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Tube Tips

A NEWSLETTER TO THE BROADCASTING INDUSTRY
RCA ELECTRON TUBE DIVISION, HARRISON, N. J.

Plate-Water-Course Inspection And Cleaning for 6448 and 6806

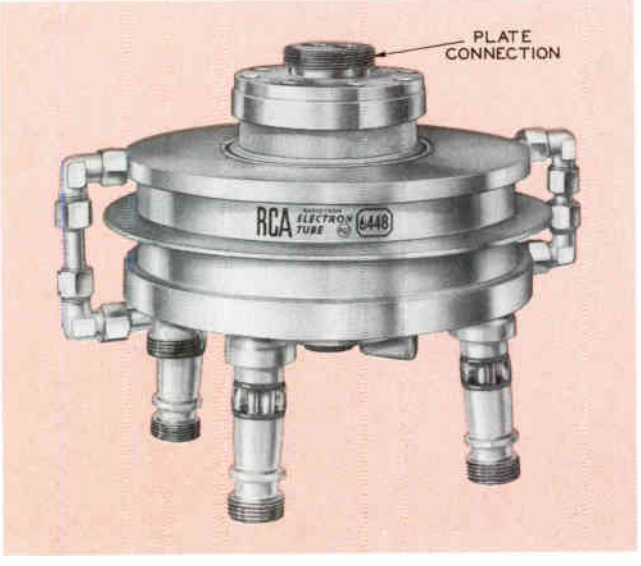
In the August issue of TUBE TIPS, television broadcasters were furnished information concerning the water purity requirements for water utilized in the cooling of the beam power tube types RCA-6448 and the RCA-6806.

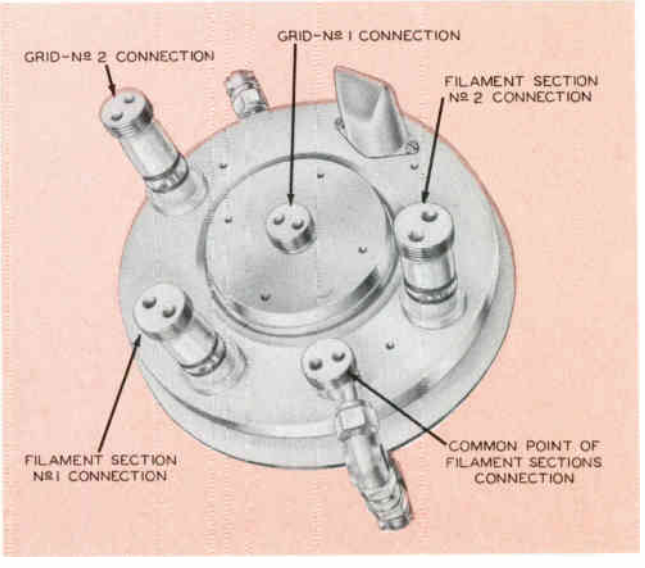
A practical indication of water-system performance is the condition of the plate water course in the 6448 and the 6806. It should be inspected after the first 200 hours of operation, and should be cleaned when necessary. Thereafter, inspections can be scheduled less frequently depending on the quality of the water.

To inspect the plate water course in the types 6448 and 6806 (types with 8 screws on plate terminal): (1) Remove the 8 screws from the plate terminal. Lift the plate-water-terminal assembly carefully out of the tube. This assembly should come out easily. Should sticking occur, due to excessive deposit build-up, clean the plate water course—as outlined in the cleaning procedure described below—before further attempting to remove the assembly. (2) Remove the O-ring from the moat. (3) Inspect the ribbed internal structure of the plate water course with the aid of a convenient light source to determine if there is a flaky or adherent deposit on the structure. If a deposit is observed, it should be removed. Such a deposit generally consists of copper oxide (usually black) which can be removed by the following cleaning procedure.

