

## VAPOUR COOLED R.F. POWER TRIODE

| QUICK REFERENCE DATA |               |               |               |               |               |               |                         |               |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------------|---------------|
| Frequency<br>(MHz)   | C telegraphy  |               | C anode mod.  |               | B telephony   |               | AF class B<br>Two tubes |               |
|                      | $V_a$<br>(kV) | $W_o$<br>(kW) | $V_a$<br>(kV) | $W_o$<br>(kW) | $V_a$<br>(kV) | $W_o$<br>(kW) | $V_a$<br>(kV)           | $W_o$<br>(kW) |
| 10                   | 15            | 360           |               |               |               |               | 12                      | 450           |
| 30                   | 12            | 285           | 11            | 165           | 10            | 60            | 10                      | 400           |
|                      |               |               | 10            | 135           | 8             | 50            | 8                       | 300           |
|                      |               |               | 8             | 110           | 6             | 35            | 6                       | 200           |

**HEATING:** direct by A.C. or D.C.; filament thoriated tungsten

Filament voltage  $V_f$  = 18 V

Filament current  $I_f$  = 280 A

### CAPACITANCES

Grid to filament  $C_{gf}$  = 240 pF

Anode to filament  $C_{af}$  = 7.5 pF

Anode to grid  $C_{ag}$  = 120 pF

### TYPICAL CHARACTERISTICS

Anode voltage  $V_a$  = 4 kV

Anode current  $I_a$  = 5 A

Amplification factor  $\mu$  = 55

Mutual conductance  $S$  = 130 mA/V

### TEMPERATURE LIMITS (Absolute limits)

Bulb temperature  $t$  = max. 180 °C

Seal temperature  $t$  = max. 180 °C

**COOLING**

Cooling data for anode dissipation  $W_a = 180 \text{ kW}$

Total dissipation to be transferred by cooling system

$$(W_a + W_g + 0.8 W_f)$$

188 kW

equivalent to

2700 kcal/min

Volume of produced vapour

at back flow water temperature of  $20^\circ\text{C}$

7.3  $\text{m}^3/\text{min}$

at back flow water temperature of  $90^\circ\text{C}$

8.3  $\text{m}^3/\text{min}$

Amount of back flowing water

at back flow water temperature of  $20^\circ\text{C}$

4.4 l/min

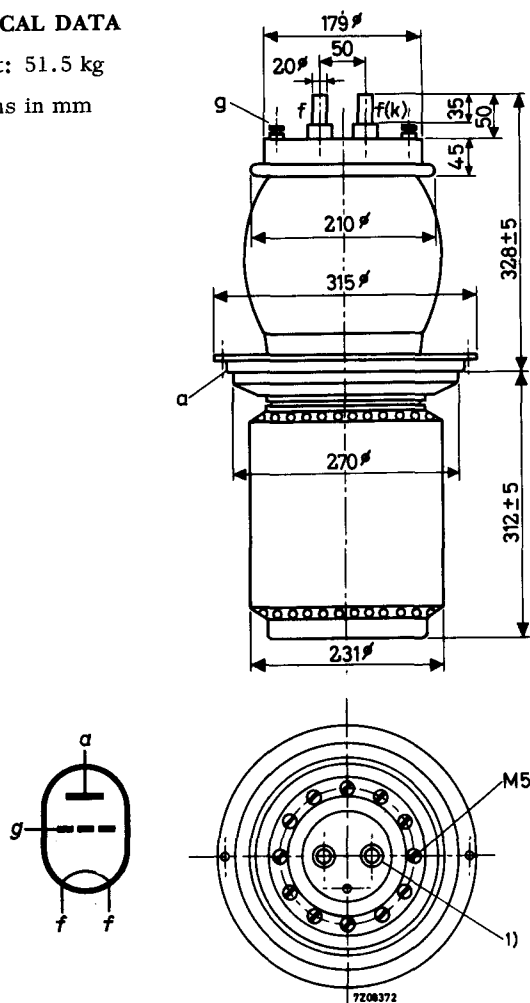
at back flow water temperature of  $90^\circ\text{C}$

