

Tube Caddy

***TUBE
SUBSTITUTION
GUIDEBOOK***

by H. A. Middleton

(DIRECT SUBSTITUTIONS ONLY)



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PREFACE

TUBE CADDY – TUBE SUBSTITUTION GUIDEBOOK has been published in answer to the requests of many technicians for an efficient guide which can be carried in their tube caddies.

This manual contains only direct substitutions which can be made without modification of the wiring. All substitutions included here will yield excellent or good results, noted by E or G, respectively, in the Performance (Perf.) column.

Because of the exact electrical characteristics of many types and the very similar characteristics of others, this information has been compiled with the thought that many sales losses resulting from the unavailability of exact replacements can be avoided. Moreover, the public convenience in securing the needed tubes will be served.

In the other substitution guides – *Receiving Tube Substitution Guidebook*, the four *Supplements* thereto, and the all-encompassing *Master Receiving-Picture Tube Substitution Guidebook* – all substitutions are listed, including those which require rewiring and socket changes. In those books, when the filament current of the tubes differs, the notation "Parallel circuits only" is made. However, because we believe that *Tube Caddy – Tube Substitution Guidebook* will be in general use by a high percentage of nontechnical personnel rather than by electronic technicians, we have included some substitutes with filament current unequal to that of the original. This has been done only in cases where the type to be substituted is almost never used in other than parallel circuits. There is limited possibility that these may not operate

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properly where the filament circuit is not wired in parallel. It was thought better to take this gamble than to eliminate the many good substitutions which this would entail. If the needed substitution is not listed in Section 1, see Section 2.

Although the substitutions listed here will almost always give from excellent to good results, it must be remembered that this information is for substitutes and, with the exception of those listed in Section 2, we do not recommend their use when the original type is available.

H. A. MIDDLETON

Phoenix, Arizona
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AMERICAN

TUBE

SUBSTITUTIONS

Section 1. RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
00A	01A 40	E G	0Y4G	0Y4 Ground pin 1	E
01A	00A 00AA 01B 40	E E E G	0Z4	0Y4 0Z4A/1003 1005/CK1005	G E E
01B	01A	E	0Z4A	0Y4 1005/CK1005 1003	G G E
0A2	0A2WA 6073 6626	E E E	1A4	1B4 32 34 1A4P 1A4T	E E E G G
0A2WA	0A2 6073 6626	G E E	1A5	1T5	G
0A3	VR75 5651	E E	1AC5	1V5	E
0A4	1267	E	1AC6	1AB6	E
0B2	0B2WA 6074 6627	E E E	1AD5	1W5	E
0B2WA	0B2 6074 6627	G E E	1AF4	1AJ4	G
0B3	VR90 1266	E E	1AG5	1AJ5 1AK5	G G
0C3	VR105	E	1AH4	1AK4	E
0D3	VR150	E	1AJ4	1AF4	G
0Y4	0Y4G	E	1AJ5	1AG5 1AK5	G G
			1AK4	1AH4 1AJ5	E G

1AK5-1P5

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
1AK5	1AG5	G	1J3	1B3	E
				1G3	E
1AX2	1X2	E		1K3	E
1B3	8016	E	1J5	1G5	G
				1F5	G
1B4	1A4	E			
	1E5	E	1K3	1B3	E
	32	E		1G3	E
	34	E		1J3	E
1B5	25S	E	1L4	1T4	G
				1U4	G
1B8	1D8	E			
			1LA4	1LB4	G
1C8	1E8	E			
			1LA6	1LC6	E
1D5	1E5	G			
			1LB4	1LA4	G
1D8	1B8	E			
			1LC5	1LG5	G
1E4	1G4	G		1LN5	G
				1P5	G
1E5	1D5	G			
			1LC6	1LA6	E
1E8	1C8	E			
			1LE3	1LF3	E
1F4	950	G			
			1LF3	1LE3	E
1F5	1J5	G			
			1LG5	1LC5	G
1G3GT	1B3	E		1LN5	E
	1J3	E			
	1K3	E	1LN5	1LC5	E
				1LG5	G
1G5	1J5	G			
	1F5	E	1N5	1P5	G
1H2	1X2B	G	1P5	1N5	G

RECEIVING TUBE SUBSTITUTIONS

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TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
1S6	1T6	E	2D21W	2D21 5727	G E
1T4	1L4 1U4	G G	2E5	2G5	E
1T5	1A5	G	2E30	5812	G
1T6	1S6	E	2E31	2E32	E
1U4	1L4 1T4 5910	G G E	2E32	2E31	E
1V	6Z3	E	2E35	2E36	E
1V5	6Z3	E	2E36	2E35	E
1V5	1AC5	E	2E41	2E42	E
1X2B	1H2	G	2E42	2E41	E
2A3	45 5930 2A3W	G E E	2G5	2E5	E
2A3W	2A3 45 5930	G G E	2G21	2G22	E
2A7	2A7S	E	2G22	2G21	E
2AF4	2AF4B 2T4	E G	2T4	2AF4 2AF4B	G G
2B7	2B7S	E	3A3	3B2 3C2	G G
2B7S	2B7	E	3AU6	3BA6	G
2C21	1642	E	3AV6	3BT6	G
2D21	2D21W 5727	E E	3B2	3A3 3C2	G G

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
3B5	3C5	E	3CE5	3CB6	E
	3Q5	E		3CF6	E
3B7	1291	E	3CF4	3BC5	G
3B24	3B24WA	E	3CF6	3BC5	G
3B28A	6277	E		3BZ6	G
			3CB6	G	
			3CE5	E	
3BA6	3AU6	G	3CS6	3BY6	G
3BC5	3CB6	G			
	3CF6	G			
	3CF5	G			
3BE6	3BF6	E	3LF4	3LE4	E
			3BF6	3BE6	E
3BT6	3AV6	G			
			3BY6	3CS6	G
3BZ6	3BC5	G			
			3C2	3A3	G
3C4	3B2	G			
			3C5	3V4	G
3C5	3B5	E			
			3C45	3Q5	E
3CB6	6130	E			
			3CB6	3BC5	G
3CB6	3BZ6	G			
			3CB6	3BZ6	G
3CB6	3BZ6	G			

RECEIVING TUBE SUBSTITUTIONS

4BQ7-5AX4

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
4BQ7	4BC8	G	4DE6	4CB6	E	
	4BK7	G		4BZ6	E	
	4BS8	G		4DK6	G	
	4BZ7	G	4DK6	4BZ6	G	
	4BZ8	G		4CB6	G	
4BS8	4BC8	G	4DE6	4DE6	G	
	4BK7	G		5AS4	5AW4	G
	4BQ7	G			5U4GA	G
	4BZ7	G	5U4GB	5U4GB	G	
	4BZ8	G		5V3	E	
4BX8	4BC8	G	5931	5931	E	
	4BK7	G		5AU4	5AS4	G
	4BQ7	G	5AW4		E	
	4BS8	G	5R4GY		G	
	4BZ8	G	5T4	G		
4BZ6	4CB6	E	5U4G	5U4G	G	
	4DE6	E		5U4GA	E	
	4DK6	G		5U4GB	E	
				5V3	E	
4BZ7	4BC8	G	5931	5931	E	
	4BK7	G		5AW4	5U4	G
	4BQ7	G	5X4		G	
	4BS8	G	5V4		G	
	4BZ8	G	5AS4	G		
4BZ8	4BC8	G	5AU4	5AU4	E	
	4BK7	G		5R4GY	G	
	4BQ7	G	5T4	5T4	G	
	4BS8	G		5U4G	G	
			5U4GA	E		
4CB6	4BC5	G	5U4GB	5U4GB	E	
	4BZ6	G		5V3	E	
	4DE6	E	5931	5931	E	
	4DK6	G		5AX4	5AZ4	G
4CE5	4BC5	G	(contd.)		5U4	G

