KDD 1 Class B output valve

The KDD 1 is, in effect, two triodes housed in a single envelope; it is intended for use in Class B output circuits operating with grid current and, in conjunction with a suitable driver valve, it will deliver 2.2 W without too much drain on the H.T. battery. The valve is of a type that requires no grid bias; without bias, grid current flows during almost the whole of the cycle of grid signal, thus avoiding any sudden surges of grid current in the secondary winding of the transformer, which would produce severe distortion of a very unpleasant character by reason of the clearly audible higher harmonics.

When there is no signal on the grid the anode current is extremely low, being only about 3 mA for the two anodes together, on 135 V; the current becomes appreciable only when the signal is applied. Consumption of anode current is roughly proportional to the alternating grid voltage, which means that a considerable saving may be effected, since the average current is much less than with maximum excitation. It is also possible to relieve the drain on the H.T. battery somewhat by turning down the receiver volume control to a low level. With a signal present on the grid, grid current flows in both of the triodes, and the driver valve must be capable of supplying the input required to load the valve fully.

The construction of the grid is such that grid current is limited to a minimum, whilst ensuring the greatest economy and sensitivity in the driver stage.

A suitable driver transformer, of ratio 2 : (1 + 1), should be used with the KDD 1 and the optimum matching impedance between anodes will in this case be 10,000 ohms.
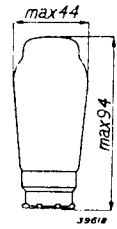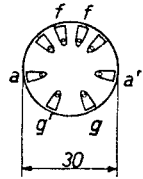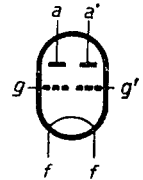

Fig. 1
Dimensions in mm

Fig. 2
Arrangement of electrodes and base connections.

FILAMENT RATINGS

Heating: direct by battery; parallel supply.

Filament voltage. . . . . $V_f = 2.0$ V
Filament current. . . . . $I_f = 0.22$ A

OPERATING DATA

Anode voltage	V_a	$= 90$ V	135 V
Grid voltage	V_g	$= 0$	0 V
Anode current (without signal)	I_{ao}	$= 2 \times 0.8$	2×1.5 mA
Anode current at max. modulation	$I_{a\,max}$	$= 2 \times 8.5$	2×14 mA
Output power at max. modulation	W_o	$= 0.72$ [1]	2.0 W [1]
Load resistor between anodes	R_{aa}	$= 10,000$	10,000 ohms
Alternating grid voltage of the driver valve . . .	V_i	$= 1.5$ [1]	1.9 V_{eff} [1]
Total distortion	d_{tot}	$= 6$ [1]	10 % [1]

[1] Measured with KC 3 as driver: transformation ratio 2 : (1 + 1).

MAXIMUM RATINGS PER SYSTEM

Anode voltage	V_a	$=$ max. 150 V
Anode dissipation ($V_i = 0$)	W_a	$=$ max. 0.35 W
Anode dissipation ($W_o =$ max.).	W_a	$=$ max. 1.5 W
Direct current per anode (average value)	I_a	$=$ max. 20 mA