5.1 l/min

## MECHANICAL DATA

Net weight: 51.5 kg

Dimensions in mm



Mounting position: vertical with anode down

## ACCESSORIES

Vapour cooling system K729

Filament connectors with cable 40667

<sup>1)</sup> This pin should be used for connecting the anode return lead

**R.F. CLASS C TELEGRAPHY**
**LIMITING VALUES (Absolute limits)**

| Frequency             | f      | up to  | 10   | up to | 30   | MHz |
|-----------------------|--------|--------|------|-------|------|-----|
| Anode voltage         | $V_a$  | = max. | 15   |       | 12   | kV  |
| Anode dissipation     | $W_a$  | = max. | 180  |       | 180  | kW  |
| Negative grid voltage | $-V_g$ | = max. | 1200 |       | 1200 | V   |
| Grid dissipation      | $W_g$  | = max. | 4    |       | 4    | kW  |
| Anode current         | $I_a$  | = max. | 33   |       | 33   | A   |
| Grid current          | $I_g$  | = max. | 8    |       | 8    | A   |

**OPERATING CONDITIONS**

|                      |          |   |      |      |      |      |     |
|----------------------|----------|---|------|------|------|------|-----|
| Frequency            | f        | = | 10   | 10   | 30   | 30   | MHz |
| Anode voltage        | $V_a$    | = | 15   | 15   | 12   | 12   | kV  |
| Grid voltage         | $V_g$    | = | -520 | -800 | -480 | -720 | V   |
| Anode current        | $I_a$    | = | 29.3 | 24.7 | 29.3 | 24.7 | A   |
| Grid current         | $I_g$    | = | 5.4  | 5.2  | 5.9  | 5.5  | A   |
| Peak driving voltage | $V_{gp}$ | = | 1090 | 1370 | 1050 | 1290 | V   |
| Driving power        | $W_{dr}$ | = | 5.5  | 6.6  | 5.7  | 6.6  | kW  |
| Anode input power    | $W_{ia}$ | = | 440  | 371  | 353  | 296  | kW  |
| Anode dissipation    | $W_a$    | = | 80   | 61   | 68   | 51   | kW  |
| Output power         | $W_o$    | = | 360  | 310  | 285  | 245  | kW  |
| Efficiency           | $\eta$   | = | 81.8 | 83.5 | 80.8 | 82.6 | %   |

## R.F. CLASS C ANODE MODULATION

## LIMITING VALUES (Absolute limits)

| Frequency             | f      | up to  | 30   | MHz |
|-----------------------|--------|--------|------|-----|
| Anode voltage         | $V_a$  | = max. | 11   | kV  |
| Anode dissipation     | $W_a$  | = max. | 120  | kW  |
| Negative grid voltage | $-V_g$ | = max. | 1000 | V   |
| Grid dissipation      | $W_g$  | = max. | 4    | kW  |
| Anode current         | $I_a$  | = max. | 22   | A   |
| Grid current          | $I_g$  | = max. | 8    | A   |

## OPERATING CONDITIONS

|                      |           |   |      |      |      |          |
|----------------------|-----------|---|------|------|------|----------|
| Frequency            | f         | = | 30   | 30   | 30   | MHz      |
| Anode voltage        | $V_a$     | = | 11   | 10   | 8    | kV       |
| Grid voltage         | $V_g$     | = | -170 | -140 | -100 | V        |
| Grid resistor        | $R_g$     | = | 40   | 44   | 33   | $\Omega$ |
| Anode current        | $I_a$     | = | 19   | 17.3 | 18   | A        |
| Grid current         | $I_g$     | = | 7.4  | 6.9  | 7.6  | A        |
| Peak driving voltage | $V_{gp}$  | = | 1000 | 930  | 855  | V        |
| Driving power        | $W_{dr}$  | = | 7.1  | 6.0  | 6.0  | kW       |
| Anode input power    | $W_{i_a}$ | = | 209  | 173  | 144  | kW       |
| Anode dissipation    | $W_a$     | = | 44   | 38   | 34   | kW       |
| Output power         | $W_o$     | = | 165  | 135  | 110  | kW       |
| Efficiency           | $\eta$    | = | 79   | 78   | 76.5 | %        |
| Modulation depth     | m         | = | 100  | 100  | 100  | %        |
| Modulation power     | $W_{mod}$ | = | 105  | 87   | 72   | kW       |