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.											
5AX4 (contd.)	5V4	G	5EA8	5U8	G											
	5W4	G		5R4GY	5T4	G										
	5Y3	G			5U4	G										
	5Z4	G			5Z3	G										
	5AS4	E			where PIV is less than 450 per plate.											
	5T4	G			5AW4	5R4WGY	G									
	5U4G	G														
	5U4GA	E														
	5U4GB	E														
	5V4	E														
5931	E															
5AZ4	5AW4	G	5T4	5AX4				G								
	5AX4	G		5AZ4				G								
	5U4	G		5U4				G								
	5V4	G		5V4				G								
	5W4	G		5W4	G											
	5Y3	G		5Y3	G											
	5Z4	G		5Z4	G											
	5AX4	E		5AS4	E											
	5V4	E														
	5Y3	E														
	5Z4	E														
	5BE8	5BR8				E	5R4	E								
									5BQ7	5BZ7	E					
5BS8			G													
	5U4	5U4				E										
									5U4GA	E						
5U4GB			E													
				5V4	E											
											5931	E				
													5BR8	5BE8	E	
																5BS8
							5BZ7	G								
													5BZ7	5BQ7	E	
																5BS8
	5CG4	5V4				E										
							5Z4	E								

RECEIVING TUBE SUBSTITUTIONS

5U4G-5Y4

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
5U4G	5AS4	E	5V4 (contd.)	5AW4	G	
	5AW4	E		5931	G	
	5U4GA	E	5W4	5AX4	G	
	5U4GB	E		5AZ4	G	
	5V3	E		5T4	G	
	5931	E		5U4	G	
5U4GA	5AS4	E	5V4	5V4	G	
	5AW4	E		5Y3	G	
	5R4GY	E		5AW4	5AW4	G
	5T4	E			5Z4	E
	5U4G	E			5931	G
	5U4GB	E		5X3	5Z3	G
	5V3	E			80	G
5931	E	83	G			
		83V	G			
5U4GB	5AS4	E	5X4	1275	G	
	5AU4	E		5AW4	5AW4	G
	5AW4	E			5Y4	G
	5R4GT	G			5Y3	5AX4
	5T4	E	5AZ4			G
	5U4G	G	5T4	G		
	5U4GA	E	5U4	G		
	5V3	E	5Y4	5V4	G	
5931	E	5W4		G		
		5Z4		G		
		5AW4		G		
5U8	5EA8	G	5Y3WGT	5Y3WGT	E	
				5Z4	E	
5V3	5AS4	G	5Y4 (contd.)	5931	G	
	5AU4	E		5Y3GT	6106	E
	5AW4	G			6853GT	E
	5U4GB	G		5Y4 (contd.)	5X4	G
		5AW4	G			
5V4 (contd.)	5AX4	G				
	5AZ4	G				
	5T4	G				
	5U4	G				
	5W4	G				
	5Y3	G				
	5Z4	G				

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
5Y4 (contd.)	5Z4	E	6AD4	6K4	G
	5931	G			
5Z3	5X3	E	6AD5	6AE5	G
	80	G		6AF5	G
	83	G		6C5	G
	83V	G		6J5	G
	1275	G		6P5	G
5Z4	5CG4	E	6AD6	6AF6	G
	5AX4	G	6AE5	6AD5	G
	5AZ4	G		6AF5	G
	5T4	G		6C5	G
	5U4	G		6J5	G
	5V4	G		6P5	G
	5W4	G	6AF4	6AN4	G
	5Y3	G		6T4	G
	5AW4	G			
	5931	G	6AF5	6AD5	G
6A4	52	G		6AE5	G
				6C5	G
				6J5	G
6A8	6J8	E		6P5	G
	6K8	E			
6AB7/1853	6AC7/1852	G	6AF6	6AD6	G
	6AJ7	G			
6AC5G	6AC5GT	E	6AG5	6AG5WA	E
	6AC5GT/G	E		6BC5	G
				6186	E
				6BA6	G
6AC5GT	6AC5G	E		6BD6	G
	6AC5GT/G	E		6CB6	G
6AC7	6AC7W	E	6AG7	6AK7	E
	6AC7WA	E	6AH6	6485	E
	6134	E			
6AC7/1852	6AB7/1853	G	6AJ4	6AM4	G
	6AJ7	G			

RECEIVING TUBE SUBSTITUTIONS

6AJ7-6AT6

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.				
6AJ7	6AB7/1853	G	6AM5	6516	E				
	6AC7/1852	G							
6AK5	6AK5W	E	6AM6	6064	E				
	5654	E							
	6096	E	6AN4	6AF4	G				
	6AK5WA	E		6T4	G				
	5595	E		6AQ5	6BM5	E			
6AK5W	6AK5 6AK5WA 5595 5654 6096	G	6AQ5W		E				
		E	6005		E				
		E	6094		E				
		E	6095		E				
		E	6669	G					
6AK5WA	6AK5 5595 6AK5W 5654 6096	G	6AQ5W	6AQ5	G				
		E		6BM5	G				
		E		6005	E				
		E		6094	E				
		E		6095	E				
6AK7	6AG7	E	6AR6	6AR6WA	E				
				6098	E				
6AK8	6T8	E	6AR6WA	6AR6	G				
6AL5	5726 6AL5W 6058 6097 6663	G E E E E		6AS6	6AS6W	E			
			5725		E				
			6187		E				
			6AL5W		6AL5 5726 6058 6097 6663	G E E E E	6AS6W	6AS6	G
								5725	E
6187	E								
6AM4	6AJ4	E	6AS7	6080	E				
				6336	E				
			6AT6 (contd.)	6AV6	G				
				6BF6	G				

6AT6-6BC8

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6AT6 (contd.)	6BK6	G	6AX7	6AU7	G
	6BT6	G	6AX8	6U8	G
	6BU6	G		6B3	6AU4
	6066	E	6B6		5Q7
6AU4	6AX4	G	6BA6	6AU6	G
	6BL4	G		6BD6	G
	6W4	G		6BA6W	E
6AU6	6BA6	G	5749	E	
	6BD6	G	6660	E	
	6AU6WA	E	6661	E	
	5749	G	6AG5	G	
	6136	E	6BC5	G	
6AU7	6AX7	G	6CB6	G	
			6CG6	G	
			6136	G	
6AU8	6AW8	G	6BA6W	6BA6	G
	6BA8	G	5749	E	
6AV4	6BX4	G	6660	E	
	6X4	G	6661	E	
6AV5	6AU5	G	6BA8	6AU8	G
	6BD5	G		6AW8	G
6AV6	6AT6	G	6BH8	G	
	6066	G	6BC5	6CB6	G
	6BK6	E		6CF6	G
	6BT6	G		6CE5	G
6AW8	6AU8	G		6BC8	6BK7
	6AX4	6U4	E		6BQ7
6W4		G	6BS8	G	
6AU4		G	6BZ7	E	
6BL4		G	6BZ8	G	
6DA4		E	X155	G	

