

BELL SYSTEM PRACTICES
Station Installation and Maintenance

ADDENDUM C31.122
Issue 1, June, 1954
AT&T Co Standard

SUBSCRIBER SETS

CONTAINING COLD CATHODE GAS-FILLED VACUUM TUBES

1. GENERAL

1.01 This addendum supplements Section C31.122, Issue 5. It is issued to bring information contained in paragraphs 2.05, 3.01, 3.03, 3.04, and 3.05 up to date and to add 2.07.

2. SUBSCRIBER SETS

2.05 Change to read as follows: The 425- and 426-type vacuum tubes and their associated mounting brackets may be added to metal or wooden sets having 1000-, 1400-, or 1500-ohm ringers. Sets with 1000-ohm ringers do not, however, provide as satisfactory a margin for operating the tripping relays in central offices as is provided by the 1400- or 1500-ohm ringers. The use of subscriber sets with vacuum tubes is subject to further limitations included in Section C63.252, Ringer Connection Limitations, Polarized Ringing Lines.

2.07 Add paragraph as follows: Where a loud ringing bell is required, use a 592C subscriber set containing a 359A tube.

3. VACUUM TUBES

3.01 Change to read as follows: The 426-type tube has three elements consisting of three electrodes: a cathode, a starter anode, and an operating anode. It contains a mixture of neon and other inert gases at low pressure. The cathode is coated with material that facilitates electron emission and, hence, ionization of the gas, which furnishes a path for current flow to the starter anode or operating anode.

3.03 Change to read as follows: The gaps between the electrodes are practically an open circuit at voltages below a value called the breakdown point. Voltages above this value will cause ionization of the gases, permitting current flow through the tube. As used in the subscriber set, one of the control electrodes is always used as a cathode and the other is used as a starter anode to secure breakdown or ionization. This occurs in the control gap (see Fig. 4) of the tubes at potentials of 65- to 85-volts. A resistance of 120,000 ohms is connected in series with the starter anode to limit the current in the control gap to a value sufficient to ionize the gas. Ionization permits current to flow across the main gap through the ringer coils to ground, thus operating the ringer. If the tube were not first fired through the control gap to the starter anode, a minimum instantaneous value of about 180 volts would be required to break down the main gap.

3.04 Change to read as follows: Once the gas becomes ionized and a current carrying path is established, there is a "sustaining voltage" of 58- to 72-volts maintained in the control gap. In the main gap, a "sustaining voltage" of 63- to 75-volts is also maintained.

3.05 Change to read as follows: Both the starter anode and the operating anode are smaller and less emissive than the cathode so that both the control and main gap pass current more readily when the starter anode or operating anode are positive. In the usual operating range for this tube, it will pass only about 1/10 as much current when the anode is negative as it will when the anode is positive.