## R.F. CLASS B TELEPHONY

## LIMITING VALUES (Absolute limits)

| Frequency             | f      | up to 10   | up to 30 | MHz |
|-----------------------|--------|------------|----------|-----|
| Anode voltage         | $V_a$  | = max. 15  | 12       | kV  |
| Anode dissipation     | $W_a$  | = max. 180 | 180      | kW  |
| Negative grid voltage | $-V_g$ | = max. 800 | 800      | V   |
| Grid dissipation      | $W_g$  | = max. 4   | 4        | kW  |
| Anode current         | $I_a$  | = max. 27  | 27       | A   |
| Grid current          | $I_g$  | = max. 8   | 8        | A   |

## OPERATING CONDITIONS

|                      |          |        |      |      |     |
|----------------------|----------|--------|------|------|-----|
| Frequency            | f        | = 30   | 30   | 30   | MHz |
| Anode voltage        | $V_a$    | = 10   | 8    | 6    | kV  |
| Grid voltage         | $V_g$    | = -150 | -115 | -82  | V   |
| Anode current        | $I_a$    | = 17   | 18.2 | 17.9 | A   |
| Grid current         | $I_g$    | = 0.8  | 1.2  | 1.5  | A   |
| Peak driving voltage | $V_{gp}$ | = 338  | 338  | 321  | V   |
| Driving power        | $W_{dr}$ | = 0.25 | 0.36 | 0.43 | kW  |
| Anode input power    | $W_{ia}$ | = 170  | 146  | 108  | kW  |
| Anode dissipation    | $W_a$    | = 110  | 96   | 73   | kW  |
| Output power         | $W_o$    | = 60   | 50   | 35   | kW  |
| Efficiency           | $\eta$   | = 35.3 | 34.3 | 32.6 | %   |
| Modulation depth     | m        | = 100  | 100  | 100  | %   |
| Grid current         | $I_g$    | = 5.9  | 6.8  | 7.2  | A   |
| Driving power        | $W_{dr}$ | = 3.6  | 4.1  | 4.1  | kW  |

## A.F. CLASS B AMPLIFIER AND MODULATOR

## LIMITING VALUES (Absolute limits)

|                       |        |   |          |    |
|-----------------------|--------|---|----------|----|
| Anode voltage         | $V_a$  | = | max. 12  | kV |
| Anode dissipation     | $W_a$  | = | max. 180 | kW |
| Negative grid voltage | $-V_g$ | = | max. 800 | V  |
| Grid dissipation      | $W_g$  | = | max. 4   | kW |
| Anode current         | $I_a$  | = | max. 33  | A  |
| Grid current          | $I_g$  | = | max. 8   | A  |