RECEIVING TUBE SUBSTITUTIONS

6BD4A-6BQ7

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6BD4A	6BK4	E	6BJ6	6662	E
6BD6	5749	G	(contd.)		
6BE6	5915	G	6BJ8	6BN8	G
	6BY6	G	6BK4	6BD4-A	E
	5750	E	6BK6	6AT6	G
	6BE6W	E		6AV6	G
	6660	E		6BF6	G
6BE6W	6BE6	G		6BT6	G
	5750	E		6BU6	G
	6660	E		6066	G
6BE8	6BR8	E	6BK7	6BC8	G
6BF6	6BU6	G		6BQ7	G
6BF7	6BG7	E		6BS8	G
	6BF7W	E		6BZ7	G
	6021	E		6BZ8	G
				X155	G
6BF7W	6BF7	G	6BL4	6AU4-GTA	G
	6021	E	6BL7	6SN7	G
6BG6	6DN6	G		5592	G
6BG7	6BF7	E		6BX7	E
6BH6	6BJ6	G	6BL8	6U8	G
	6CB6	G	6BM5	6AQ5	E
	6265	E	6BN8	6BJ8	G
	6661	E	6BQ6	6CU6	E
6BH8	6AU8	G		6DQ6	E
	6AW8	G		6FH6	E
	6BA8	G	6BQ7	6BK7	G
6BJ6	6CB6	G	(contd.)	6BZ7	E
(contd.)	6BH6	G		6BC8	G

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.			
6BQ7 (contd.)	6BS8	G	6BZ6	6CB6	E			
	6BZ8	G		6DE6	E			
	X155	G		6DK6	G			
6BR8	6BE8	E	6BZ7	6BK7	G			
6BS8	6BC8 6BK7 6BQ7 6BZ7 6BZ8 X155	G G E G G G		6BQ7	E			
			6BC8	G				
			6BQ8	E				
			6BS8	G				
			6BZ8	E				
			X155	E				
6BT6	6AV6 6Q66 6BK6	E E G	6BZ8	6BC8	G			
				6BK7	G			
				6BS8	G			
				6BZ7	G			
6BU6	6BF6	G	6C4	X155	E			
				6C4W	E			
6BW7	6BX6	G	6C4	6100	E			
				6135	E			
				5610	G			
6BX4	6X4	G	6C4W	6C4	G			
6BX6	6BY7	E		6100	E			
				6135	E			
6BX7	6BL7	E	6C5	6AD5	G			
6BX8	6BC8 6BE6 6BK7 6BQ7 6BS8 6BZ7 6BZ8 X155	G G G G G G G G		6AE5	G			
				6AF5	G			
				6J5	G			
				6P5	G			
				6C6	6D6 77 78 1221 1603 7700	G E E E E E	6D6	G
							77	E
			78				E	
1221	E							
6BY6	6CS6 5915	G G	1603	E				
			7700	E				
6BY7	6BX6	E						

RECEIVING TUBE SUBSTITUTIONS

6CB6-6DK6

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
6CB6	6AG5	G	6CS6	6BE6	G	
	6AK5	G		6BY6	G	
	6BC5	G	6CS8	6CR8	G	
	6BZ6	G		6CU6	6DQ6	E
	6CF6	E	6BQ6GT		E	
	6DC6	G	6FH6		E	
	6DE6	E	6CX8		6EB8	G
	6DK6	G			6D6	6C6
	5590	G		77		G
	5591	G	78	E		
5654	G	6D7	6E7	G		
6CD6	6DN6		E	6DA4	6AX4	G
	6CE5	6BC5	G		6DC6	6BZ6
				6CB6		G
	6CF6	6AG5	G	6DE6	6BZ6	G
		6AK5	G		6CB6	G
6BC5		G	6DE6	G		
5590		G	6DK6	G		
5591		G	6CF6	E		
6CG6	6CB6	E	6DC6	6DC6	G	
	5654	G		6DE7	6DR7	G
	6DE6	E	6DG6		6K6	G
	6CH6	6AU6			G	6V6
		6BA6	G		6W6	E
6BD6		E	6DK6		6BZ6	G
5591		G		6CB6	G	
5654		G	6DE6	G		
6CL6	6132	E	6CS5	6W6	E	
	6677	E		6Y6	G	
6CR8	6CS8	G				

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6DN6	6BG6	G	6FH6	6BQ6	G
	6CD6	E		6CU6	G
				6DQ6	G
6DQ6	6BQ6	G	6G5	6E5	G
	6CU6	G		6T5	G
	6FH6	E		6U5	G
6DR7	6DE7	G	6G6	6F6	G
6DT5	6DW5	G		6K6	G
				6V6	G
6DW5	6DT5	G	6H5	6U5/6G5	E
6E5	6T5	E		6J4	6J4WA
	6U5/6G5	E			
6E6	6Z7	G	6J5	6AD5	G
				6AE5	G
6E7	6D7	G		6AF5	G
				6C5	G
6EA8	6U8	G		6L5	G
				6P5	G
6EB8	6CX8	G		6J5WGT	E
				7193	E
6EH5	6CU5	G	6J5WGT	6J5	G
6F6	6K6	G		7193	E
	6L6	G			
	6U6	G	6J6	5964	E
	6V6	G		6101	E
	5881	G		6J6W	E
	1621	E		5844	E
	1622	E		6099	E
	1611	E			
			6J6W	6J6	G
6F7	6F7S	E		6099	E
				6101	E
6F8	6C8	G			

RECEIVING TUBE SUBSTITUTIONS

6J7-6Q7

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
6J7	6K7	G	6L6	6F6	G	
	6S7	G		6K6	G	
	6U7	G		6U6	G	
	6W7	G		6V6	G	
	1221	E		1614	E	
	1223	E		KT66	E	
	1620	E		5881	E	
	7000	G		1621	G	
6J8	6A8	G	1622	G		
	6D8	G	5932	E		
	6K8	G	6550	E		
			6L6WGB	E		
6K4	6AD4	E	6L6WGB	6L6	G	
6K5	6C5	G		5881	E	
	6J5	G		5932	E	
			6L7	1612	E	
6K6	6F6	G	6N6	6AB6	G	
	5881	G		6N7	6Y7	G
	1621	E	6Z7		G	
	5871	G	1635		E	
	6L6	G	6P5		6AD5	G
	6U6	G			6AE5	G
	6V6	G		6AF5	G	
6K7	6J7	G		6C5	G	
	6S7	G		6J5	G	
	6U7	G		6L5	G	
	6W7	G	6Q5	884	E	
	5732	E		6Q7	6B6	E
6K8	6A8	G	6R7		G	
	6J8	G	6T7		G	
	6L5	6AD5	G	6V7	G	
6AE5		G				
6C5		G				

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.		
6R7	6Q7	G	6SH7	6AB7	G		
	6T7	G		6AC7	G		
	6V7	G		6SG7	G		
6R8	6T8	G	6SK7	6SJ7	G		
				6W7	G		
				6006	G		
6SA7	6SB7Y	G	6SJ7	6SJ7WGT	E		
	5961	E		6006	G		
	6SA7WGT	E		6SK7	G		
6SA7WGT	6SA7	G	6SS7	5693	E		
				6SS7	G		
				6SJ7WGT	6SJ7	G	
6SB7Y	6SA7	G	6SJ7	5693	E		
	5961	G					
6SD7	6AB7/1853	G	6SK7	6SS7	G		
	6AC7/1852	G		6SK7W	E		
	6SS7	G		6SK7WA	E		
	6SE7	G		6AB7	G		
	6SJ7	G		6AC7	G		
	6SK7	G		6SG7	G		
	5693	G		6SH7	G		
				6SJ7	G		
6SE7	6AB7/1853	G	6SK7W	6006	G		
	6AC7/1852	G		6137	E		
	6SS7	G		6SK7WA	6SK7	G	
	6SD7	G			6SK7WA	E	
	6SJ7	G			6137	E	
	6SK7	G			6SK7WA	6SK7	G
	5693	G				6SK7W	E
6SF7	6SV7	G	6SL7	6SN7	G		
				6SU7	G		
6SG7	6AB7	G	6SL7WGT	5691	E		
	6AC7	G		6SL7WGT	E		
	6SH7	G		6113	E		
	6SJ7	G					
	6SK7	G					
	6006	E					

