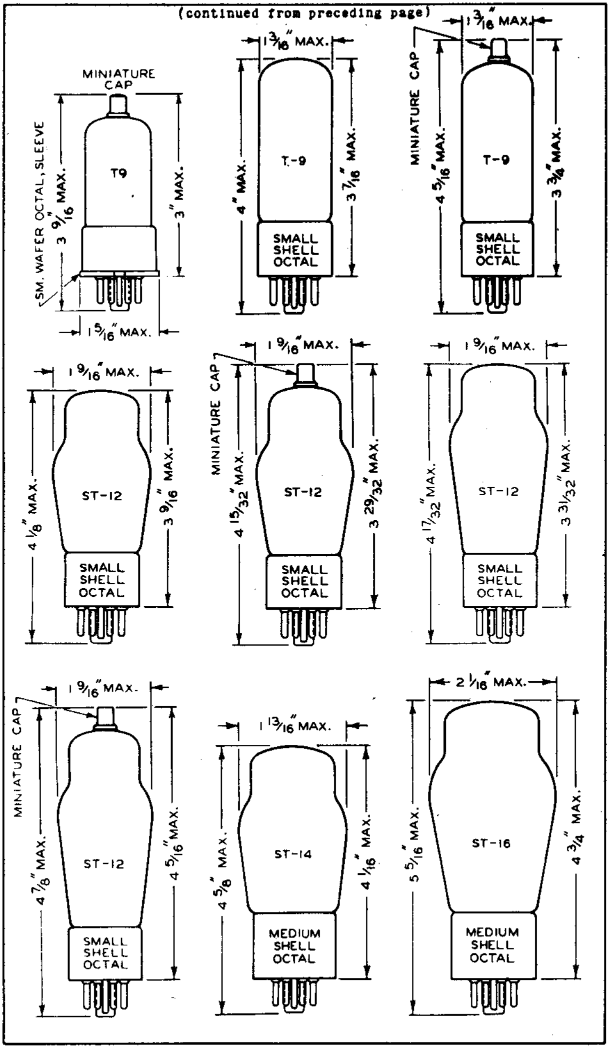
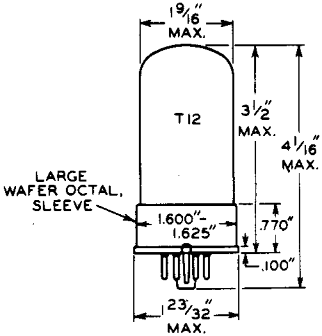
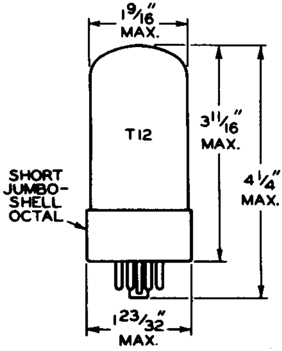
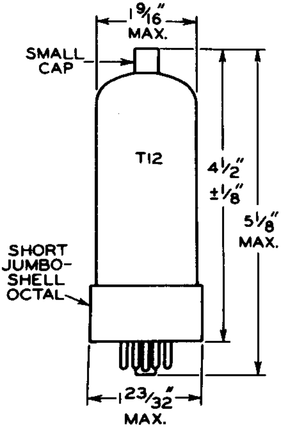


OUTLINES—Glass Tubes

OCTAL BASE TYPES WITH T-12 BULBS

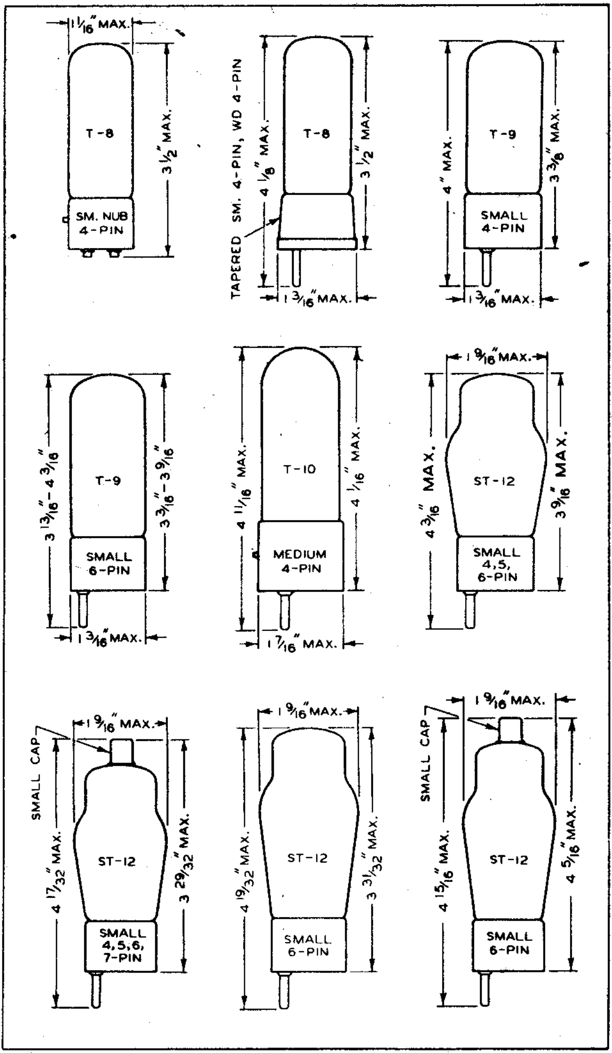






OUTLINES

GLASS TUBES — 4, 5, 6 & 7 PIN BASE TYPES



OUTLINES

GLASS TUBES - 4, 5, 6 & 7 PIN BASE TYPES

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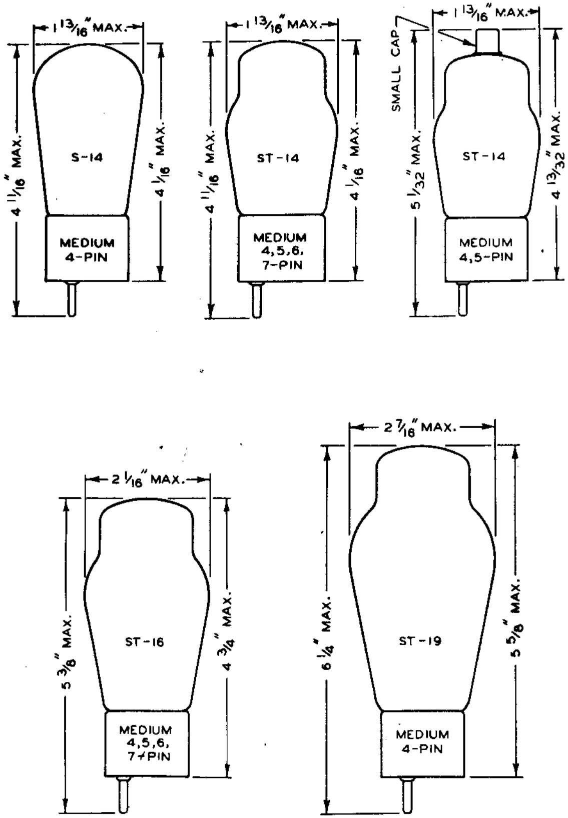

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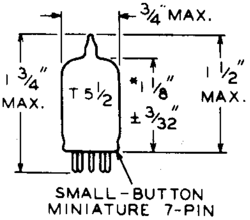
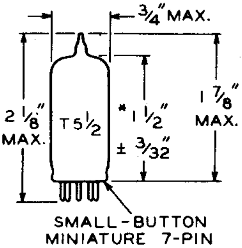
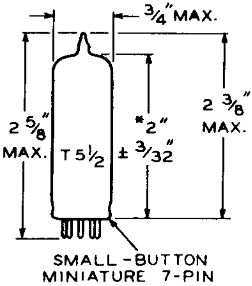
OUTLINES — Glass Tubes

SMALL-BUTTON MINIATURE & NOVAL BASE TYPES

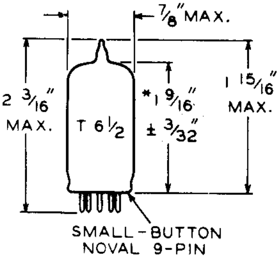
SMALL-BUTTON MINIATURE 7-PIN TYPES

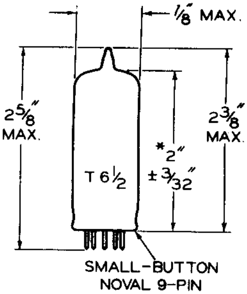






SMALL-BUTTON NOVAL 9-PIN TYPES





* Measured from base seat to bulb-top line as determined by ring gauge of 7/16" I.D.