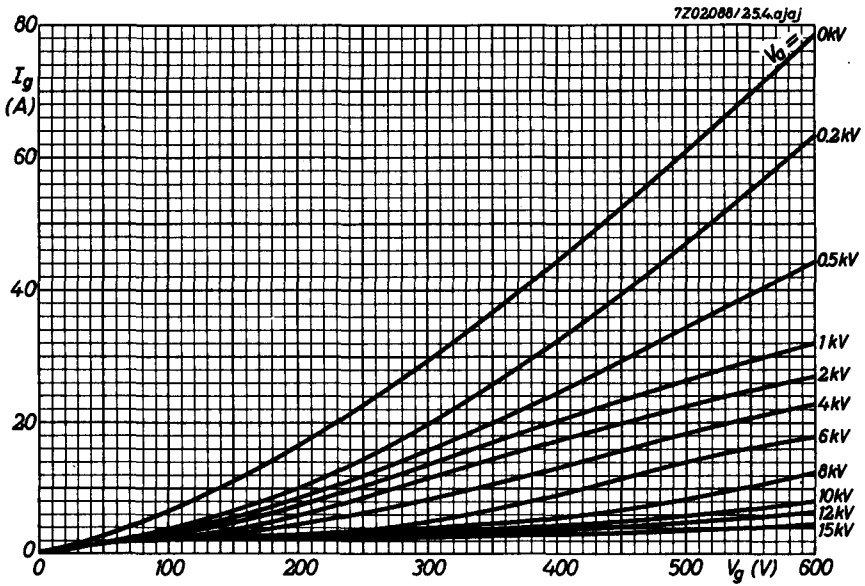
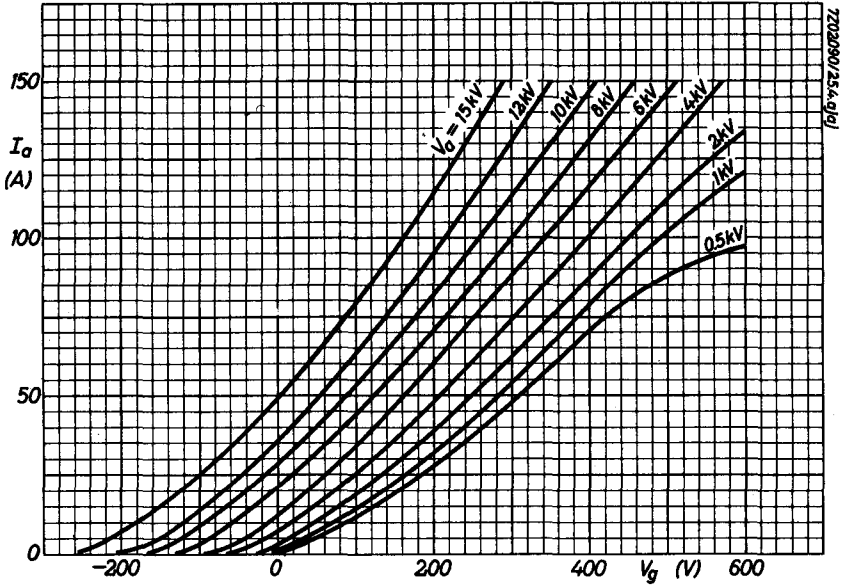
## OPERATING CONDITIONS (Two tubes in push-pull)