RECEIVING TUBE SUBSTITUTIONS

6SN7-6V7

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6SN7	6SL7	G	6T7 (contd.)	6R7	G
	5692	G		6V7	G
	6SN7WGT	E	6T8	6R8	G
	6180	E		6AK8	G
	6BL7	E		6U4	6W4
6BX7	E	6AX5	G		
6SQ7	6SR7	G	6U5/6G5	6N5	E
	6ST7	G		6E5	E
	6SZ7	E		6AB5	G
	6SQ7W	E	6T5	G	
6SR7	6SQ7	G	6U6	5881	G
	6ST7	G		6F6	G
	6SZ7	G		6K6	G
6SU7	6SL7	E		6V6	G
	6113	E	6U7	6K7	G
	6SU7WGT	E		5732	G
	5755	E	6U8	6AX8	G
	6188	E		6BL8	G
6SU7WGT	6SU7	G		6EA8	G
	5755	E	6V6	6F6	G
	6188	E		6K6	G
6SV7	6SF7	G		6L6	G
	6SZ7	6ST7		G	6U6
6Y6			G		
6W6			G		
6T4	6AN4	G	1621	G	
	6AF4	G	1622	G	
6T5	6E5	G	5871	E	
	6G5	G	5992	E	
	6U5	G	5187	E	
6T7 (contd.)	6B6	G	6V7	6R7	G
	6Q7	G		6T7	G

6W2-7AG7

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6W2	6X2	G	6Y7 (contd.)	1635	E
6W4	6U4 6AX4	E E	6Z3	1V	E
6W5	6AX5 6X5 6ZY5	G G G	6Z5	6Y5 6N7 6Y7	E G G
6W6	6G6 6K6 6U6 6V6 6Y6	G G G G G	6ZY5	0Z4 6AX5 6W5 6X5 1274	G G G G G
6W7	6S7	G	7A4	7B4	G
6X2	6W2	E		XXL	E
6X4	6AV4 6BX4 6X4W 6063 6202 5993	E G E E G E	7A5	7B5 7C5	G G
			7A7	7B7 7C7 7H7 7L7	G G G G
6X5	6AX5 6W5 0Z4 6ZY5 1274 6X5WGT 5852	G G E G G E E	7A8	7J8 7S7	G G
			7AB7	1204	E
			7AF7	7F7 7N7	G G
6Y6	6K6 6L6 6U6 6V6	G G G G	7AG7	7AH7 7G7 7H7 7L7 7T7 7V7	G G G G G G
6Y7 (contd.)	6N7 6Z7	G G			

RECEIVING TUBE SUBSTITUTIONS

7AH7-7T7

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
7AH7	7AG7	G	7F7	7AF7	G
	7AJ7	G		7N7	G
7AJ7	7AH7	G	7F8	7F8W	E
7B4	7A4	G	7G7	7A7	G
	XXL	G		7B7	G
				7C7	G
7B5	7A5	G		7H7	G
	7C5	G		7L7	G
				7V7	G
7B6	7C6	G		1232	G
	7E6	G	7G8	1206	E
7B7	7C7	G	7J7	7B8	G
	7AH7	G		7S7	G
7B8	7A8	G	7L7	7A7	G
	7J7	G		7G7	G
	7S7	G		7H7	G
7C4	1203A	E		7T7	G
7C5	7A5	G		7V7	G
	7B5	G	7N7	7AF7	G
				7F7	G
7C6	7B6	G	7R7	7E7	G
7C7	7B7	G			
	7AH7	G	7S7	7J7	G
7C24	5762	E		7B8	G
7E5	1201	E	7T7	7A7	G
			(contd.)	7B7	G
7E6	7B6	G		7C7	G
	7C6	G		7G7	G
				7H7	G
7E7	7R7	G		7L7	G

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
7T7 (contd.)	7V7	G	10Y	10	E	
	1231	G		RK10	E	
	1273	G		50	G	
7V7	7B7	G		210	E	
		G		310	E	
		G		71A	G	
		G				
7X7	XXFM	E	12A8	12K8	G	
		7Y4	G	12AC6	12AF6	G
			G	12AD6	12AG6	G
7Z4	7X6	G	12AD7	12DF7	G	
		G	12AE6	12AT6	G	
8AU8	8AW8	G		12AV6	G	
	8BA8	G	12AF6	12AC6	G	
	8BH8	G				
8AW8	8AU8	G	12AG6	12AD6	G	
	6BH8	G	12FA6	G		
8BA8	8AU8	G	12AK7	12AX7	E	
	8AW8	G	12AT6	12AV6	G	
8BH8	8AU8	G		12BK6	G	
	8AW8	G	12AT7	12AU7	G	
8CX8	8EB8	G		12AX7	G	
				12AY7	G	
				12AT7WA	E	
8EB8	8CX8	G	6060	E		
			6201	E		
10	10Y	E	6679	E		
		E	12DF7	G		
		G	12AU6	12BA6	G	
		E		12BD6	G	
		E				

RECEIVING TUBE SUBSTITUTIONS

12AU7-12CU6

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.	
12AU7	12AT7	G	12BA6	12AU6	G	
	12AX7	G		12BD6	G	
	12AY7	G	12BD6	12AU6	G	
	12AU7WA	E		12BA6	G	
	5814	E		12BF6	12BU6	G
	5963	G	12BK6		12AT6	G
	6067	E			12AV6	G
	6189	E			12BT6	G
	6680	E			12BU6	G
	12DF7	G		12BQ6	12CH6	E
12AV6	12AT6	G			12CU6	E
	12BK6	G	12DQ6		E	
	12BT6	G	12BT6		12AT6	G
	12BU6	G		12AV6	G	
12AV7	12AZ7	E	12BV7	12BK6	G	
	5965	G		12BU6	G	
12AX7	12AT7	G		12BV7	12BY7	E
	12AU7	G	12BY7		12BV7	E
	12AY7	G		12DQ7	G	
	12AD7	E		12C5	12CA5	G
	5751	E	12CU5		E	
	6057	E	12CA5		12C5	G
	6681	E			12CU5	E
12AY7	12AT7	G	12CA5	12C5	G	
	12AU7	G		12CU5	E	
	6072	E	12CU5	12C5	E	
	12AX7	G		12CU6	12BQ6	E
12AZ7	12AV7	E	12DQ6		E	
	12B4	12A4	G	12B7	14A7	E

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
12D4	12AX4	G	12L6	12W6 1632	E E
12DF7	12AD7	G			
	12AX7	G	12L8	1644	G
	12AT7	G	12SA7	12SY7	E
	12AU7	G	12SC7	1634	G
	12AY7	G			
	5751	G	12SG7	12SH7	G
	6057	G		12SJ7	G
	6681	G		12SK7	G
12DM5	12ED5	G	12SH7	12SG7	G
				12SJ7	G
12DQ6	12BQ6	G		12SK7	G
	12CU6	G			
			12SK7	12SG7	G
12DQ7	12BY7	G		12SH7	G
				12SJ7	G
12DZ6	12EA6	G			
			12SL7	2C52	E
12EA6	12DZ6	G	12SN7	12SX7	G
12ED5	12DM5	G	12SQ7	12SR7	G
			12SR7	12SQ7	G
12EG6	12FA6	G		12SW7	G
12EH5	12CU5	G	12SW7	12SR7	G
			12SX7	12SN7	G
12FA6	12AG6	G			
	12EG6	G	12SY7	12SA7	G
12J5	12J5WGT	E	12W6	12L6 1632	E E
12J5WGT	12J5	G			
			13DE7	13DR7	G
12J7	12K7	G			
			13DR7	13DE7	G
12K7	12J7	G	14A7/ 12B7	12B7	E
				14C7	G
12K8	12A8	G	(contd.)		