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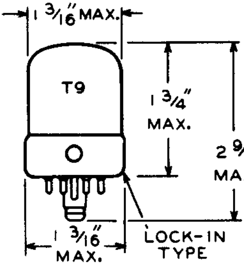
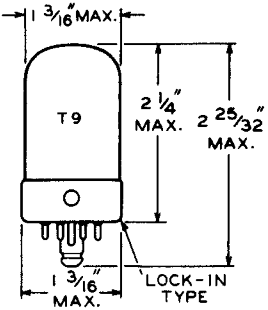
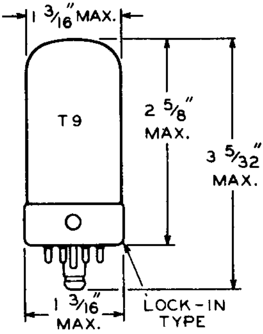
OUTLINES—Glass Tubes

LOCK-IN TYPES







TUBE DEPARTMENT

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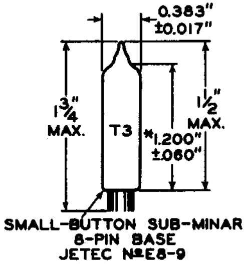
SMALL-BUTTON SUB-MINAR BASE TYPE

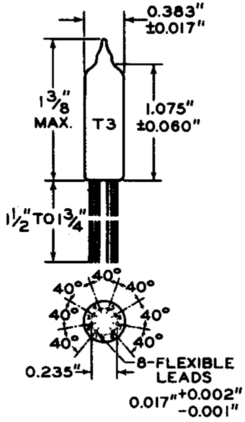


* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF .210" I.D.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

OUTLINES—Glass Tubes

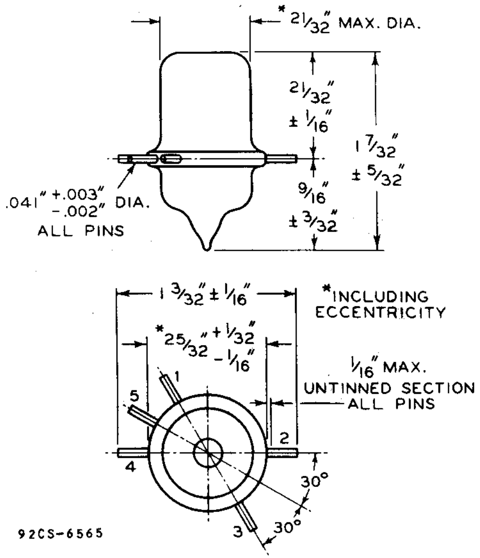
FLEXIBLE-LEAD TYPE



TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

OUTLINES—Glass Tubes

RADIAL 5-PIN BASE TYPE



BOTTOM VIEW

SEE DIAGRAM "A" ON NEXT PAGE FOR ADDITIONAL SOCKET-DESIGN INFORMATION

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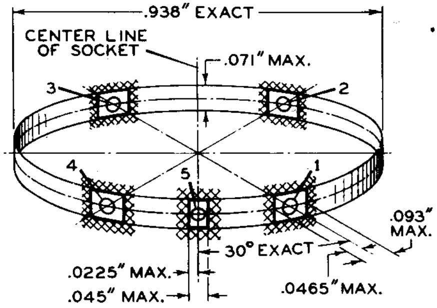
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RADIAL 5-PIN BASE TYPE

MAXIMUM PIN VARIATIONS AT SOCKET CLIPS

ESSENTIAL DIMENSIONS FOR SOCKET DESIGN



NOS 1—5 SHOW THE IDEAL POSITIONS OF PIN CROSS-SECTIONS AT SOCKET CLIPS LOCATED ON A CIRCLE OF 0.938" DIAMETER. THE AREAS WITHIN THE CROSS-HATCHING SHOW ACTUAL VARIATIONS OF PIN CROSS-SECTIONS AND INDICATE THE MAXIMUM VARIATIONS WHICH SOCKET CLIPS SHOULD ACCOMODATE FOR THE CIRCLE SHOWN.

THE CLEAR AREA FOR PIN POSITION NO 5 IS NARROWER THAN THE OTHERS BECAUSE PIN NO 5 IS USED AS A REFERENCE FOR OTHER PINS.

SOCKETS SHOULD BE DESIGNED SO THAT THE MINIMUM DIAMETRIC CLEARANCE BETWEEN SOCKET CLIPS IS NEVER LESS THAN 0.850".

DIAGRAM A

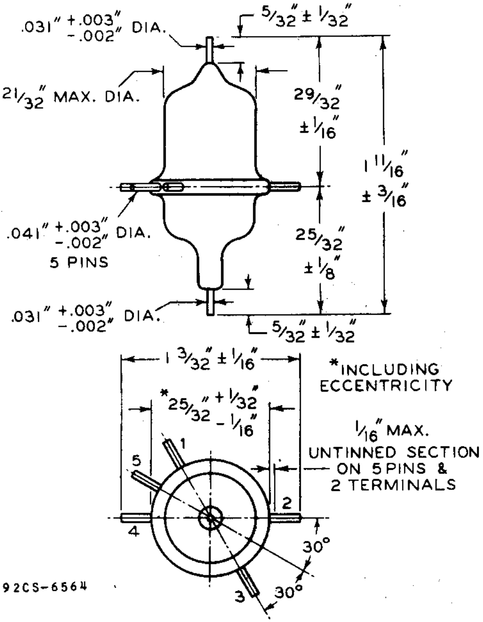
92CM-6563RI

← indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

OUTLINES—Glass Tubes

RADIAL 5-PIN BASE TYPE WITH END TERMINALS



BOTTOM VIEW

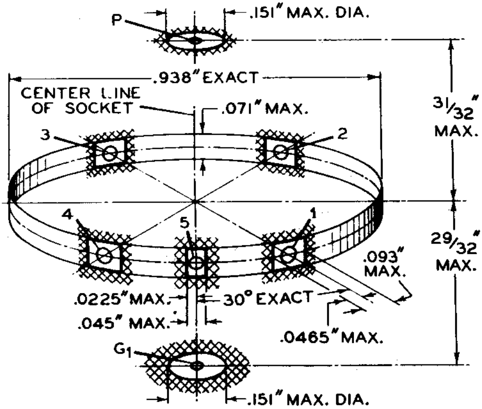
SEE DIAGRAM "B" ON NEXT PAGE FOR ADDITIONAL SOCKET-DESIGN INFORMATION

OUTLINES—Glass Tubes

RADIAL 5-PIN BASE TYPE WITH END TERMINALS

MAXIMUM PIN AND TERMINAL VARIATIONS AT SOCKET CLIPS AND TERMINAL CONNECTORS

ESSENTIAL DIMENSIONS
FOR SOCKET DESIGN



Nos 1—5 SHOW THE IDEAL POSITIONS OF PIN CROSS-SECTIONS AT SOCKET CLIPS LOCATED ON A CIRCLE OF 0.938" DIAMETER. THE AREAS WITHIN THE CROSS-HATCHING SHOW ACTUAL VARIATIONS OF PIN CROSS-SECTIONS AND INDICATE THE MAXIMUM VARIATIONS WHICH SOCKET CLIPS SHOULD ACCOMODATE FOR THE CIRCLE SHOWN.

THE CLEAR AREA FOR PIN POSITION No 5 IS NARROWER THAN THE OTHERS BECAUSE PIN No 5 IS USED AS A REFERENCE FOR OTHER PINS.

SOCKETS SHOULD BE DESIGNED SO THAT THE MINIMUM DIAMETRIC CLEARANCE BETWEEN SOCKET CLIPS IS NEVER LESS THAN 0.850".

P & G_1 SHOW THE IDEAL POSITIONS OF TERMINAL CROSS-SECTIONS AT TERMINAL ENDS. THE AREAS WITHIN THE CROSS-HATCHING SHOW ACTUAL VARIATIONS OF TERMINAL CROSS-SECTIONS AND INDICATE THE MAXIMUM VARIATIONS WHICH TERMINAL CONNECTORS SHOULD ACCOMODATE.