To clean the plate water course: (1) Prepare a solution of pure citric acid powder in distilled water using 250 grams of citric acid per liter of water (or two pounds per gallon). (2) Support the tube in the wooden tray in which it was shipped so that the plate terminal faces up. Fill the plate water course of the tube with the citric-acid solution (about ½-pint is required). (3) Allow the plate water course to soak for a period of 10 to 12 hours or until clean. (4) Pour the solution from the plate water course. (5) Allow tap water to flow at a moderate rate into the plate water course and out of the course over the sides of the tube. This flow should continue for at least 15 minutes to provide a thorough rinse for the plate water course. (6) Rinse the plate water course thoroughly—several times—with distilled or demineralized water. (7) Replace the O-ring in the moat. Orient the plate-water-terminal assembly so that it is in its original position (refer to dimensional outline of the tube for orientation) and then seat it. Replace the eight screws. Tighten the screws in succession until snug.

To inspect and clean the plate water course for the types 6448 and 6806 (with no screws on the plate terminal): (1) Prepare a solution of pure citric acid in distilled water using 250 grams of citric acid per liter of water (or two pounds per gallon). (2) Support the





tube in the wooden tray in which it was shipped so that the plate terminal faces up. Using a small funnel inserted in one of the plate water holes, fill the plate water course of the tube with citric-acid solution (about ½-pint is required). (3) Allow the plate water course to soak for about 10 to 12 hours. (4) Pour the solution from the plate water course. The color of this solution is an indication of the condition of the plate water course. A blue-green color indicates that a substantial amount of deposit has been dissolved. Lack of color or only a faint greenish tint indicates that the water course is satisfactorily clean. (5) Wash the plate water course thoroughly by allowing tap water to flow at a moderate rate into one of the plate water holes and out of the other for at least 15 minutes. (6) If the color of the solution at step 4 indicates a substantial deposit, repeat steps 3, 4, and 5 until the solution at step 4 has only a faint greenish tint. (7) Rinse the plate water course thoroughly—several times—with distilled or demineralized water.

Be sure to follow the correct inspection and cleaning procedure for your specific type of 6448 and 6806. In the first procedure described above, the plate water terminal is held in place by eight screws and is removable; in the second inspection and cleaning procedure, the plate water terminal is *not* removable.

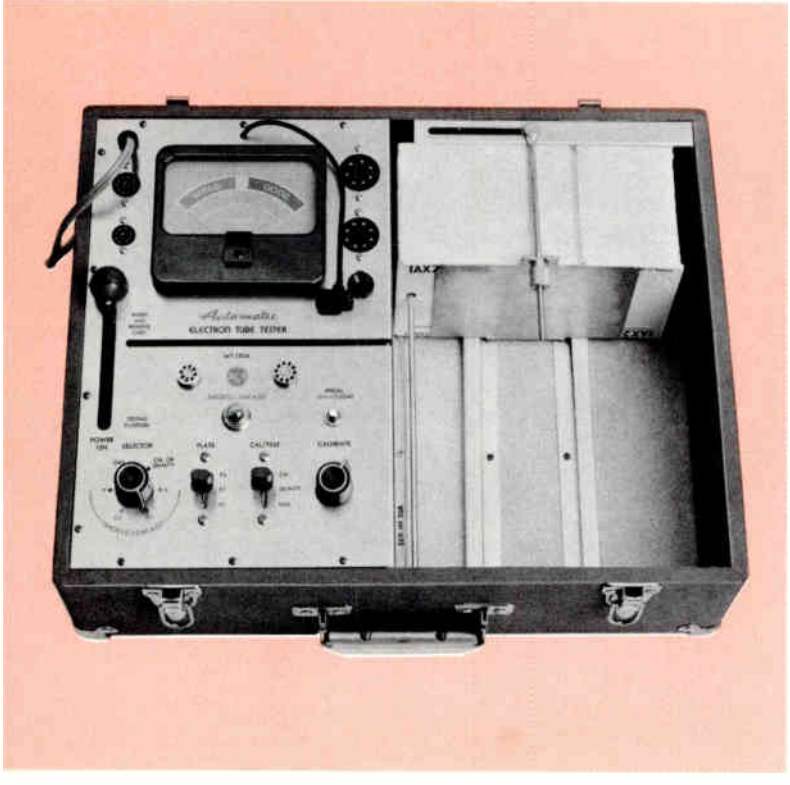
Other water courses of each of the above tube types can be cleaned with a citric-acid solution prepared in the manner described. Soaking, washing, and rinsing should be carried out exactly as described for the plate water course in the types 6448 and 6806 which have no screws on the plate terminal.