RECEIVING TUBE SUBSTITUTIONS

14A7/12B7-25AX4

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
14A7/12B7 (contd.)	14H7 1280 1284	G G E	14W7	12B7 14A7 14C7 14H7 1280 1284	G G G G G G
14AF7/XXD	14F7 14N7	G G			
14B6 14B8	14E6 14J7 14S7	G G G	17AX4 17BQ6	17D4 17DQ6	E E
14C5	14A5	G	17C5	17CA5 17CU5	G E
14C7	12B7 14A7 14H7 1280 1284	E G G G E	17CA5 17CU5 17D4	17C5 17C5 17AX4	G E G
14E6	14B6	G	17DQ6	17BQ6	G
14E7	14R7	G	19C8	19T8	G
14F7	14AF7/XXD	G	19T8	19C8	G
14H7	12B7 14A7 14C7 1280 1284	G G G G G	19X3 19Y3 20	19Y3 19X3 X99	E E G
14J7	14B8 14S7	G G	25A6	25B6 25L6 25C6 5824	G G G G
14N7	14AF7/XXD	G			
14R7	14E7	G	25A7	32L7	E
14S7	14B8 14J7	G G	25AX4	25U4 25W4	G G

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
25B5	43	G	25F5	25C5 25CA5	G G
25B6	25A6 25G6 25L6 25N6 5824	G G G G E	25L6	25A6 25B6 25C6 25N6 5824 6046	G G G G E G
25BQ6	25CU6 25DQ6	E E	25S	1B5	E
25C5	25CA5 25F5	G G	25U4	25AX4 25W4	E E
25C6	25A6 25B6 25L6 25N6 5824	G G G G G	25W4	25U4	G
			25W6	25L6	E
			25Y5	25Z5	E
25CA5	25C5 25F5	G G	25Z5	25Y5	E
25CD6	25DN6 25EC6	G G	25Z6	35Z6 25Z6WGT	G E
25CU6	25BQ6 25DQ6	E E	25Z6WGT	25Z6	E
25DN6	25CD6	G	26CG6	26A6	G
25DQ6	25BQ6 25CU6	G G	27	56	G
25E6	25E6WGT	E	28D7	28D7W	E
25E6WGT	25E6	G	30	31	G
25EC6	25CD6	G	31	30	G
			32 (contd.)	1B4 34	G G

RECEIVING TUBE SUBSTITUTIONS

32-55S

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
32	951	G	42	6B5	G
(contd.)				41	G
32L7	25A7	E	45	2A3	G
33	1F4	G	45Z5	35Z5	G
	950	E	50	10	G
34	1A4	G	50AX6	50Z6	G
	1B4	G	50B5	35B5	E
	32	G	50C5	50CA5	G
	951	G	50C6	50L6	G
35A5	50A5	G	50CA5	50C5	G
35B5	50B5	G	50EH5	50C5	G
35L6	50C6	G	50CA5	50CA5	G
	50L6	G	50L6	50C6	E
35W4	35C3	G	50Y6	50Z7	E
35Z5	45Z5	G	50Y7	50Z7	G
35/51	24A	G	50Z6	50AX6	E
36	39/44	G	50Z7	50Y6	E*
37	76	E	50Y7	50Y7	G
39/44	36	G	53	5608-A	E
40	00A	G	55	2A6	E
	01A	G	55S	2A6	E
	12A	G		55	E
40A1	40B2	G			
40B2	40A1	G			
41	42	G			

*No changes necessary but pilot light will not light. Light pilot light by inserting 40 ohms resistance in series with filament circuit and connecting pilot light across it.

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
56	27	G	83	5Z3	G
	485	G			
56AS	37	E	83V	5Z3	G
	76	E		80	G
					83
56S	27	E	85AS	85	E
	56	E	89	89Y	E
57	58	G	X99	20	G
57AS	6C6	E	X155	6BC8	G
	77	E		6BK7	G
					6BQ7
57S	57	E		6BS8	G
	58	E		6BZ7	G
					6BZ8
58AS	6D6	E			
	78	E	117L7/M7	117M7	E
58S	57	E	117N7	117P7	E
	58	E			
71A	482	G	182B/482B	71A	E
	483	G		183/483	E
	182B/482B	G	183/483	71A	E
	183/483	G		182B/482B	E
75	85	G	210T	10	E
76	37	E		50	G
77	6C6	E	807	5933	E
	1221	E	884	6Q5	G
78	6D6	E	950	1F4	G
80	5Z3	G	954	956	E
	83V	G			
	83	G			
			956	954	E

RECEIVING TUBE SUBSTITUTIONS

1005/CK1005-1611

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
1005/ CK1005	0Y4 0Z4A	G G	1273 (contd.)	7L7 7T7	G G
CK1013	5517	E	1274	6AX5 6W5	G G
1201	7E5	E		6ZY5 6X5	G E
1203	7C4	E	1275	5X3	G
1204	7AB7	E		5Z3 80	E G
1206	7G8	E		83 83V	G G
1221	6C6 77	E E	1280	12B7 14A7	G G
1223	6J7	E		14C7 14H7	G E
1229	1A4 1B4 32 951	E E E E	1284	12B7 14A7 14C7 14H7 1280	G G G G G
1230	30	E			
1231	7G7 7V7	G G	1291	3B7	E
1232	7G7	E	1293	1LE3	G
1238	28D7	G	1294	1R4	E
1266	0B3	G	1299	3D6	E
1267	0A4	G	1603	6C6 7700	E E
1273 (contd.)	7A7 7AJ7 7H7	G G G	1611	6F6	E

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
1612	6L7	E	5590	6BC5	G
				5591	G
1614	6L6	E		9001	G
	5881	E		9003	G
				6CF6	G
1620	6J7	E			
			5591	6AG5	G
1621	6F6	G		5590	G
	6K6	G		9001	G
	6L6	G		9003	G
	6V6	G		6CF6	G
	5881	E		6AK5	G
				5654	G
1622	6F6	G			
	6L6	E	5595	6AK5	G
	6V6	G		6AK5WA	E
	5881	E		5654	E
				6096	E
1626	12E5	G			
	12J5	G	5608-A	53	E
1632	12L6	E	5610	6C4	G
	12W6	E			
			5633	5634	E
1634	12SC7	G	5634	5633	E
1635	6Y7	G			
			5651	0A3	G
1642	2C21	G			
			5654	6AK5WA	G
1644	12L8	G		5595	E
				6096	E
2050	2051	E		6AJ5	G
				6AK5	G
2051	2050	E		5591	G
				6096	E
5187	6V6	G			
			5670	2C51	G
5517	CK1013	E		5670WA	E

RECEIVING TUBE SUBSTITUTIONS

5670WA-5840

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
5670WA	5670	G	5749	6BA6W	E
			(contd.)	6661	E
5672	5678	G			
5678	5672	G	5750	6BE6	G
				6BE6W	E
				6660	E
5691	6SL7	E			
			5751	12AX7	G
5692	6SN7	G		5751WA	E
	6180	E		6057	G
	6SN7WGTA	E		12DF7	G
5693	6SJ7WGT	E	5751WA	12AX7	G
	6SJ7	E		5751	G
				6057	G
5702	5784	G			
	5702WA	E	5755	6SU7	G
				6SU7WGT	E
5703	5703WA	E		6188	E
5725	6AS6	G	5762	7C24	G
	6AS6W	E			
	6187	E	5784	5702	G
				5784WA	G
5726	6AL5	G			
	6AL5W	E	5812	2E30	G
	6058	E			
	6097	G	5814	12AU7	G
	6663	E		5814WA	E
5727	2D21	G	5824	25B6	E
	2D21W	E		25L6	E
				6046	G
5732	6K7	G			
			5840	5899	G
5744	5744WA	E		5900	G
				5901	G
5749	6BA6	G			
(contd.)	6660	E			