TABLE
VALVES KC 3 + KDD 1

| Ratio of driver transformer $\dfrac{\text{prim. wdg.}}{1/2 \text{ sec. wdg.}}$	$\dfrac{5}{3} = \dfrac{1.67}{1}$					$\dfrac{2}{1}$					$\dfrac{7}{3} = \dfrac{2.33}{1}$				
Load resistor between anodes (ohms) R_{aa}	5,000	7,500	10,000	15,000	20,000	5,000	7,500	10,000	15,000	20,000	5,000	7,500	10,000	15,000	20,000
Max. output power (W) (limited by grid current of KC 3)	1.8	2.2	2.2	2.2	1.9	1.6	2.0	2.2	2.1	1.8	1.5	1.8	2.0	2.0	1.8
Distortion with that output (%)	10	11	13	19	22	7.2	8.2	10	15	20	5	5.7	8.0	13	18
Combined anode current of both anodes (mA) with that output	35	32	32	24	20	33	30	28	23	19	31	29	27	22	19
Alternating grid voltage V_i for 50 mW output (sensitivity) (V_{eff})	0.31	0.26	0.22	0.19	0.17	0.35	0.29	0.25	0.22	0.20	0.39	0.32	0.29	0.25	0.22
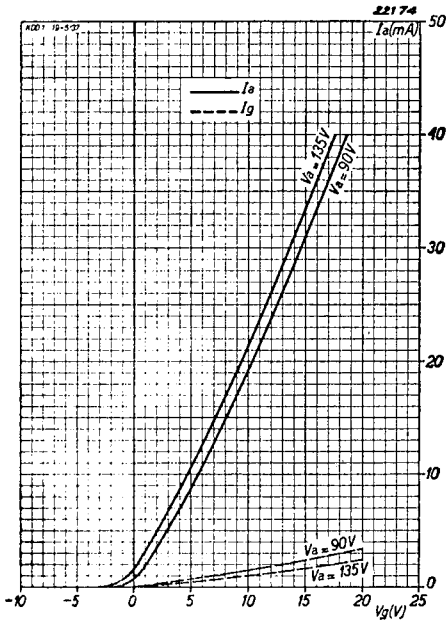
Fig. 3
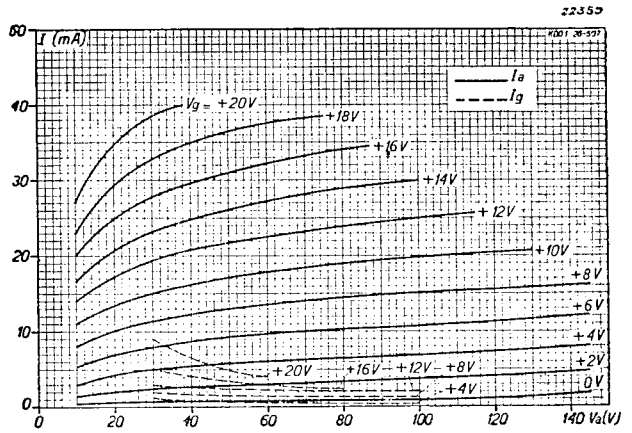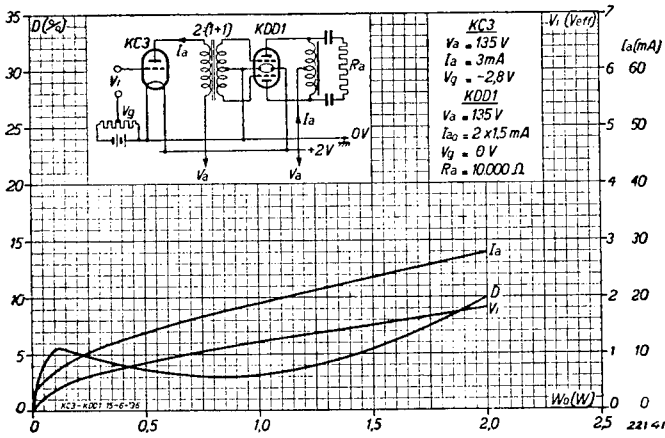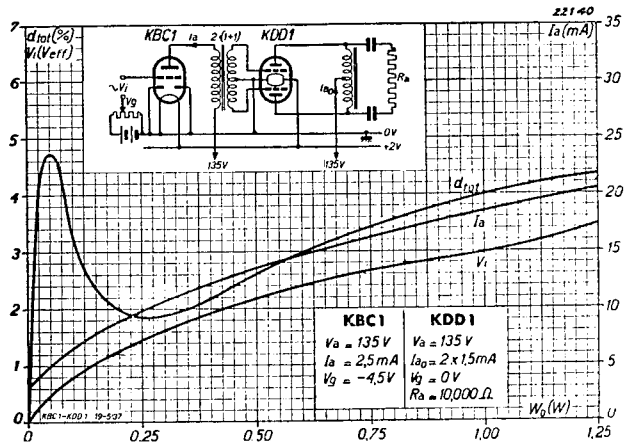Anode current and grid current as functions
of the grid voltage.

Fig. 4
Anode current and grid current as functions of the anode voltage,
with grid voltage as parameter.

Fig. 5
Anode current, alternating grid voltage and total distortion d_{tot} as
functions of the output power of the KDD 1 for an anode voltage
of 135 V, using the KC 3 as driver valve.

Fig. 6
Anode current, alternating grid voltage and total distortion d_{tot} as
functions of the output power of the KDD 1 for an anode voltage
of 135 V, using the KBC 1 as driver valve.