



ELECTRONIC TUBE REFERENCE

1946

Specialized - Gauge Tube electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
GAUGE

Thermocouple vacuum-gauge tube designed for measuring gas pressure in vacuum systems, with approximately five-ohm thermocouple resistance.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1 V / 70 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Gauge

No fixed ratings recorded.

Thermocouple vacuum-gauge tube with approximately 5-ohm thermocouple resistance.

1946 — Thermocouple Vacuum-Gauge Tube

A thermocouple-type vacuum-gauge tube designed for the determination of gas pressures in vacuum systems and vacuum enclosures.

Overview

The **1946** is a specialized thermocouple-type vacuum-gauge tube. Unlike standard thermionic valves, this device operates on thermoelectric principles to measure the thermal conductivity of residual gases, providing a direct electrical indication of vacuum levels within a system or enclosure.

Construction and Physical Dimensions

The 1946 is constructed with a hard glass envelope made of Corning Code 772 Nonex glass. This material provides the necessary thermal and mechanical stability required for direct connection to high-vacuum systems. The physical interface to the vacuum system is made via a tubulation with a diameter of 3/8 inches.

The physical dimensions of the tube are as follows:

- **Maximum Length:** 6-1/4 inches (excluding the flexible leads)
- **Maximum Diameter:** 1-1/16 inches
- **Tubulation Diameter:** 3/8 inches

The tube is designed to be versatile in its installation, permitting mounting in **any operating position**.

Electrical and Heater Characteristics

The internal structure of the 1946 contains a heater element and an integrated thermocouple. The electrical connections are made via four flexible leads extending from the device:

- Two leads are dedicated to the heater (H, H).
- Two leads are dedicated to the thermocouple (TC, TC).

The electrical ratings and characteristics of these elements are:

Parameter	Value
Heater Voltage	1.0 V
Heater Current	0.07 A
Thermocouple Resistance (Approximate)	5,

During operation, the device must be kept within its thermal limits. The maximum rated ambient temperature is **50 °C**.

Gas Pressure Ranges and Sensitivity

The 1946 is calibrated to detect gas pressures across specific ranges, operating on the principle that the thermal conductivity of the gas changes with pressure, which in turn alters the temperature of the heater and the corresponding voltage generated by the thermocouple.

The tube's pressure measurement capabilities are categorized into two sensitivity ranges:

Useful Sensitivity Range

The device can detect and measure pressures across a broad span:

- **In Microns of Hg:** 1000 to 0.1 Microns of Hg

- **In Millimeters of Hg:** 1 to 10^{-4} mm of Hg

Greatest Sensitivity Range

The region where the device exhibits its highest resolution and response is:

- **In Microns of Hg:** 1000 to 1 Microns of Hg
- **In Millimeters of Hg:** 1 to 10^{-3} mm of Hg

Technical Summary

The **1946** is a specialized thermocouple vacuum-gauge tube housed in a Corning Code 772 Nonex hard glass envelope. Operating with a low-power 1.0 V, 0.07 A heater and featuring an approximate 5-ohm thermocouple, it provides reliable pressure measurements in vacuum systems. With four flexible leads for electrical connection and a 3/8-inch tubulation, it can be mounted in any position. It is capable of measuring gas pressures down to 10^{-4} mm of Hg (0.1 Microns of Hg), with its greatest sensitivity concentrated between 1 and 10^{-3} mm of Hg (1000 to 1 Microns of Hg), up to a maximum operating ambient temperature of 50 °C.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 RCA Industrial and Communications Types

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1960 RCA INDUSTRIAL AND COMMUNICATIONS TYPES

Section 1 · Gauge

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Useful pressure upper	1000 micron Hg	—
Useful pressure lower	0.1 micron Hg	—
Closest sensitivity upper	1 mm Hg	—
Closest sensitivity lower	0.0001 mm Hg	—