DIAGRAM B

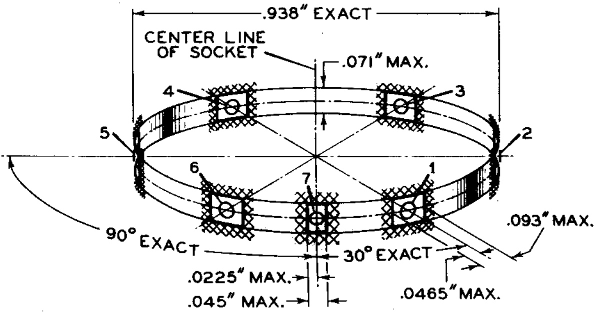
92CM-6562R1

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

MAXIMUM PIN VARIATIONS AT SOCKET CLIPS

ESSENTIAL DIMENSIONS FOR SOCKET DESIGN



Nos 1—7 SHOW THE IDEAL POSITIONS OF PIN CROSS-SECTIONS AT SOCKET CLIPS LOCATED ON A CIRCLE OF 0.938" DIAMETER. THE AREAS WITHIN THE CROSS-HATCHING SHOW ACTUAL VARIATIONS OF PIN CROSS-SECTIONS AND INDICATE THE MAXIMUM VARIATIONS WHICH SOCKET CLIPS SHOULD ACCOMODATE FOR THE CIRCLE SHOWN.

THE CLEAR AREA FOR PIN POSITION No 7 IS NARROWER THAN THE OTHERS BECAUSE PIN No 7 IS USED AS A REFERENCE FOR OTHER PINS.

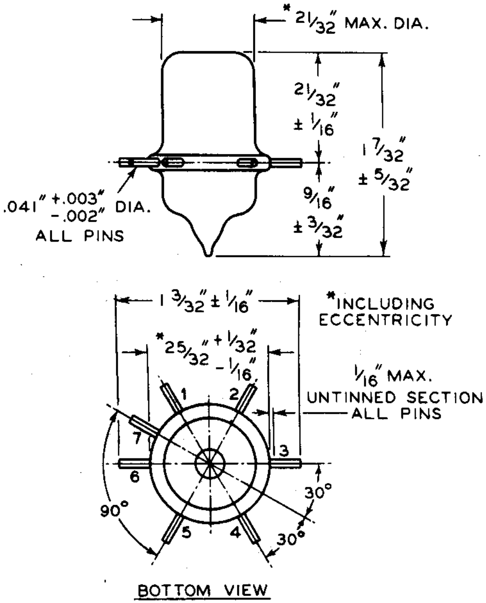
SOCKETS SHOULD BE DESIGNED SO THAT THE MINIMUM DIAMETRIC CLEARANCE BETWEEN SOCKET CLIPS IS NEVER LESS THAN 0.850".

DIAGRAM C

92CM-6566

OUTLINES — Glass Tubes

RADIAL 7-PIN BASE TYPE



SEE DIAGRAM "C" ON NEXT PAGE FOR ADDITIONAL SOCKET-DESIGN INFORMATION

92CS-6516R1

BASES

MINIMUM DIAMETERS

Until such time as the Handbook pages covering bases are reissued to include minimum diameters of wafers, shells, and sleeves, this provisional sheet will supply these minimum diameters for the following bases to supplement the maximum diameters which are shown on the respective base drawings.

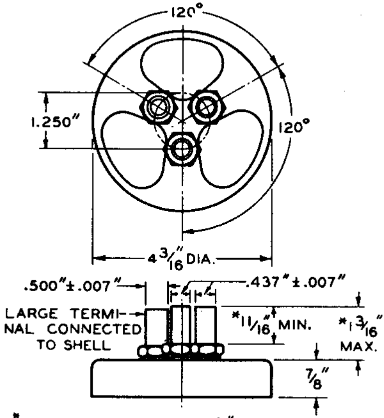
Base		*Minimum Diameter*
3-PIN & 4-PIN TYPES:		
Peewee 3-Pin		0.610"
Small 4-Nub		0.970"
WD 4-Pin		1.097"
Tapered Small 4-Pin		1.136"
Small 4-Pin		1.136"
Medium 4-Pin		1.337"
Medium 4-Pin with Bayonet		1.337"
Jumbo 4-Pin		1.840"
Super-Jumbo 4-Pin		2.177"
5-PIN TYPES:		
Small 5-Pin		1.136"
Medium 5-Pin		1.337"
Giant 5-Pin		2.142"
6-PIN TYPES:		
Small 6-Pin		1.136"
Medium 6-Pin		1.337"
7-PIN TYPES:		
Small 7-Pin		1.136"
Medium 7-Pin		1.337"
Medium 7-Pin with Bayonet		1.337"
Giant 7-Pin		2.146"
8-PIN TYPES:		
Dwarf Shell Octal 8-Pin		1.028"
Dwarf Metal Shell Octal 8-Pin		1.015"
Small Shell Octal 8-Pin		1.136"
Intermediate Shell Octal 8-Pin		1.235"
Small Wafer Octal 8-Pin		1.271"
with Sleeve No. R1483	Wafer	1.271"
	Sleeve	1.198"
with Sleeve No. T254	Wafer	1.271"
	Sleeve	1.369"
Medium Shell Octal 8-Pin		1.337"
Large Wafer Octal 8-Pin		1.677"
with Sleeve No. T253	Wafer	1.677"
	Sleeve	1.845"
12-PIN & 14-PIN TYPES:		
Medium Shell Diheptal 14-Pin		2.200"

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

BASES

3-TERMINAL TYPES

With Top View



* ON FINISHED TUBE, ADD 1/8" FOR SOLDER.

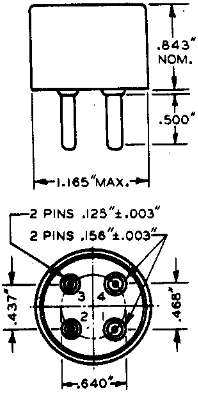
92CS-4792R3

JETEC No. A3-80
RCA No. 3232

BASES

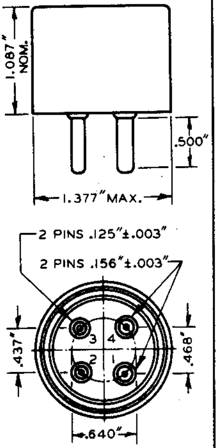
4-PIN TYPES
With Bottom Views

SMALL 4-PIN



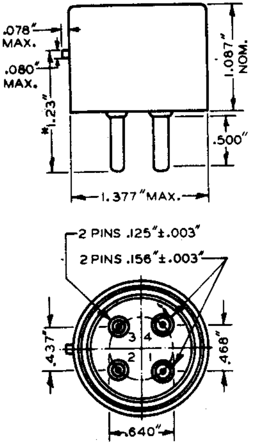
No. 4108

MEDIUM 4-PIN



No. 4106

MEDIUM 4-PIN WITH BAYONET



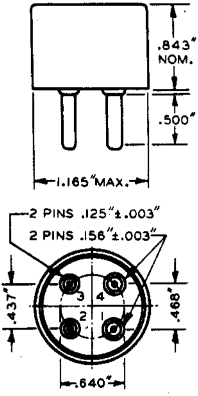
No. 4102

* On finished tube, add .030" for solder.

BASES

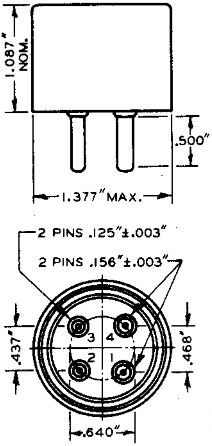
4-PIN TYPES
With Bottom Views

SMALL 4-PIN



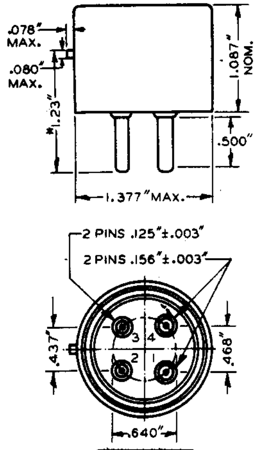
No. 4108

MEDIUM 4-PIN



No. 4106

MEDIUM 4-PIN
WITH BAYONET



No. 4102

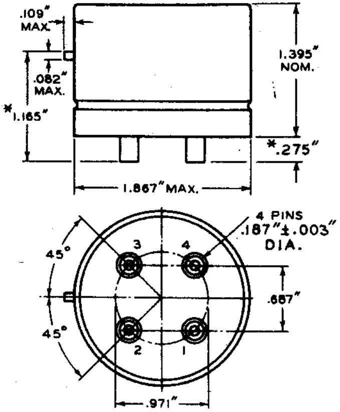
* on finished tube, add .030" for solder.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

4-PIN TYPES
With Bottom View

JUMBO 4-PIN



No. 1839

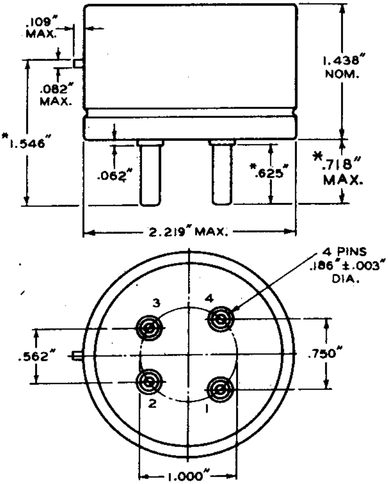
* On finished tube, add .060" for solder.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

4-PIN TYPES
With Bottom View

SUPER-JUMBO 4-PIN



No. 4310

* On finished tube, add .030" for solder.