5844-6057

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
5844	6J6	G	5933	807	G
	6J6W	E			
	6099	E			
5852	6X5	G	5961	6SA7	G
	6X5WGT	E			
5871	6V6	G	5964	6J6	G
		G			
5881	6L6	E	5965	12AV7	G
	1614	E			
	1622	G			
	5932	G			
5899	5840	G	5992	6V6	G
	5901	G			
	5900	E			
5900	5840	G	5993	6X4	G
	5901	G		6X4W	E
	5899	E		6063	E
5901	5840	G	5998	6AS7	G
	5899	G			
	5900	G			
5910	1U4	G	6000	6000W	E
	G				
	G				
5915	6BE6	E	6005	6AQ5	G
	6BY6	G		6AQ5W	E
	G				
5930	2A3	G	6006	6SG7	G
	2A3W	E			
	G				
5931	5U4GB	E	6021	6BF7	G
		E		6BF7W	E
		E			
5932	6L6	G	6046	25L6	G
	5881	G		5824	G
	G				
5933	6099	E	6054	6J7	G
		E		6101	E
		E		7000	E
5934	6L6	G	6057	12AX7	G
		G		5751	G

RECEIVING TUBE SUBSTITUTIONS

6058-6185

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6058	6AL5	G	6096 (contd.)	6AK5	E
	5726	G		5654	G
	6AL5W	E	6097	6AL5	G
	6097	E		6AL5W	E
	6663	E		6058	E
6060	12AT7	G	6098	6663	E
	6201	G		6AR6	G
6063	6X4	G	6099	6AR6WA	E
	6X4W	E		6J6	G
	5993	E	6J6W	E	
6064	6AM6	G	6100	6C4	G
6066	6AT6	G		6C4W	E
			6101	6J6	G
6067	12AU7	G	6113	6SL7	G
6072	12AY7	G		6132	6CH6
6073	0A2	G	6134	6AC7	G
	0A2WA	E		6135	6C4
	6626	E	6C4W	E	
6074	0B2	G	6100	E	
	0B2WA	E	6136	6AU6	G
	6627	E		6AU6WA	E
6080	6AS7	G	6137	6SK7	G
	6336	E		6SK7W	E
6094	6AQ5	G		6SK7WA	E
	6AQ5W	E		6180	6SN7
	6005	E	5692		E
	6095	E	6185		6AG5
6096 (contd.)	6AK5W	E			
	5595	E			
	5726	G			

6187-XXL

RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6187	6AS6	G	6661	6660	E
	6AS6W	E			
	5725	E	6662	6BJ6	G
6188	6SU7	G	6663	6AL5	G
	6SU7WGT	E		6AL5W	E
	5755	E		5726	E
6189	12AU7	G	6669	6058	E
	12AU7WA	E		6097	E
				6AQ5	G
6201	12AT7	G	6677	6CL6	G
	6060	G			
6202	6X4	G	6679	12AT7	G
6265	6BH6	G	6680	12AU7	G
6485	6AH6	G	6681	12AX7	G
				12DF7	G
6550	6L6	G	7000	6J7	E
6626	0A2	G	7193	6J5	G
	0A2WA	E			
	6073	E			
6627	0B2	G	7700	6C6	E
	0B2WA	E		1603	E
	6074	E			
6660	6BA6	G	8016	1B3	G
	6BA6W	E	9001	5591	G
	5749	E		9003	G
	6661	6BH6	G	9003	5590
	6BA6	G	9001		G
(contd.)	6BA6W	E	XXFM	7X7	E
	5749	E	XXL	7A4	E

Section 2. RUGGEDIZED TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
0A2	0A2WA	E	5Y3GT	5Y3WGT	E
	6073	E		6106	E
	6626	E		6853GT	E
0A3	5651	E	6AC7	6AC7W	E
				6AC7WA	E
0B2	0B2WA	E	6AG5	6134	E
	6074	E		6AG5WA	E
	6527	E		6186	E
1B3	8016	E	6AH6	6485	E
1U4	5910	E			
2A3	2A3W 5930	E E	6AK5	6AK5W	E
				6AK5WA	E
				5595	E
				5654	E
2C21	1642	E		6096	E
2C51	5670	E	6AL5	6AL5W	E
	5670WA	E		5726	E
	6185	E		6058	E
	6385	E		6097	E
	6386	E		6663	E
2D21	2D21W	E	6AM5	6516	E
	5727	E			
3B24	3B24WA	E	6AM6	6064	E
3B28A	6277	E	6AQ5	6AQ5W	E
				6005	E
				6094	E
3C45	6130	E		6095	E
5R4GY	5R4WGY	E	6AR6	6AR6WA	E
				6098	E
5U4	5931	E		6384	E

RUGGEDIZED TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.
6AS6	6AS6W	E	6J4	6J4WA	E
	5725	E			
	6187	E	6J5	6J5WGT	E
6AS7	6080	E		7193	E
	6336	E	6J6	6J6W	E
6AT6	6066	E		5844	E
		E		6099	E
		E	6101	E	
6AU6	6AU6WA	E	6J7	6054	E
	6136	E		7000	E
6BA6	6BA6W	E	6L6	6L6WGB	E
	5749	E		5881	E
	6660	E		5932	E
	6661	E			
6BE6	6BE6W	E	6SA7	6SA7WGT	E
	5750	E	6SJ7	6SJ7WGT	E
	6660	E		5693	E
6BF7	6BF7W	E	6SK7	6SK7W	E
	6021	E		6SK7WA	E
6BH6	6065	E		6137	E
	6661	E	6SL7	6SL7WGT	E
	6BJ6	6662		E	5691
6BR7			6059	E	6SN7
	E	5692		E	
6BW6	6061	E	6SQ7	6SQ7W	E
6C4	6C4W	E		6SU7	6SU7WGT
	6100	E	5755		E
	6135	E	6188		E
6C6	7700	E	6V6	5187	E
6CH6	6132	E		5992	E

RUGGEDIZED TUBE SUBSTITUTIONS

6X4-6384

TUBE	SUB.	PERF.	TUBE	SUB.	PERF.		
6X4	6X4W	E	25Z6	25Z6WGT	E		
	5993	E		26Z5	26Z5W	E	
	6063	E			28D7	28D7W	E
6X5	6X5WGT	E	5670	6385		E	
	5852	E	5702	5702WA		E	
7A6	5679	E		5703	5703WA	E	
7C24	5762	E	5744	5744WA	E		
7F8	7F8W	E		5784	5784WA	E	
9D6	6065	E	6000	6000W	E		
12AT7	12AT7WA	E		6062	5763	E	
	6060	E			6098	6384	E
	6201	E				6106	6853
	6679	E	6384				6098
12AU7	12AU7WA	E	6384	6098	E		
	5814	E					
	5814WA	E					
	6067	E					
	6189	E					
	6680	E					
12AX7	5751	E	6384	6098	E		
	5751WA	E					
	6357	E					
	6681	E					
12AY7	6072	E	6384	6098	E		
12J5	12J5WGT	E					
	6158	E					
13D3	6158	E	6384	6098	E		
25E6	25E6WG	E					

