Comments

1. Type 6J7 (with published g_m = 1225 μmhos) has less distortion than type 6SJ7 (with published g_m = 1650 μmhos) under the same conditions.

The distortion for a given output voltage increases when a valve is replaced by another having higher mutual conductance, although there are also differences between valve types having approximately the same mutual conductance.

2. Load resistance R_L = 0.1 megohm provides lower distortion than higher values of load resistance.

3. The distortion under any given conditions decreases when the resistance of the following grid resistor is increased.

Comparison between triode and pentode

[Refer Sect. 2(ix)]

The comparison is based on intermodulation distortion with type 6SJ7 as both triode and pentode, having R_L = 0.25 and R_g = 1.0 megohm (Fig. 12.16A). Generally similar results are obtained with type 6J7 and with other load resistances (Ref. B8).

1. At the level used in the first a-f stage in a typical receiver (E_0 = 10 volts r.m.s.) the pentode gives only about one eighth of the intermodulation distortion given by a triode, when both are adjusted for minimum distortion.

2. The two curves in Fig. 12.16A cross, and the intermodulation distortion is therefore the same for both triode and pentode, at about 31 r.m.s. volts output.

3. At higher output voltages the pentode gives the greater intermodulation distortion, the ratio being 2.3 : 1 at 63 r.m.s. volts output.

4. The pentode, to give the minimum value of distortion, requires fairly critical adjustment. Under the working conditions recommended in this section, however, the distortion with a pentode is likely to be less than with a general-purpose triode at output voltages up to about 20 volts r.m.s.

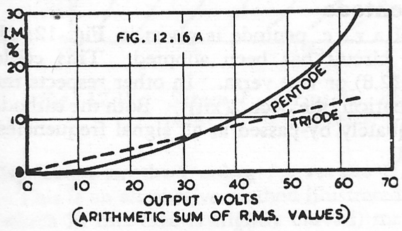

Fig. 12.16A. Intermodulation distortion for type 6SJ7 with E_{bb} = 250 volts, R_L = 0.25 $M\Omega$, R_g = 1.0 $M\Omega$, in both triode and pentode operation.

(x) Conversion factors with r.c.c. pentodes

(A) **The mutual conductance** may be derived from published data (generally plotted against E_{c1}) or if these are not available then it may be calculated as for triodes, Sect. 2(x). See also values quoted for 6J7 and 6SJ7 in (vii) above.

(B) **The plate resistance** may be estimated by the following method from published data. The usual data are for either equal plate and screen voltages (e.g. 100 V) or for 250 V and 100 V respectively. Unfortunately there is no general rule for calculating the effect of a change of plate voltage on the plate resistance, and the accuracy obtainable by graphical means is very poor. However, as some sort of guide, the plate resistance of type 6SJ7 is increased about twice, and of type 6J7 about 2.75 times, for a change from 100 to 250 volts on the plate, with 100 volts on the screen and − 3 volts grid bias.

The plate resistance of a r.c.c. pentode may vary from slightly below the published value at $E_b = E_{c2}$ = 100 volts, to 6 or 8 times this value, depending on the load resistance and value of K. Typical values for types 6J7 and 6SJ7 are given below [see also table in (vii) above] :

R_L = 0.1 megohm $\quad r_p$ = 0.6 to 2.1 megohms
R_L = 0.25 megohm $\quad r_p$ = 1.6 to 3.7 megohms
R_L = 0.5 megohm $\quad r_p$ = 3.0 to 6.0 megohms
for K = 0.78 to 0.55 respectively.