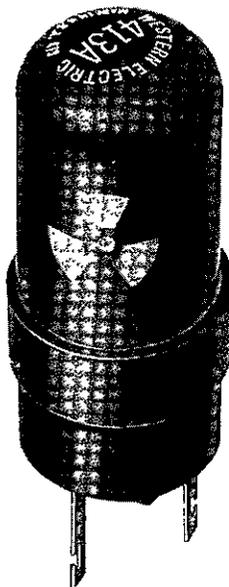


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ELECTRON TUBE DATA SHEET  
WESTERN ELECTRIC 413A ELECTRON TUBE



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DESCRIPTION

The 413A is a two-electrode inert-gas-filled cold cathode tube having a high current rating. In addition to its initial field of use in telephone message register circuits it is especially suitable also for use in control circuits such as in switching or pulse counting apparatus.

MAXIMUM RATINGS

Forward or Inverse Average Cathode Current . . . . .	20	200 milliamperes
Average Life, Approximate. . . . .	10000	10 hours

MAXIMUM RATINGS, Absolute Values

Cathode Current <sup>1</sup>	
Peak, Forward or Inverse . . . . .	200 milliamperes
Average, Forward or Inverse . . . . .	70 milliamperes
Averaging Time . . . . .	2 seconds
Ambient Temperature Limits . . . . .	-55 to +65 centigrade

ELECTRICAL DATA, Throughout Life

	<u>Min.</u>	<u>Bogey</u>	<u>Max.</u>
Anode Breakdown Voltage			
Forward . . . . .	180	200	255 volts
Inverse . . . . .	180	200	--- volts
Anode Voltage Drop, Forward or Inverse . . . . .	55	62	75 volts
Ionization Time <sup>2</sup> . . . . .	---	1	--- millisecond
Deionization Time, Approximate . . . . .	---	2	--- milliseconds

MECHANICAL DATA

Mounting Position . . . . .	Any
Net Weight, Approximate . . . . .	1.2 ounces
Dimensions and pin connections shown in outline drawing on page 3.	

Note 1: Sufficient resistance must be used in series with the tube to assure that the electrode currents do not exceed their maximum rated values.

Note 2: With 15 volts overvoltage (15 volts above anode breakdown voltage) when tube is in total darkness.