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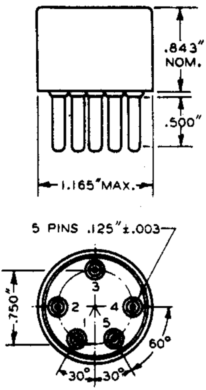
RCA MANUFACTURING COMPANY, INC.

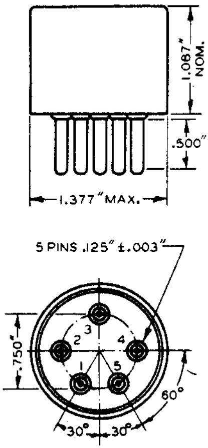
5-PIN TYPES
With Bottom Views

SMALL 5-PIN



No. 5108

MEDIUM 5-PIN



No. 5106

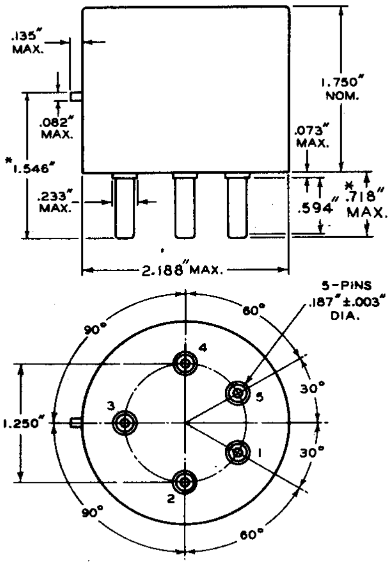
DWARF SHELL OCTAL 5-PIN
INTERMEDIATE SHELL OCTAL 5-PIN
MEDIUM SHELL OCTAL 5-PIN
SMALL SHELL OCTAL 5-PIN
SMALL WAFER OCTAL 5-PIN

For details of above bases, see corresponding OCTAL 8-PIN type.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

5-PIN TYPES
With Bottom View

GIANT 5-PIN



No. 5325

* On finished tube, add .030" for solder.

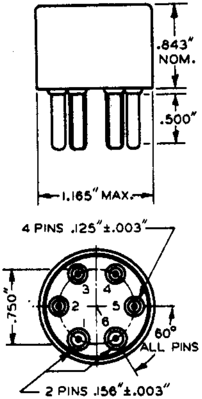
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

6-PIN TYPES

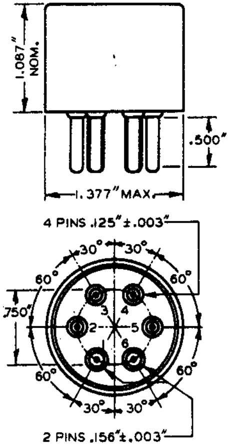
With Bottom Views

SMALL 6-PIN



No. 6108

MEDIUM 6-PIN



No. 6106

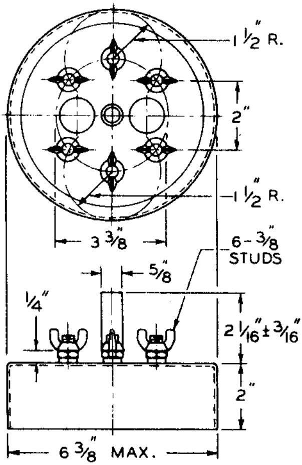
LONG-SHELL MEDIUM 6-PIN
Same As Medium 6-Pin Above, Except
That Shell Length Is 1.315" Nominal
—No. 6105—

INTERMEDIATE SHELL OCTAL 6-PIN
SMALL SHELL OCTAL 6-PIN
SMALL WAFER OCTAL 6-PIN
SMALL WAFER OCTAL 6-PIN, WITH SLEEVE

For details of above bases, see corresponding OCTAL 8-PIN type.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

№ 6628 BASE



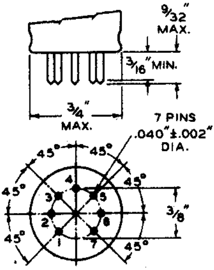
SPACE FOR CONNECTOR BETWEEN WING NUT AND LOCK NUT IS 3/16" MAX.

92CM-4438R2

BASES

7-PIN TYPES
With Bottom Views

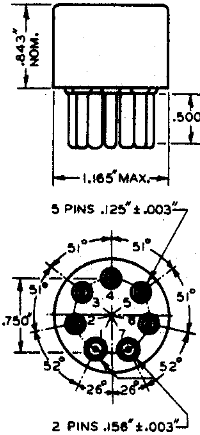
MINIATURE BUTTON 7-PIN



Sockets for the Miniature Button 7-Pin Base should have a center hole (0.156" min. diameter) extending through the socket. Sockets for r-f tube types having this base should have a cylindrical metal sleeve to shield the grid pin from the plate pin. This sleeve should have a minimum inside diameter of 0.135", and should be long enough to shield opposite socket terminals one from another.

The socket design should be such that circuit wiring cannot impress lateral strains through the socket contacts on the base pins. The point of bearing of the contacts on the base pins should not be closer than 1/8" from the bottom of a seated tube.

SMALL 7-PIN



No. 7108

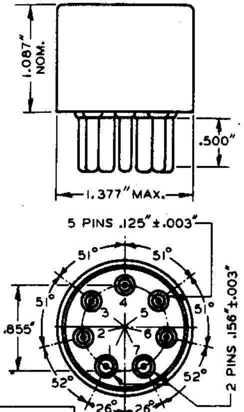
INTERMEDIATE SHELL OCTAL 7-PIN
MEDIUM SHELL OCTAL 7-PIN
SMALL SHELL OCTAL 7-PIN
SMALL WAFER OCTAL 7-PIN
SMALL WAFER OCTAL 7-PIN, WITH SLEEVE

For details of above bases, see corresponding OCTAL 8-PIN type.

BASES

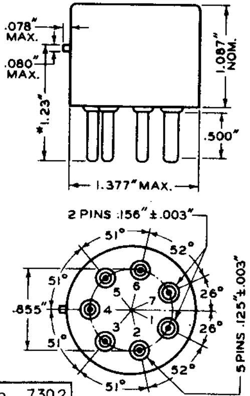
7-PIN TYPES
With Bottom Views

MEDIUM 7-PIN



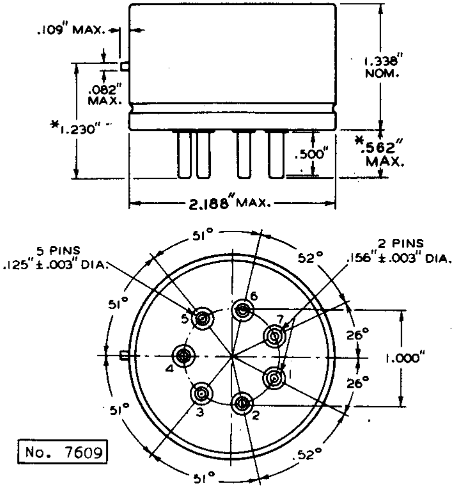
No. 7306

MEDIUM 7-PIN WITH BAYONET



No. 7302

GIANT 7-PIN



No. 7609

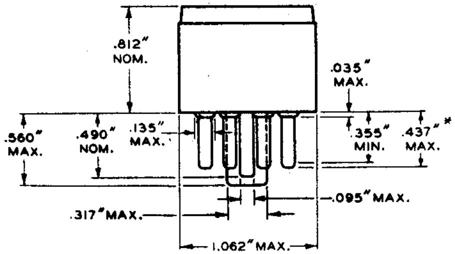
* On finished tube, add .030" for solder.