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FOREIGN

TUBE

SUBSTITUTIONS

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Section 3. EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
1C2	1AC6	G	64ME	6CD7	G
1D13	1A3	G	AGR9950	5869	E
1F3	1T4	G	AGR9951	5870	E
1FD9	1S5	G	B36	12SN7	G
1P10	3S4 3SF	G E	B65	6SN7	G
1P11	3V4	E	B152	12AT7	G
1R5SF	1AQ5	E	B309	12AT7	G
1T4SF	1AM4	E	B319	7AN7	G
1U5SF	1AS5	E	B329	12AU7	E
3S4	3W4	E	B339	12AX7	E
5B/250A	807	E	B719	6AQ8	G
6A7E	6A7	E	BPM04	6AQ5	G
6D2	6AL5	G	C6J	5685	E
6F12	6AM6	G	D63	6H6	G
6M1	7U5G	G	D77	6AL5	E
7D9	6AM5	G	D152	6AL5	G
8D3	6AM6	G	DA90	1A3	E
30C1	8A8	G	DAC32	1H5	E
30L1	7AN7	G	DAF91	1S5	E
63ME	6U5G	G	DAF92	1U5	G

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
DAF96	1AH5	E	DK91	1R5	E
DC70	6375	G	DK92	1AC6	E
DC80	1E3	E	DK96	1AB6	E
DCC90	3A5	E	DL33	3Q5	E
DD6	6AL5	E	DL35	1C5	E
DD7	6AL5	G	DL36	1Q5	E
DDR7	6AM5	G	DL91	1S4	G
DF33	1N5	E	DL92	3S4	E
DF60	5678	E	DL93	3A4	E
DF62	1AD4	E	DL94	3V4	E
DF91	1T4	E	DL95	3Q4	E
DF92	1L4	G	DL96	3C4	E
DF96	1AF4	G	DL98	3B4	E
	1AJ4	E	DL651	CK546	E
DF651	CK549	E	DM70	1M3	G
DF904	1U4	G	DP61	6AK5	E
DH63	6Q7	G	DY30	1B3	G
DH77	6AT6	E	DY80	1X2A	G
DH149	7C6	G	E80F	6084	E
DK32	1A7	E			

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

E80L-ECH81

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
E80L	6227	E	EC70	5718 5861	G E
E81L	6686	E	EC80	6Q4	E
E83F	6689	E	EC81	6R4	E
E88CC	6929	E	EC90	6C4	E
E90CC	5929	E	EC91	6AQ4	E
E91H	6687	E	EC92	6AB4	E
E180F	6688	E	ECC33	6SN7	G
E182CC	7119	E	ECC35	6SL7	G
EA76	5647 6489	E E	ECC81	12AT7	E
EAA91	6AL5	G	ECC82	12AU7	E
EABC80	6AK8 6T8	G G	ECC83	12AX7	E
EB34	6H6	E	ECC85	6AQ8	E
EB91	6AL5	E	ECC88	6DJ8	E
EBC33	1639	G	ECC91	6J6	E
EBC81	6BD7	G	ECF80	6BL8	E
EBC90	6AT6	E	ECF82	6U8	E
EBC91	6AV6	G	ECH35	6E8 6P8G	E E
EBF80	6N8	E	ECH42	6C9	G
EBF89	6DC8	E	ECH81	6AJ8	E

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
ECL80	6AB8	E	EL33	6AG6 6M6G	E E
ECL82	6BM8	E	EL34	6CA7	G
ED2	6AL5	E	EL35	6L6G	E
EF22	7G7	E	EL37	6L6 5881	E E
EF70	6487	G	EL38	6CN6	E
EF71	5899	G	EL70	6373	G
EF72	5840	G	EL81	6CJ6	E
EF73	6488	E	EL83	6CK6	E
EF80	6BX6	E	EL84	6BQ5	E
EF85	6BY7	E	EL85	6BN5	E
EF86	6267	E	EL86	6CW5	E
EF89	6DA6	G	EL90	6AQ5	E
EF91	6AM6	E	EL91	6AM5	E
EF92	6CQ6	E	EL94	3V4	E
EF93	6BA6	E	EL620	5672	E
EF94	6AU6	G	EL821	6CH6	G
EF95	6AK5	E	ELT	6370	E
EF96	6AG5	G	EM34	6CD7	E
EH90	6CS6	E	EM35	6U5G	G
EK90	6BE6	E			

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

EM80-KK32

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
EM80	6BR5	E	GZ30	5Z4	E
EM81	6DA5	E	GZ31	5U4G	E
EN32	6574	E	GZ32	5V4	E
EN70	5643	E	GZ34	5AR4 5U4	E G
EN91	2D21	E	H52	5U4	G
EN92	5696	E	H63	6F5	E
EN93	6D4	E	HBC90	12AT6	E
EQ80	6BE7	E	HBC91	12AV6	G
EY51	6X2	E	HD14	1H5	G
EY70	5641	G	HD30	3B4	E
EY80	6U3	E	HF93	12BA6	E
EY81	6R3	E	HF94	12U6	G
EY84	6374	E	HK90	12BE6	E
EY86	6S2	E	HL90	19AQ5	E
EZ35	6X5	E	HL92	50C5	E
EZ80	6V4	E	HM04	6BE6	E
EZ81	6BW4 6CA4	E E	HY90	35W4	E
EZ90	6X4	E	KF35	1E5	E
FG95	5560	E	KK32	1C7 1D7	G G

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
KL35	1F5	G	N147	6AG6	G
KT32	25L6	G	N148	7C5	G
KT61	6AG6	G	N152	21A6	G
KT63	6F6	G	N329	16A5	G
	6J7	G			
KT66	6L6	E	N359	21A6	G
	5881	E			
N709			N709	6BQ5	G
KT71	50L6	E	N727	6AQ5	E
KT81	7C5	G	PABC80	9AK8	E
KTW63	6K7	G	PCC84	7AN7	E
L63	6J5	G	PCC85	9AQ8	E
L77	6C4	E	PCF80	8A8	G
				9A8	E
LN152	6AB8	G	PCF82	9U8	E
LZ319	8A8	G	PCL82	16A8	E
N14	1C5	G	PL21	2D21	E
N17	3S4	E	PL81	21A6	E
N18	3Q4	E	PL82	16A5	E
N19	3V4	E	PL83	15A6	E
N77	6AM5	E	PY80	19X3	E
N78	6BJ5	E	PY81	17Z3	E
N144	6AM5	E	PY82	19Y3	E
	6AN5	G			

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS QQV03-10-Z63

EUR.	AMER.	PERF.	EUR.	AMER.	PERF.
QQV03-10	6360	G	VFT6	6U5G	E
QQV03-20A	6252	G	W17	1T4	E
QQV03-28	6252	G	W63	6K7	G
QV05-25	807	G	W77	6065	E
R52	5Z4G	E	W149	7B7	G
SP6	6AM6	E	W179	6BY7	G
TD03-10	5861	G	W727	6BA6	E
U50	5Y3	G	X14	1A7	G
U52	5U4	G	X17	1R5	E
U70	6X5	G	X18	1AC6	E
U78	6X4	E	X63	6A8	G
U147	6X5	G	X79	6AE8	E
U149	7Y4	G	X81	7S7	G
U154	19Y3	G	X148	7S7	G
U319	19Y3	G	X727	6BE6	E
UBC41	14L7	E	Y61	6U5	E
UCH42	14K7	E	Y63	6U5G	G
UF41	12AC5	E	Z14	1N5	G
UL84	45B5	E	Z63	6J7	G
V2M70	6X4	G			

