



engineering data service

SYLVANIA

VG1A

MECHANICAL DATA

Mounting Position	Any
Envelope	Pyrex Glass
Bulb	See Outline Drawing

ELECTRICAL DATA

Filament Voltage	3 to 7.5 V
Filament Current	3.5 to 5 A
Grid Voltage	+150 V
Grid Current	5 mA
Collector Voltage	-25 V

DESCRIPTION:

In the hot filament ionization gauge, such as the SYLVANIA type VG1A, the electrons emitted from a heated filament in the sensing tube are accelerated toward a positively charged cylindrical grid. Some electrons pass into the space between the grid and a negatively charged collector and collide with gas molecules from the vacuum system to produce positive ions. The positive ions are then collected on the negative collector. At a constant voltage and emission current, the number of positive ions formed is proportional to the pressure below 1×10^{-3} mm mercury and the strength of the ion current on the collector is indicated on a microammeter calibrated in units of pressure. Inasmuch as pressure indication is linear, the hot filament gauge is generally considered the most accurate continuous indication for pressures below 1×10^{-3} mm of mercury.

ADVANTAGES:

1. Hot filament gauges are highly sensitive, read to very low pressures and have a broad range.
2. Scales are linear.
3. The sensing tubes can be easily degassed.

SENSITIVITY:

With all due precautions in degassing, voltage supply, leakage, etc., the sensitivity of the VG1A tube for air falls between 90 and 125 microamperes per micron Hg. A good average value for pressure below one micron is 100 microamperes per micron. Electrode potentials and grid currents other than standard may be used. Sensitivity is directly proportional to grid current but, for maximum tube life, grid currents should be kept low, particularly at pressures above 0.1 micron.

DEGASSING:

For lower pressure measurements (under 1×10^{-5} mm Hg) the tube must be degassed. A current of 7 amperes supplied through a special pair of leads for a few minutes degasses the spiral grid, and a flame touched to the hard-glass envelope outgasses the collector, which consists of a thin internal coating connected by a unique crack-resistant, glass-to-metal seal. The large diameter of the VG1A tubulation also helps reduce inaccuracies due to gas evolution.

INSTALLATION:

An open tubulation is required for installation, but a closed tube is supplied by Sylvania to protect the electrodes against contamination before installation. This tubulation can either be sealed directly to any Pyrex glass system or can be supplied on request with a glass-to-metal seal or ground joint for other types of connection. Normally, the tube is installed in a vertical position, but it can be operated in any position without sagging of the electrodes. The VG1A is also available with $\frac{3}{4}$ inch tubulation and/or long insulated leads terminating in a Jones plug.

QUICK REFERENCE DATA

A hot filament ionization gauge used to measure pressures down to 10^{-7} mm of mercury.



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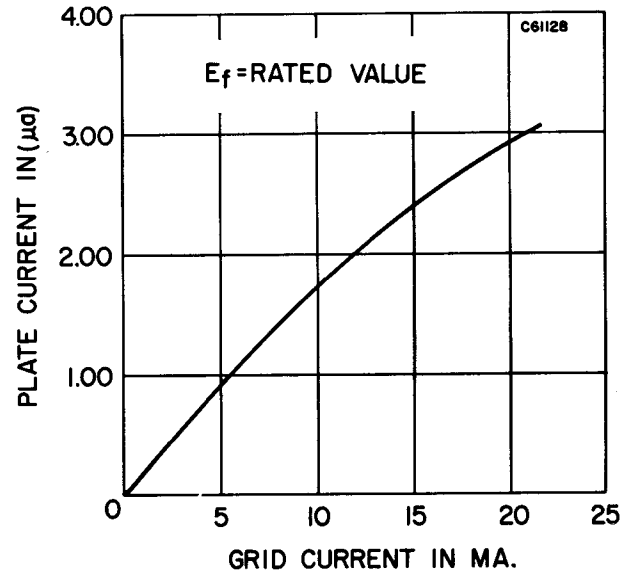
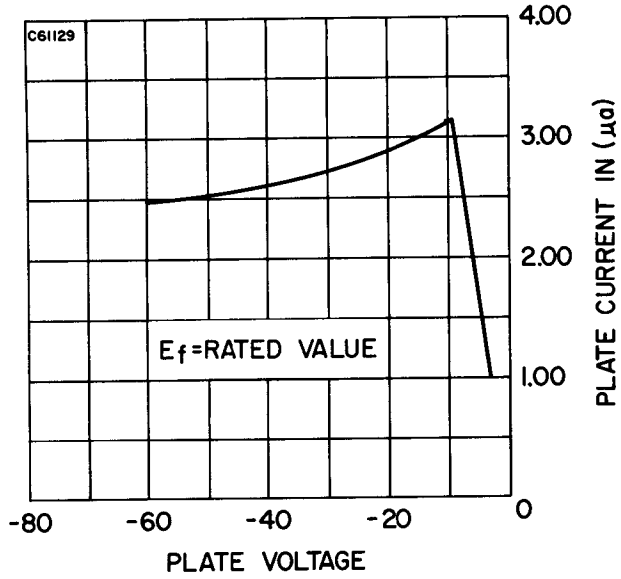
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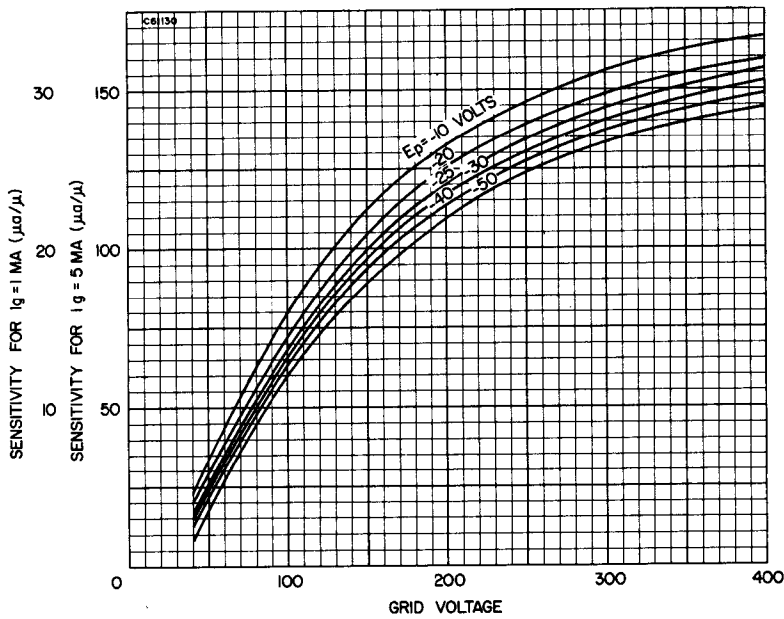
PAGE 1 OF 2

File Under
SPECIAL PURPOSE
ELECTRONIC TUBES

AVERAGE PLATE CHARACTERISTICS



PRESSURE SENSITIVITY



OUTLINE