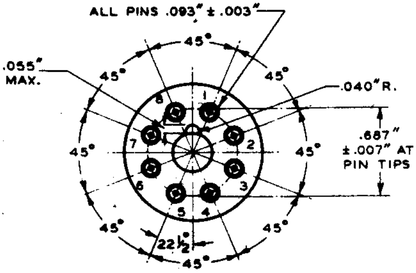
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

8-PIN TYPES
With Bottom View

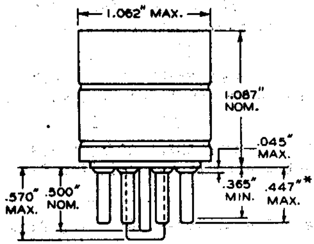
DWARF SHELL OCTAL 8-PIN





DWARF SHELL OCTAL 5-PIN
As Above, Omitting Pins No. 2, 4 & 6

DWARF METAL SHELL OCTAL 8-PIN



No. 8520

Other dimensions are same as above.

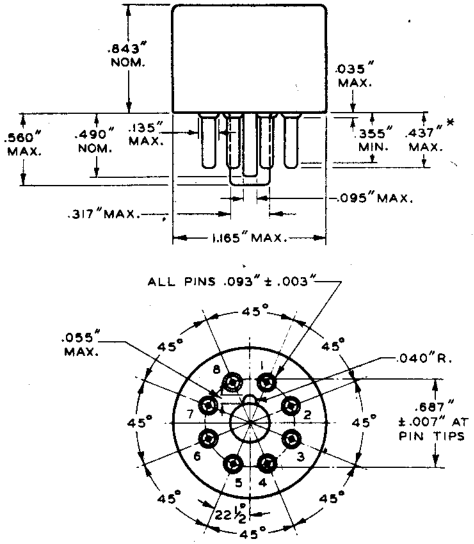
* On finished tube, add .030" for solder.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

8-PIN TYPES
With Bottom View

SMALL SHELL OCTAL 8-PIN



No. 8529

SMALL SHELL OCTAL 7-PIN
As Above, Omitting Pin No. 6
—No. 7529—

SMALL SHELL OCTAL 6-PIN
As Above, Omitting Pins No. 4 & 6
—No. 6529—

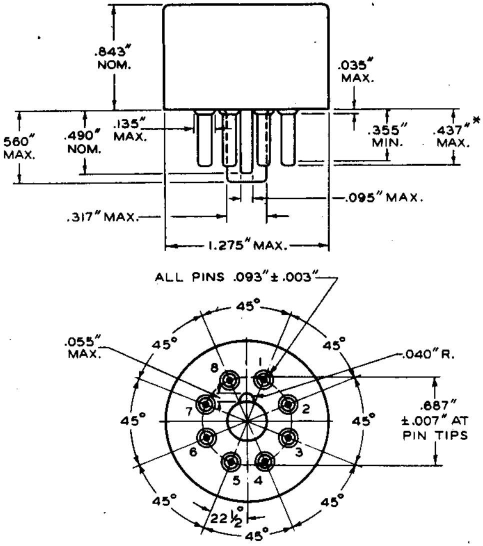
SMALL SHELL OCTAL 5-PIN
Arrangement A - As Above, Omitting Pins No. 3, 5 & 6
—No. 5429—

Arrangement B - As Above, Omitting Pins No. 3, 5 & 7
—No. 5529—

*. On finished tube, add .030" for solder.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

INTERMEDIATE SHELL OCTAL 8-PIN



No. 8537

INTERMEDIATE SHELL OCTAL 7-PIN
As Above, Omitting Pin No. 6
-No. 7537-

INTERMEDIATE SHELL OCTAL 6-PIN
As Above, Omitting Pins No. 4 & 6
-No. 6537-

INTERMEDIATE SHELL OCTAL 5-PIN
Arrangement A - As Above, Omitting Pins No. 3, 5 & 6
-No. 5437-

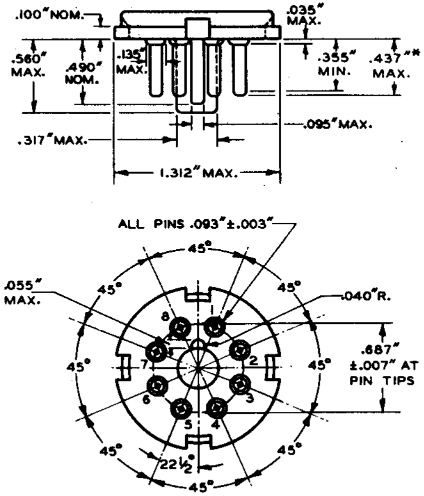
Arrangement B - As Above, Omitting Pins No. 3, 5 & 7
-No. 5537-

* On finished tube, add .030" for solder.

BASES

8-PIN TYPES
With Bottom View

SMALL WAFER OCTAL 8-PIN



No. 8527

SMALL WAFER OCTAL 7-PIN
As Above, Omitting Pin No. 6
-No. 7527-

SMALL WAFER OCTAL 6-PIN
As Above, Omitting Pins No. 4 & 6
-No. 6527-

SMALL WAFER OCTAL 5-PIN
Arrangement A - As Above, Omitting Pins No. 3, 5 & 6
-No. 5427-

Arrangement B - As Above, Omitting Pins No. 3, 5 & 7
-No. 5527-

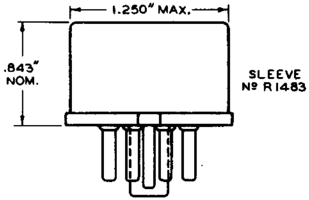
* On finished tube, add .030" for solder.

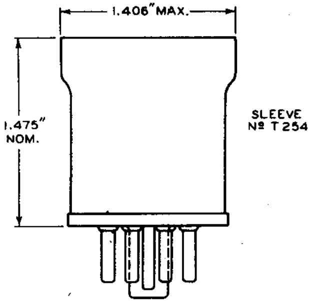
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

8-PIN TYPES

SMALL WAFER OCTAL 8-PIN
WITH SLEEVE ASSEMBLIES





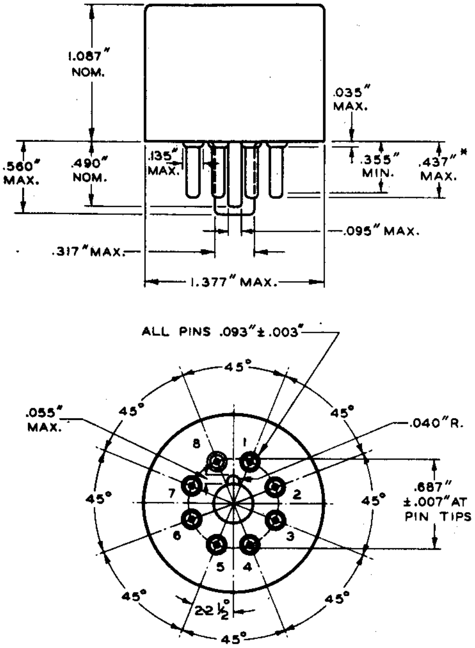
Other dimensions are same as for SMALL WAFER OCTAL 8-PIN BASE

SMALL WAFER OCTAL 7-PIN, WITH SLEEVE
As Above With Sleeve No. R1483, Omitting Pin No. 6

SMALL WAFER OCTAL 6-PIN, WITH SLEEVE
As Above With Sleeve No. R1483, Omitting Pins No. 4 & 6

8-PIN TYPES
With Bottom View

MEDIUM SHELL OCTAL 8-PIN



No. 8533

MEDIUM SHELL OCTAL 7-PIN
As Above, Omitting Pin No. 6
– No. 7533 –

MEDIUM SHELL OCTAL 6-PIN
As Above, Omitting Pins No. 4 & 6
– No. 6533 –

MEDIUM SHELL OCTAL 5-PIN
As Above, Omitting Pins No. 3, 5 & 7
– No. 5533 –

* On finished tube, add .030" for solder.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

BASES

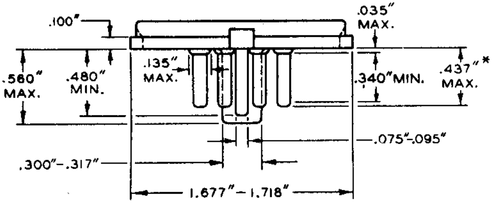
8-PIN TYPES

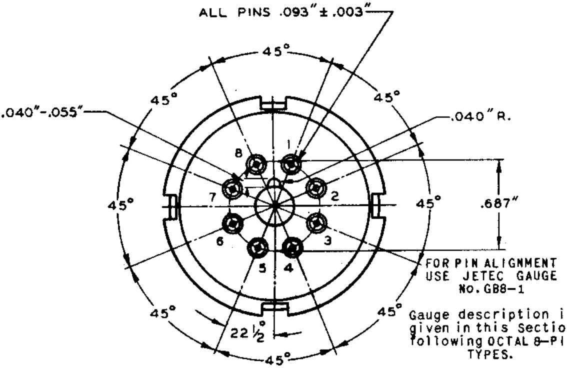
With Bottom View

LONG MEDIUM-SHELL OCTAL 8-PIN
Same As Medium-Shell Octal 8-Pin On Preceding Page, Except That Shell Length Is 1.375"

RCA No. 8545

LARGE-WAFER OCTAL 8-PIN ←





Gauge description is given in this section following OCTAL 8-PIN TYPES.

