

# PHOTOMULTIPLIER TUBES

| TYPE NO. | Min. Useful Photocathode Diameter (mm) | Number of Stages | Base         | Maximum Spectral Response (Angstroms) | Resolution C s-137 | Minimum Photocathode Sensitivity ( $\mu\text{A/lm}$ )                                | Average Photocathode Sensitivity ( $\mu\text{A/lm}$ ) | Minimum Anode Sensitivity (A/lm) | For a Supply Voltage of (V) | Minimum Gain at 1800 V |
|----------|----------------------------------------|------------------|--------------|---------------------------------------|--------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|-----------------------------|------------------------|
| 152AVP   | 14                                     | 10               |              | 4200                                  |                    | 25                                                                                   | 40                                                    | 30                               | 1800                        | $5 \times 10^6$        |
| 50 AVP   | 32                                     | 11               | duodecal     | 4200                                  |                    | 25                                                                                   | 50                                                    | 60                               | 1800                        | —                      |
| 51 UVP   | 32                                     | 11               | duodecal     | 4000                                  |                    | 25                                                                                   | 50                                                    | 60                               | 1800                        | —                      |
| 52 AVP   | 20                                     | 10               | spec. 13 pin | 4200                                  |                    | 15                                                                                   | 30                                                    | 15                               | 1800                        | —                      |
| 53 AVP   | 44                                     | 11               | diheptal     | 4200                                  |                    | 25                                                                                   | 50                                                    | 60                               | 1800                        | —                      |
| 53 UVP   | 44                                     | 11               | diheptal     | 4000                                  |                    | 25                                                                                   | 50                                                    | 60                               | 1800                        | —                      |
| 54 AVP   | 111                                    | 11               | diheptal     | 4200                                  |                    | 25                                                                                   | 50                                                    | 100                              | 1800                        | —                      |
| 55 AVP   | 44                                     | 15               | bidecal      | 4200                                  |                    | 25                                                                                   | 50                                                    | —                                | —                           | $10^8$                 |
| 56 AVP   | 42                                     | 14               | bidecal      | 4200                                  |                    | —                                                                                    | 50                                                    | —                                | —                           | $10^8$                 |
| 57AVP    | 200                                    | 11               | diheptal     | 4200                                  |                    |                                                                                      |                                                       | 60                               | 1800                        | $5 \cdot 10^6$         |
| 58AVP    | 110                                    | 14               | bidecal      | 4200                                  |                    | —                                                                                    | 50                                                    | —                                | 3000                        | $> 10^8$               |
| 150 CVP  | 32                                     | 10               |              | 8000                                  |                    | —                                                                                    | 20                                                    | 100                              | 1800                        | $5 \cdot 10^6$         |
| 153 AVP  |                                        | 11               | diheptal     |                                       | $< 9\%$            | For all other characteristics, see 53 AVP                                            |                                                       |                                  |                             |                        |
| XP1010   |                                        |                  |              |                                       | $< 9\%$            | Selected for low noise and resolution.<br>For all other characteristics, see 150 AVP |                                                       |                                  |                             |                        |
| XP1030   | 63.5                                   | 10               |              | 4200                                  |                    | 40                                                                                   | 60                                                    | 100                              | 1800                        | $4 \times 10^6$        |
| XP1031   | 63.5                                   | 10               |              | 4200                                  | $< 9\%$            | 40                                                                                   | 70                                                    | 100                              | 1800                        | $4 \times 10^6$        |

INSTRUCTIONS FOR USE — To take full advantage of the possibilities offered by the Amperex photomultipliers and to insure a long life of the tubes, the following rules must be observed.

| Voltage distribution                          | A <sup>1</sup> | B          |
|-----------------------------------------------|----------------|------------|
| Between D <sub>1</sub> and PK                 | $1.5 V_0^2$    | $2 V_0^2$  |
| Between D <sub>2</sub> and D <sub>1</sub>     | $V_0^3$        | $V_0^3$    |
| Between D <sub>3</sub> and D <sub>2</sub>     | $V_0$          | $V_0$      |
| Between D <sub>n-3</sub> and D <sub>n-4</sub> | $V_0$          | $V_0$      |
| Between D <sub>n-2</sub> and D <sub>n-3</sub> | $V_0$          | $1.25 V_0$ |
| Between D <sub>n-1</sub> and D <sub>n-2</sub> | $V_0$          | $1.5 V_0$  |
| Between D <sub>n</sub> and D <sub>n-1</sub>   | $V_0$          | $1.75 V_0$ |
| Between anode and D <sub>n</sub>              | $0.75 V_0$     | $2 V_0$    |

<sup>1</sup>When the supply voltage is low, special attention has to be paid to the fact that the voltage between photocathode and dynode No. 1 may never be less than 180 V and that the voltage between the other electrodes may never drop below 80 V. (With the tubes 50 AVP and 51 UVP between D<sub>3</sub> and D<sub>1</sub> at least 160 V.)

<sup>2</sup>In case of gamma-spectrometry this must be between 2 and  $3V_0$ .

<sup>3</sup>With the tubes 50 AVP and 51 UVP between D<sub>3</sub> and D<sub>1</sub>:  $2V_0$ .

<sup>4</sup>n means last dynode i.e.:

n = 10 for the 150 AVP and 52 AVP

n = 11 for the 50 AVP, 51 UVP, 53 AVP, 53 UVP and 54 AVP

n = 14 for the 56 AVP

n = 15 for the 55 AVP

## COUNTING, SELECTING and INDICATING TUBES

| TYPE NO.          | FILAMENT |       | Maintaining Voltage (V)                               | at Cathode Current ( $\mu$ a)                                                 | Maximum Counting Rate (KC) | Bias (V)                                  | Minimum A-K Ignition Voltage (V) |  |
|-------------------|----------|-------|-------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------|-------------------------------------------|----------------------------------|--|
|                   | Volts    | Amps  |                                                       |                                                                               |                            |                                           |                                  |  |
| 6370/E1T          | 6.3      | 0.3   | —                                                     | —                                                                             | 100                        | —                                         | —                                |  |
| 6977 <sup>1</sup> | 1.0      | 0.3   | Anode: 50 DC                                          | Zero light output at 3.5 grid volts.<br>Maximum light output at 0 grid volts. |                            |                                           |                                  |  |
| ET51              | 6.3      | 0.3   | T:100<br>S: 100                                       | T:5.5<br>S: 1.0                                                               | 1,000                      | +25 V (Grid)                              |                                  |  |
| Z303C             | —        | —     | 186 to 196                                            | 300                                                                           | 4                          | +35 Guide<br>- 20 Cath.                   | —                                |  |
| Z502S             | —        | —     | 186 to 196                                            | 300                                                                           | 4                          | +35 Guide<br>- 20 Cath.                   | —                                |  |
| Z503M             | —        | —     | 108                                                   | 60                                                                            | —                          | —                                         | 129                              |  |
| Z550M             | —        | —     | 82                                                    | 3 ma                                                                          | —                          | Fires on 5 V above common starter voltage |                                  |  |
| NF00649           | 24       | 0.125 | Small, compact, selective, digital indicator (Green)  |                                                                               |                            |                                           |                                  |  |
| NF00650           | 24       | 0.125 | Small, compact, selective, digital indicator (Orange) |                                                                               |                            |                                           |                                  |  |

<sup>1</sup>Available to Military Specifications.