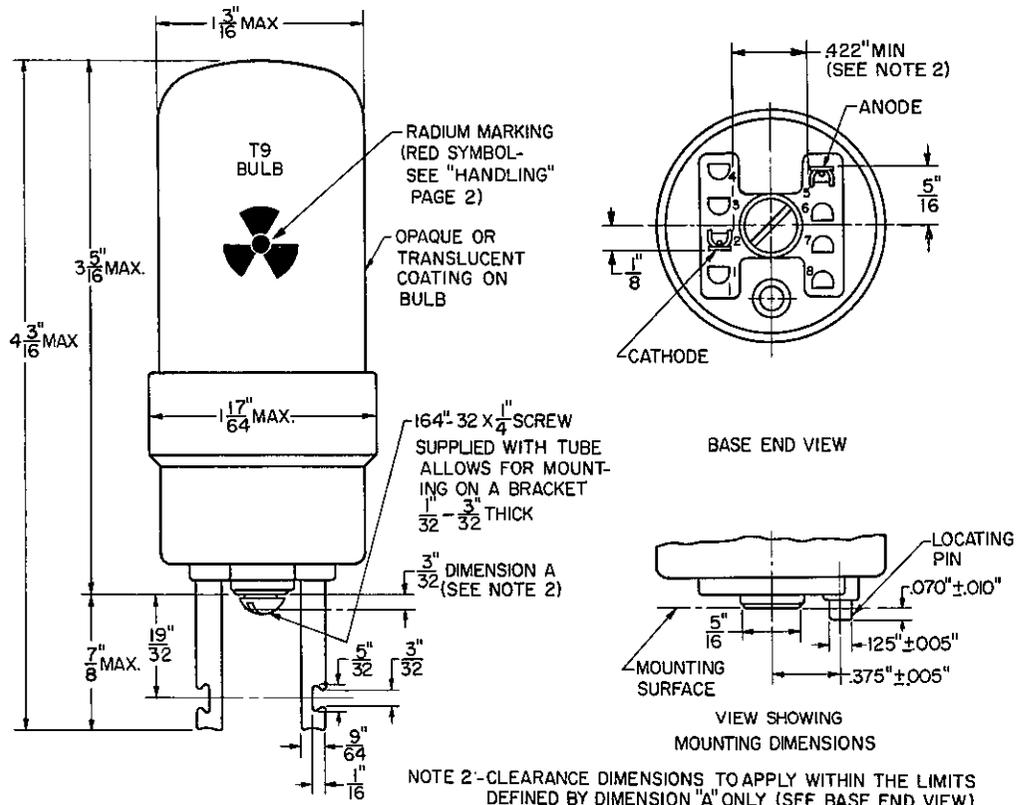
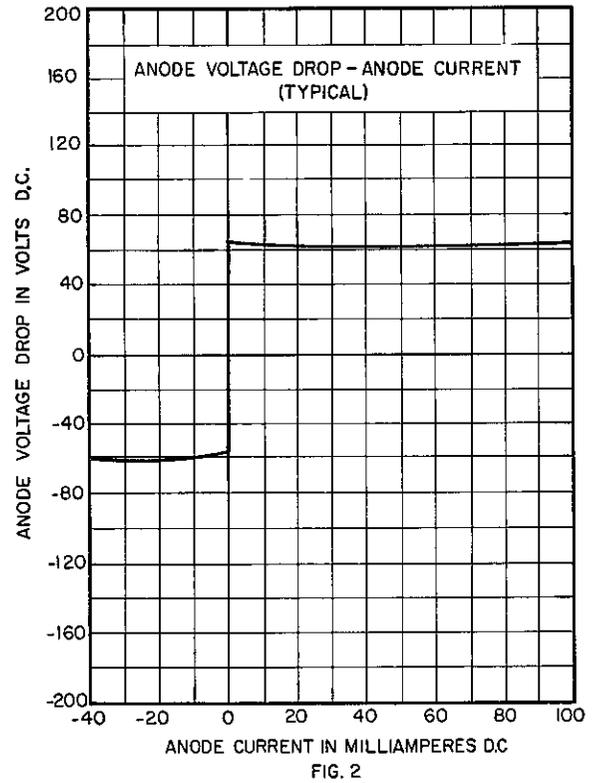
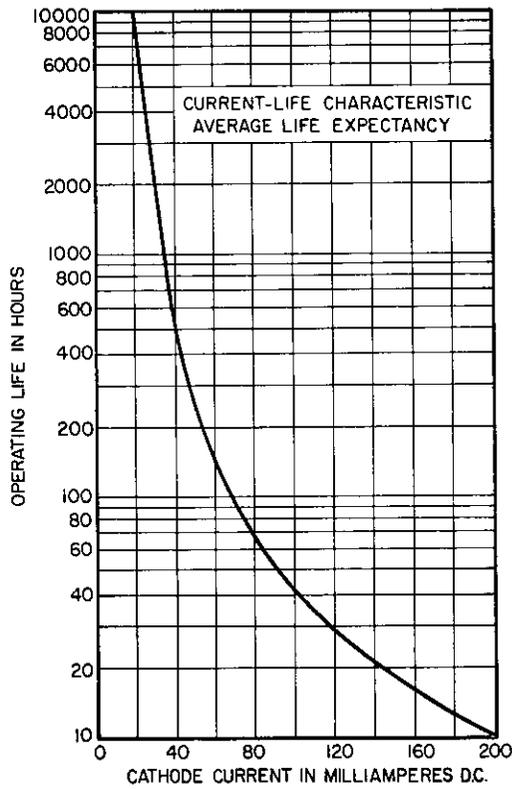
HANDLING

Western Electric cold cathode tubes contain a minute amount of radium bromide which is a radioactive material. The amount in most types is too small to require any special care in use, handling or disposal.

A few types contain a larger quantity of radium bromide in which the radium approximates that found on a luminous watch dial. These types bear a red three-bladed propeller-shaped symbol on the tube envelope. Instructions for handling such tubes are given below and also in Bell System Practices for Central Office maintenance.

Installations ordinarily require no precautions against radiation. However, quantities of the tubes should not be so installed, or so stored outside the shipping carton, that they will be within a few inches of personnel or in proximity to photographic film for extended periods of time. For example, however, a 40-hour week exposure at about one (1) foot from a bank of 500 tubes (covering an area of 20 inches x 45 inches) is well within the accepted tolerance limits for personnel. Reasonable care should be exercised in handling and disposal of broken tubes. In general, attention should be given to the following:

- (a) Avoid breathing dust or vapors from broken tubes.
- (b) Avoid contacting broken parts with bare hands.
- (c) Use wet rag to pick up broken parts. Wrap broken parts in rag and tie securely so as to form a package. Thoroughly wash hands after disposal.
- (d) Dispose of broken or defective tubes as they are taken out of service. One or two tubes at a time may be disposed of with normal waste material. Accumulation of tubes in one concentrated area of the place of final disposition should be avoided.



# *Western Electric*

A development of Bell Telephone Laboratories, the research laboratories of the American Telephone and Telegraph Company and the Western Electric Company.