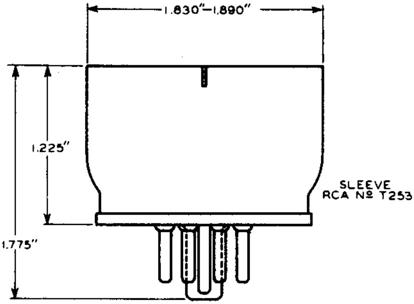
JETEC B8-32
RCA No. 8534

* On finished tube, add .030" for solder. ← indicates a change.

BASES

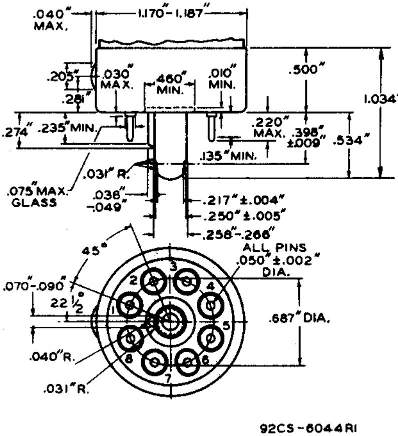
8-PIN TYPES
With Bottom View

LARGE-WAFER OCTAL 8-PIN WITH SLEEVE



Other dimensions are same as for LARGE-WAFER OCTAL 8-PIN BASE

LOCK-IN 8-PIN



JETEC No. D8-1

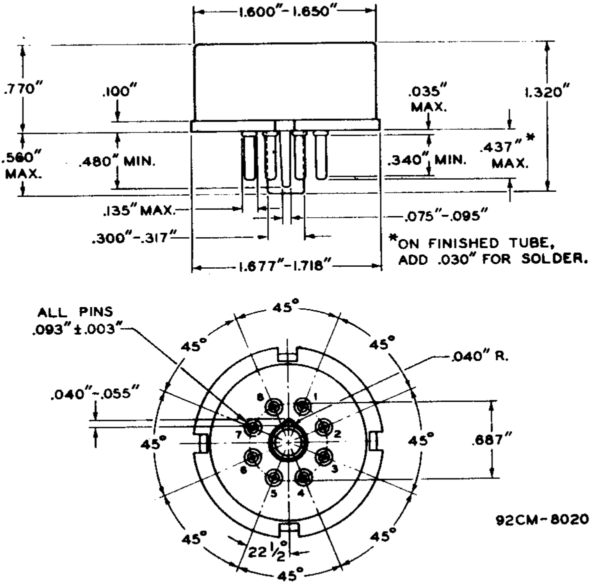
→ Indicates a change.

BASES

8-PIN TYPES

With Bottom View

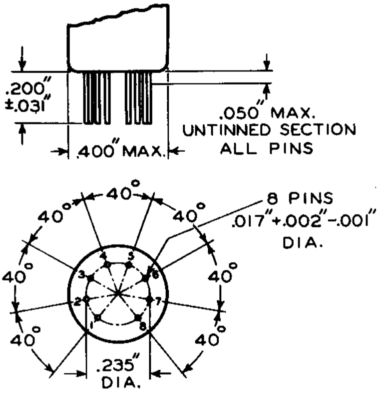
LARGE-WAFER OCTAL 8-PIN BASE WITH SLEEVE (JETEC №B8-86)



Base-pin positions are held to tolerances such that entire length of pins will enter flat-plate gauge (JETEC No.GB8-1) having thickness of 1/4" and eight 0.1030" ± 0.0005" holes so located on a 0.6870" ± 0.0005" diameter circle that the distance along the chord between any two adjacent hole centers is 0.2630" ± 0.0005".

Pin fit in gauge shall be such that gauge together with supplementary weight totaling 2 lbs. will not be lifted when pins are withdrawn.

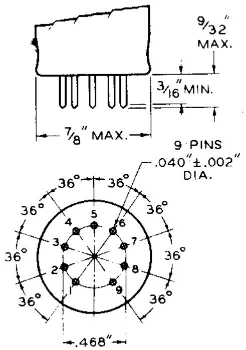
SMALL-BUTTON SUB-MINAR 8-PIN BASE



92CS-7158

The design of the socket should be such that the point of bearing of the contacts on the base pins should not be closer than 0.050" from the bottom of the seated tube.

SMALL-BUTTON NOVAL 9-PIN BASE
JETEC No E9-1



92CS-6694

The pins will fit a flat-plate gauge having thickness of 1/4" and ten holes 0.0520" ± 0.0005" so located on a 0.4680" ± 0.0005" diameter circle that the distance along the chord between any two adjacent hole centers is 0.1446" ± 0.0005".

The design of socket should be such that circuit wiring can not impress lateral strains through the socket contacts on the base pins. The point of bearing of the contacts on the base pins should not be closer than 1/8" from the bottom of the seated tube.

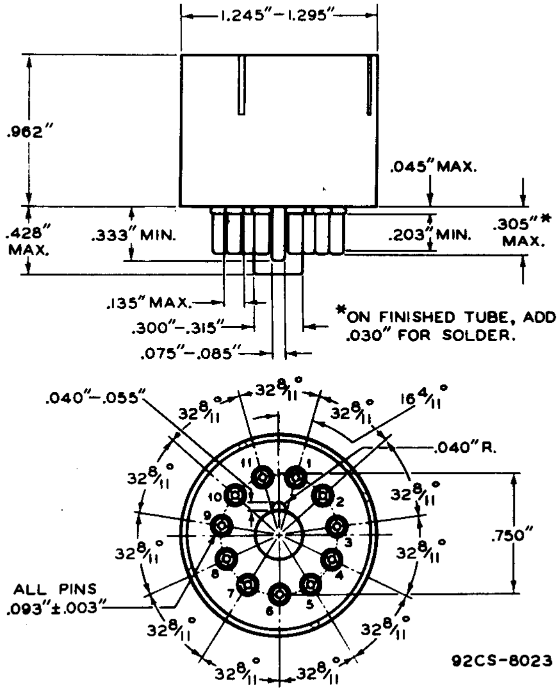
BASES

11-PIN TYPES

With Bottom View

SMALL-SHELL NEOSUBMAGNAL 11-PIN BASE

JETEC № B11-104



Base-pin positions are held to tolerances such that pins will fit flat-plate gauge having thickness of 1/4 inch and eleven 0.1030"–0.1035" holes so located on a 0.7500" ± 0.0005" diameter circle that the distance along the chord between any two adjacent hole centers is 0.2125" ± 0.0005". Pin fit in gauge shall be such that entire length of pins will enter gauge, and on withdrawal, they will become disengaged without lifting gauge and supplementary weight totaling 3 pounds.