Z77-ZD17

EUROPEAN-AMERICAN TUBE SUBSTITUTIONS

EUR.	AMER.	PERF.
Z77	6AM6 6064	G E
Z152	6BX6	G
Z179	6BX6	G
Z719	6BX6	E
Z803U	6779	E
ZD17	1S5	E

Section 4. AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.
0A2	150C2	E	1B3	DY30 UF41	G E
0A4	Z300T	E	1C5	DL35 N14	E G
0B2	108C1	G	1C7	KK32	G
0D3	150C3	E	1D7	KK32	G
0E3	85A1	E	1E3	DC80	E
0G3	85A2	E	1E5	KF35	G
1A3	DA90 1D13	E G	1F5	KL35	G
1A7	DK32 X14	E G	1H5	DAC32 HD14	E G
1AB6	DK96	E	1L4	DF92	G
1AC6	DK92 X18 1C2	E E E	1M3	DM70	G
1AD4	DF62	E	1N5	DF33 Z14	E G
1AF4	DF96	G	1Q5	DL36	E
1AH5	DAF96	E	1R5	DK91 X17 1C1	E E E
1AJ4	DF96	E	1S4	DL91	G
1AM4	1T4SF	E	1S5	DAF91 ZD17 ZD19 1FD9	E E G E
1AQ5	1R5SF	E			
1AS5	1U5SF	E			

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.	
1T4	DF91	E	5U4	GZ34	G	
	W17	E		H52	G	
	1F3	E		U52	G	
1U4	DF904	G	5U4G	GZ31	E	
1U5	DAF92	G	5V4	GZ32	E	
1X2A	DY80	G	5Y3	U50	G	
2D21	EN91	E	5Z4	GZ30	E	
	PL21	E		5Z46	R52	E
3A4	DL93	E	6A7	6A7E	E	
3A5	DCC90	E	6A8	X63	G	
	DL99	G		6AB4	EC92	E
3B4	DL98	E	6AB8	ECL80	E	
	HD30	E		LN152	G	
3C4	DL96	E	6AE8	X79	E	
3Q4	DL95	E	6AG5	EF96	G	
	N18	E		6AG6	EL33	E
3Q5	DL33	E		KT61	G	
				N147	G	
				6AJ8	ECH81	E
3S4	DL92	E	6AK5	DP61	E	
	N17	E		EF95	E	
	1P10	E		6AK8	EABC80	E
	3V4	EL94		E	5AR4	GZ34
DL94	E					
N19	E					
1P11	E					
3W4	3S4-SF	E				

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

6AL5-6CA7

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.	
6AL5	D77	E	6BD7	EBC81	E	
	DD6	E		6BE6	EK90	E
	DD7	G			HM04	E
	D152	G	X727		E	
	EAA91	G	6BE7		EQ80	E
	EB91	E		6BJ5	N78	E
	6D2	G			6BL8	ECF80
6AM5	DDR7	E	6BM8	ECL82		E
	EL91	E		6BN5		EL85
	N77	E			6BQ5	EL84
	N144	G	N709	G		
	7D9	E	6BR5	EM80		E
6AM6	EF91	E		6BW4	EZ81	E
	SP6	E			6BX6	EF80
	Z77	G	Z152	G		
	6F12	G	Z179	G		
	8D3	E	Z719	E		
6AQ4	EC91	E	6BY7	EF85	E	
				W179	G	
6AQ5	BPM04	E	6C4	EC90	E	
	EL90	E		L77	E	
	N727	E		6C9	ECH42	E
6AQ8	B719	G	6CA4		EZ81	E
	ECC85	E			6CA7	EL34
6AT6	DH77	E	6AU6	EF94		G
	EBC90	E		6AV6		EBC91
6BA6	EF93	E			6BA6	EF93
	HM04	E	HM04			E
	W727	E	W727	E		

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.
6CD7	EM34	E	6J7	KT63	G
	64ME	E		Z63	G
6CH6	EL822	G	6K7	KTW63	G
6CJ6	EL81	E		W63	G
6CK6	EL83	G	6L6	EL37	E
				KT66	E
6CN5	EL86	E	6L66	EL35	E
6CN6	EL38	E	6M6G	EL33	E
6CQ6	EF92	E	6N8	EBF80	E
6CS6	EH90	E	6P8G	ECH35	E
6CW5	EL86	G	6Q4	EC80	E
6D4	EN93	E	6Q7	DH63	G
6DA5	EM81	E	6R3	EY81	E
6DC8	EBF89	E	6R4	EC81	E
6DJ8	ECC88	E	6S2	EY86	E
6E8	ECH35	E	6SL7	ECC35	G
6F5	H63	E		6SN7	B65
			ECC33		G
6F6	KT63	G	6T8	EABC80	G
6H6	EB34	E		6U3	EY80
	D63	G			
6J5	L63	G	6U5	EM35	E
				Y61	E
6J6	ECC91	E	(contd.)	Y63	E

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

6U5-14L7

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.	
6U5 (contd.)	6M1	E	8A8	LZ319	G	
	63ME	E		PCF80	G	
6U5G	VFT6	E	9A8	30C1	G	
	Y63	E		PCF80	E	
	6M1	E		9AK8	PABC80	E
	63ME	E				
6U8	ECF82	E	9AQ8	PCC85	E	
6V4	EZ80	E	9U8	PCF82	E	
6X2	EY51	E	12AC5	UF41	E	
6X4	EZ90	E	12AT6	HBC90	E	
	U78	E				
6X5	EZ35	E	12AT7	B152	G	
	U147	G		B309	G	
	U70	G		ECC81	E	
7AN7	B319	G	12AU6	B329	E	
	PCC84	E		HF94	G	
	30L1	G	12AU7	ECC82	E	
7B7	W149	G	12AV6	HBC91	G	
7C5	KT81	G	12AX7	B339	E	
	N148	G		ECC83	E	
7C6	DH147	E	12BA6	HF93	E	
	DH149	G				
7G7	EF22	E	12BE6	HK90	E	
		E	12SN7	B36	G	
7S7	X81	G	14K7	UCH42	E	
	X148	G				
7Y4	U149	G	14L7	UBC41	E	

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

AMER.	EUR.	PERF.	AMER.	EUR.	PERF.
15A6	PL83	E	5560	FG95	E
16A5	N329	G	5641	EY70	G
	PL82	E	5643	EN70	E
16A8	PCL82	E	5647	EA76	E
17Z3	PY81	E	5672	EL620	E
19AQ5	HL90	E		DL620	G
19X3	PY80	E	5678	DF60	G
19Y3	PY82	E	5685	C6J	E
	U154	G	5718	EC70	G
	U319	G	5840	EF72	G
21A6	N152	G	5861	EC70	E
	N359	G		TD03-10	G
	PL81	E	5869	AGR9950	E
25L6	KT32	G	5870	AGR9951	E
35W4	HY90	E	5899	EF71	G
45B5	UL84	E	5920	E90CC	E
50C5	HL92	E	6064	Z77	G
50L6	KT71	E	6065	W77	G
CK546	DL651	E	6084	E80F	E
CK549	DF651	E	6085	E80CC	E
807	QV05-25	G	6227	E80L	E
	5/3250A	E			
1639	EBC33	G			

AMERICAN-EUROPEAN TUBE SUBSTITUTIONS

6252-7119

AMER.	EUR.	PERF.
6252	QQV03-28	G
6267	EF86	E
6360	QQV03-10	G
6370	ELT	E
6373	EL70	G
6374	EY84	E
6375	DC70	G
6487	EF70	G
6488	EF73	E
6489	EA76	E
6574	EN32	E
6686	E81L	E
6687	E91H	E
6688	E180F	E
6689	E83F	E
6779	Z803U	E
6922	E88CC	E
7119	E182CC	E