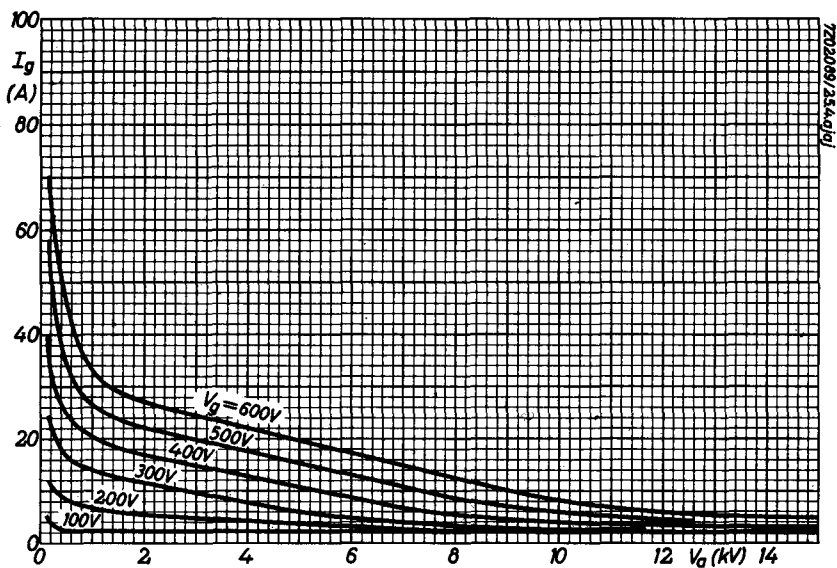
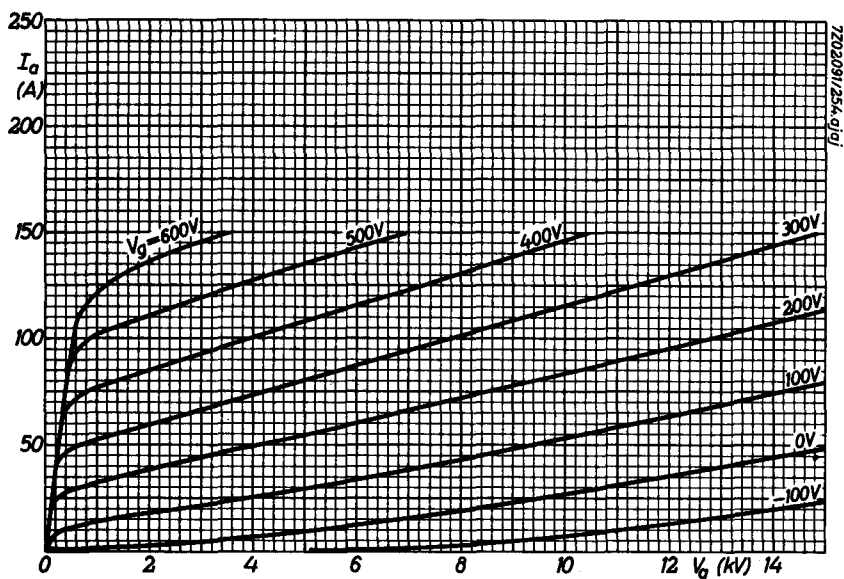
|                      |                 |   |            |            |          |
|----------------------|-----------------|---|------------|------------|----------|
| Anode voltage        | $V_a$           | = | 12         | 10         | kV       |
| Grid voltage         | $V_g$           | = | -180       | -150       | V        |
| Load resistance      | $R_{aa\sim}$    | = | 552        | 410        | $\Omega$ |
| Peak driving voltage | $V_{g\dot{g}p}$ | = | 0 1210     | 0 1205     | V        |
| Anode current        | $I_a$           | = | 2x2.0 2x26 | 2x1.8 2x28 | A        |
| Average grid current | $I_g$           | = | 0 2x4.4    | 0 2x4.8    | A        |
| Peak grid current    | $I_{gp}$        | = | 0 2x23     | 0 2x24     | A        |
| Driving power        | $W_{dr}$        | = | 0 2x2.4    | 0 2x2.6    | kW       |
| Anode input power    | $W_{i_a}$       | = | 2x24 2x312 | 2x18 2x280 | kW       |
| Anode dissipation    | $W_a$           | = | 2x24 2x87  | 2x18 2x80  | kW       |
| Output power         | $W_o$           | = | 0 450      | 0 400      | kW       |
| Efficiency           | $\eta$          | = | - 72       | - 71.4     | %        |

## A.F. CLASS B AMPLIFIER AND MODULATOR

## OPERATING CONDITIONS (Two tubes in push-pull; continued)

|                      |              |   |              |             |          |
|----------------------|--------------|---|--------------|-------------|----------|
| Anode voltage        | $V_a$        | = | 8            | 6           | kV       |
| Grid voltage         | $V_g$        | = | -115         | -82         | V        |
| Load resistance      | $R_{aa\sim}$ | = | 338          | 268         | $\Omega$ |
| Peak driving voltage | $V_{ggp}$    | = | 0 1110       | 0 990       | V        |
| Anode current        | $I_a$        | = | 2x1.6 2x27   | 2x1.4 2x25  | A        |
| Average grid current | $I_g$        | = | 0 2x5.0      | 0 2x4.9     | A        |
| Peak grid current    | $I_{gp}$     | = | 0 2x24       | 0 2x22      | A        |
| Driving power        | $W_{dr}$     | = | 0 2x2.5      | 0 2x2.2     | kW       |
| Anode input power    | $W_{ia}$     | = | 2x12.8 2x216 | 2x8.4 2x150 | kW       |
| Anode dissipation    | $W_a$        | = | 2x12.8 2x66  | 2x8.4 2x50  | kW       |
| Output power         | $W_o$        | = | 0 300        | 0 200       | kW       |
| Efficiency           | $\eta$       | = | - 69.5       | - 67        | %        |





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