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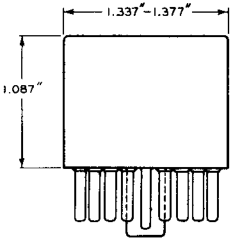
SMALL SHELL MAGNAL 11-PIN



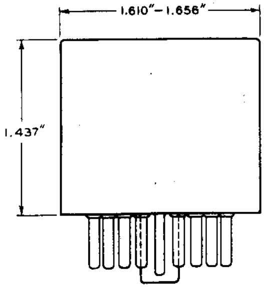
No. 11247

Other dimensions are same as for
LARGE WAFER MAGNAL 11-PIN

← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

MEDIUM SHELL MAGNAL 11-PIN



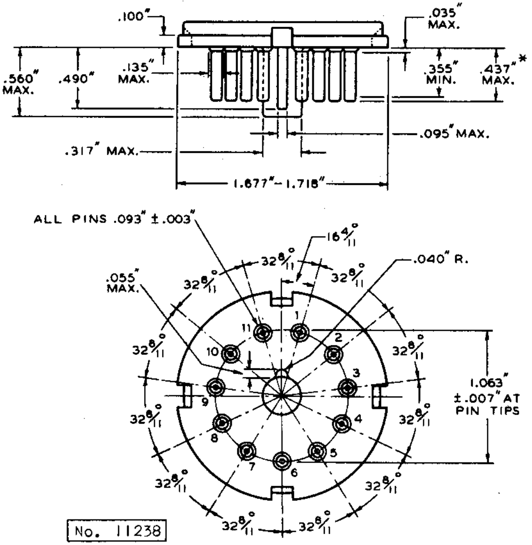
No. 11248

Other dimensions are same as shown for LARGE WAFER MAGNAL 11-PIN BASE

BASES

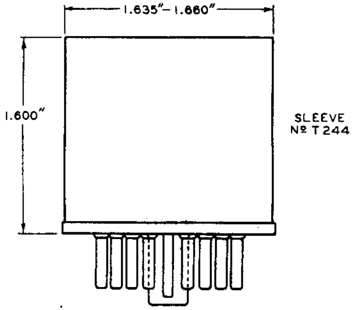
11-PIN TYPES
With Bottom View

LARGE WAFER MAGNAL 11-PIN



No. 11238

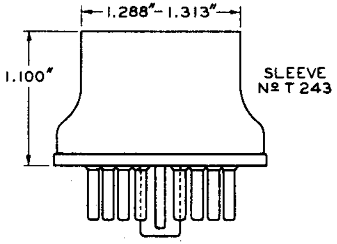
LARGE WAFER MAGNAL 11-PIN
WITH SLEEVE ASSEMBLIES



Other dimensions are same as above.

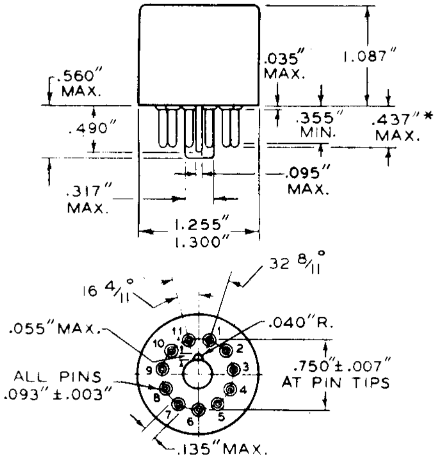
* On finished tube, add .030" for solder. ← Indicates a change.

LARGE WAFER MAGNAL 11-PIN WITH SLEEVE ASSEMBLIES (CONT'D)



Other dimensions are same as shown on preceding page.

SMALL SHELL SUBMAGNAL 11-PIN



No. 11343

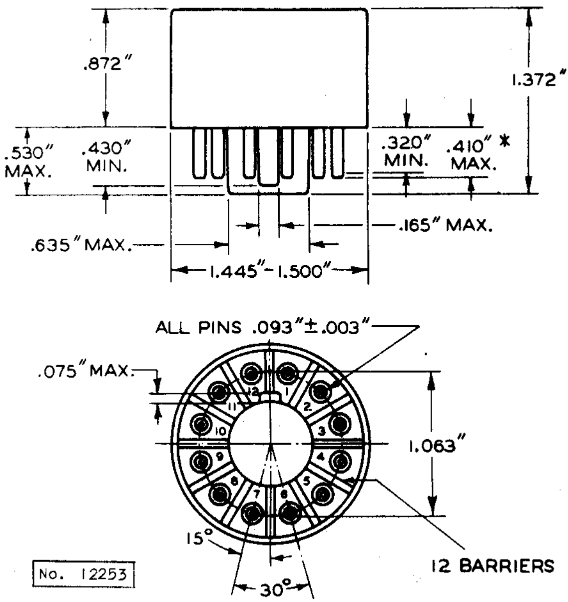
* On finished tube, add .030" for solder. ← Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

BASES

12-PIN TYPES
With Bottom View

SMALL SHELL DUODECAL 12-PIN



No. 12253

Base-pin positions are held to tolerances such that pins will fit flat-plate gauge having thickness of 0.25" and twelve 0.1030"±0.0005" holes so located on a 1.0630"±0.0005" diameter circle that the distance along the chord between any two adjacent hole centers is 0.2772"±0.0005"
Pin fit in gauge shall be such that gauge together with supplementary weight totaling 3 lbs. will not be lifted when pins are withdrawn.

SMALL SHELL DUODECAL 7-PIN
As above, Omitting Pins No. 3,4,5,8 & 9
– No. 7253 –

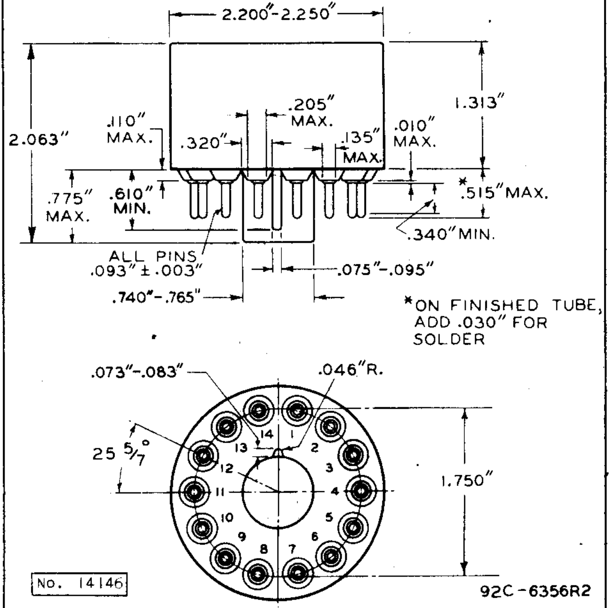
MEDIUM SHELL DIHEPTAL 12-PIN
For details of this base, see corresponding DIHEPTAL 14-PIN type

* on finished tube, add .030" for solder.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

14-PIN TYPES
With Bottom View

MEDIUM SHELL DIHEPTAL 14-PIN



No. 14146

92C-6356R2

Base-pin positions are held to tolerances such that pins will fit flat-plate gauge having thickness of 0.25" and fourteen 0.1030" ± 0.0005" holes so located on a 1.7500" ± 0.0005" diameter circle that the distance along the chord between any two adjacent hole centers is 0.3900" ± 0.0005".

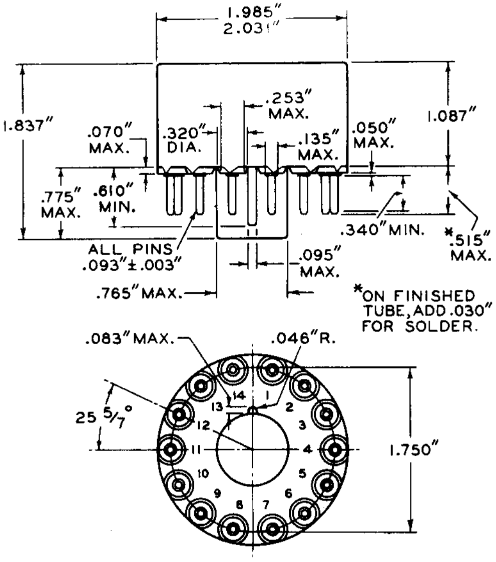
Pin fit in gauge shall be such that gauge together with supplementary weight totaling 3 lbs. will not be lifted when pins are withdrawn.

MEDIUM SHELL DIHEPTAL 12-PIN
As above, Omitting Pins No. 6 & 13
-No. 12146-

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

14-PIN TYPES
With Bottom View

SMALL-SHELL DIHEPTAL 14-PIN BASE



BOTTOM VIEW OF BASE

92CM-6580

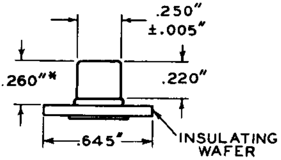
No. 14151

Gauge information is the same as that shown for MEDIUM-SHELL DIHEPTAL 14-PIN BASE

BASES

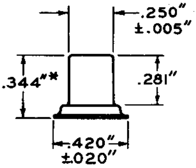
1–TERMINAL TYPES (CAPS)

MINIATURE WITH WAFER



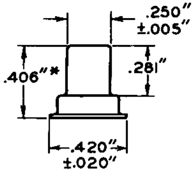
JETEC No.C1-4
RCA No.M-399

SKIRTED MINIATURE



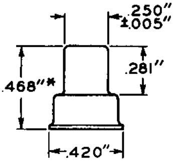
JETEC No.C1-3
RCA No.3933

SKIRTED MINIATURE



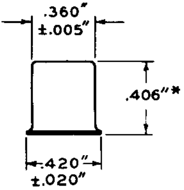
JETEC No.C1-2
RCA No.3927

SKIRTED MINIATURE



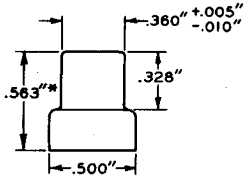
JETEC No.C1-33

SMALL



JETEC No.C1-1
RCA No.3907

SKIRTED SMALL



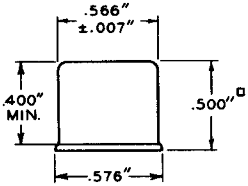
JETEC No.C1-22

* Add 0.020" for solder on finished tube.

BASES

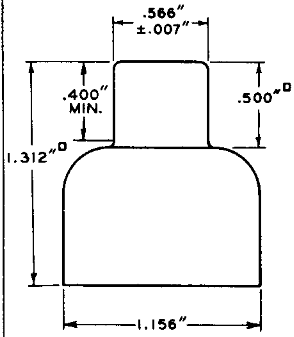
1 – TERMINAL TYPES (CAPS)

MEDIUM



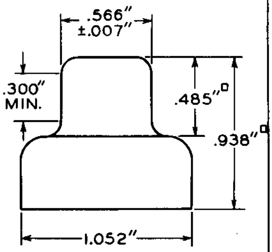
JETEC No.C1-5
RCA No.3903

SKIRTED MEDIUM



JETEC No.C1-6
RCA No.3904

SKIRTED MEDIUM



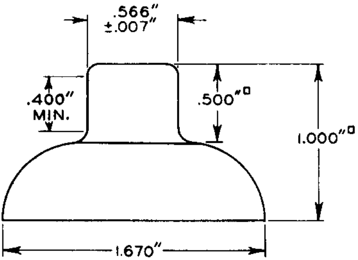
JETEC No.C1-14
RCA No.3980

□ Add 0.040" for solder on finished tube.

BASES

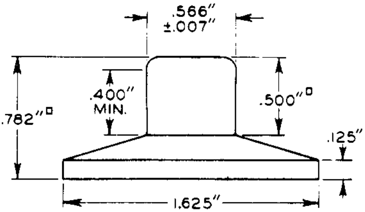
1 TERMINAL TYPES (CAPS)

SKIRTED MEDIUM



JETEC No.C1-27
RCA No.3985

SKIRTED MEDIUM



JETEC No.C1-29
RCA No.39002

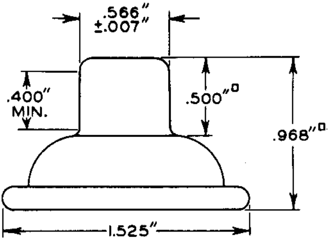
□ Add 0.040" for solder on finished tube.

RCA

BASES

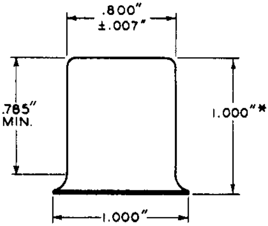
1 TERMINAL TYPES (CAPS)

SKIRTED MEDIUM WITH ROLLED EDGE



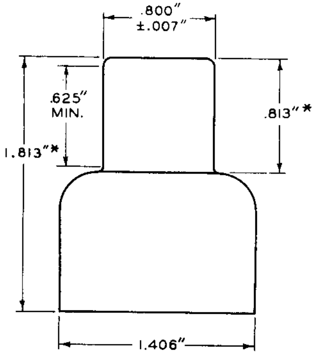
JETEC No.C1-19
RCA No.3940

LARGE



JETEC No.C1-8
RCA No.3910

SKIRTED LARGE



JETEC No.C1-9
RCA No.3905

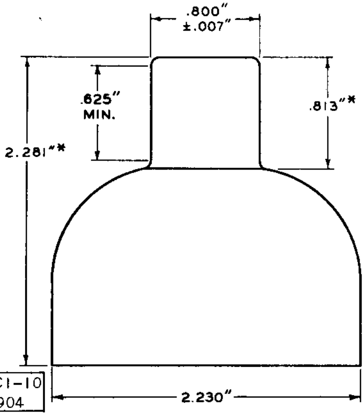
□ Add 0.040" for solder on finished tube.
* Add 0.060" for solder on finished tube.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

BASES

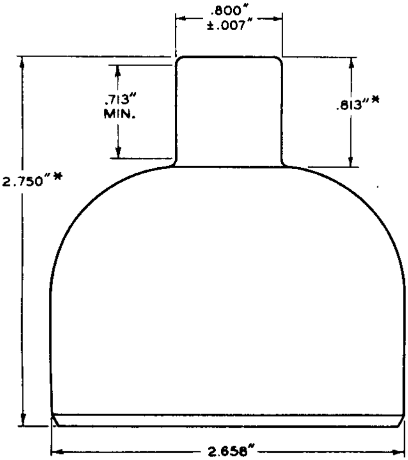
1-TERMINAL TYPES (CAPS)

SKIRTED LARGE



JETEC No.C1-10
RCA No.1904

SKIRTED LARGE



JETEC No.C1-30
RCA No.1902

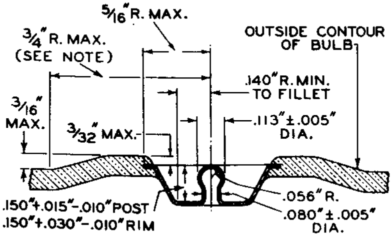
* Add 0.060" for solder on finished tube.

BASES

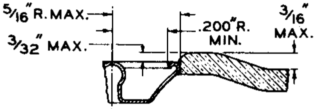
1-TERMINAL TYPES (CAPS)

DETAILS OF RECESSED SMALL BALL CAP & BULB ASSEMBLY

JETEC No. J1-22



ALTERNATE EDGE DESIGN



VARIANT SEAL SHAPES

NOTE: PROTRUSION OF GLASS AROUND CAP ABOVE BULB CONTOUR IS LIMITED TO AREA BOUNDED BY CIRCLE CONCENTRIC WITH CAP AXIS AND HAVING RADIUS OF 3/4" MAX.

FOR ATTACHING OR DETACHING, THE CONNECTOR SHOULD REQUIRE NOT MORE THAN 8 POUNDS TOTAL FORCE PERPENDICULAR TO THE PLANE OF THE RIM OF THE CAP.

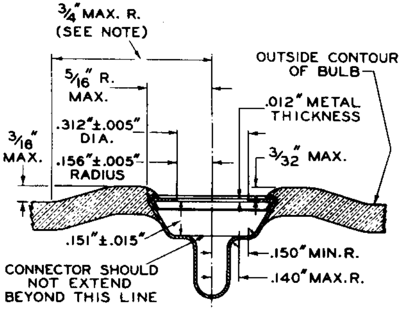
ANGLE BETWEEN PLANE OF THE RIM OF CAP AND PLANE TANGENT TO ORIGINAL CONTOUR OF BULB AT CENTER OF CAP WILL NOT BE MORE THAN 10°.

92CM-6535R4

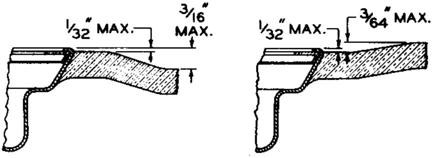
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DETAILS OF RECESSED SMALL CAVITY CAP & BULB ASSEMBLY

JETEC No. J1-21



VARIANT SEAL SHAPES



NOTE: PROTRUSION OF GLASS AROUND CAP ABOVE BULB CONTOUR IS LIMITED TO AREA BOUNDED BY CIRCLE CONCENTRIC WITH CAP AXIS AND HAVING RADIUS OF 3/4" MAX.

FOR ATTACHING OR DETACHING, THE CONNECTOR SHOULD REQUIRE NOT MORE THAN 8 POUNDS TOTAL FORCE PERPENDICULAR TO THE PLANE OF THE RIM OF THE CAP.

CONNECTOR SHOULD PROVIDE POSITIVE SPRING CONTACT TO TOP AND BOTTOM INTERIOR SURFACES. IT SHOULD NOT MAKE CONTACT TO THE INSIDE TOP SURFACE ONLY.

ANGLE BETWEEN PLANE OF THE RIM OF CAP AND PLANE TANGENT TO ORIGINAL CONTOUR OF BULB AT CENTER OF CAP WILL NOT BE MORE THAN 10°.

92CM-6651R2