Should the plate water course require cleaning more frequently than every 500 hours, analysis of the system is recommended. A properly operating system should not require cleaning more often than every 1000 hours of tube operation. Time spent in maintenance of a properly designed system should be reflected in reduced operating costs as a result of greatly increasing the life of these beam power tube types.

New WT-110A Automatic Tube Tester Announced

Radio and television broadcast engineers should be interested in the new portable WT-110A *Automatic* Electron Tube Tester which is capable of testing a wide variety of receiving-type tubes. The new tube tester provides the important achievement of simplified, accurate, and rapid tube analysis in a lightweight, self-contained tube testing unit.

The WT-110A will check receiving-tube types for interelectrode shorts and leakage, for gas condition, and for general quality. The general quality test is based on measurement of the transconductance of the tube. Readings are provided in terms of "Renew-?-Good" on a 4½-inch meter. The gas condition of the tube is also indicated on the meter.



An outstanding feature of the WT-110A is the use of an individual pre-punched computer-type information card for each different tube type. When the card is inserted into the panel slot of the tester, all tube-pin and test-voltage connections are automatically set up for testing purposes. It is not necessary to adjust external swiches or other controls to set up pin and operating-voltage connections for the tube.

At present, the RCA *Automatic* Electron-Tube Tester comes supplied with a set of 239 of these pre-punched cards for 7-pin and 9-pin miniature, octal-, and loctal-type receiving tubes. Other cards are available as accessories to test almost all popular types on the RETMA list, assuring a more-than-adequate coverage of all modern tubes. Unpunched cards and a punch are also available as accessories to allow the technician to make his own cards.

Made of durable plastic, the pre-punched cards are captively hinged in the case adjacent to the meter and controls panel of the tester and are indexed in numerical-alphabetical order by tube type. The attached card file can be easily disengaged to permit the addition or removal of individual cards.

The pre-punched card system used in the WT-110A accommodates the popular receiving tube types employed in TV and radio receivers, including diodes, triodes, tetrodes, pentodes, and multiunit receiving tubes which have similar and dissimilar units.

The WT-110A has special provision for making high-resistance interelectrode leakage and low-value gas-current tests on certain tube types. These special tests make possible a better evaluation of tube types used in applications critical to leakage or gas.

Other features of the new tube tester include a front-panel calibration control to permit compensation for above- or below-normal line voltage; easily replaceable screw-mounted tube sockets. In addition, front-panel steel pin straighteners for miniature tubes are mounted on the front panel.

Weighing only 25 pounds, the WT-110A *Automatic* Electron Tube Tester has an aluminum panel and is housed in a vinyl-plastic case with detachable cover.

User price (optional) of RCA's WT-110A is $199.50. It is being made available by local RCA distributors.

Developmental Image Orthicon Sensitivity Is Twice That of RCA-6474

A new image orthicon for use in color cameras is now under development by the RCA Electron Tube Division. The new tube, currently designated as developmental type C-73438, is available to television broadcasters on a developmental basis.

The C-73438, incorporating Super-Dynode and Micro-Mesh design, has a sensitivity twice that of the RCA-6474 color camera tube. Furthermore, the C-73438 features a "stabilized" target which greatly reduces the tendency for "sticking" to increase throughout the life of the tube, and thus effectively contributes to longer service-hours.

Because of the stabilized target and its stabilized secondary emission which permits maintaining high sensitivity throughout the life of the tube, the C-73438 is expected to have a much longer life in comparison with the useful life of the 6474.

Intended for use in color cameras utilizing the method of simultaneous pickup of the studio or outdoor scene to be televised, the C-73438 has a new, greatly improved photosurface which provides the greater sensitivity, a spectral response approaching that of the human eye, and excellent resolution capability. With a color camera employing a suitably designed optical system, and utilizing efficient color filters, commercially acceptable color pictures can be obtained with approximately 350 foot-candles of incident incandescent illumination on the scene and a lens stop of f:8 or smaller.

The photocathode in the new camera tube is characterized by a relatively wide spectral response, but has very little infrared sensitivity. The spectral characteristics of the tube enables it to translate colors very accurately when operated in an appropriate color camera. The spectral response is so closely matched to the 6474 that, under most conditions, no change in color filters is required.

The C-73438 is designed to operate on a substantially linear signal-output curve, and is thus capable of producing a picture having natural tone value and accurate detail. Furthermore, the new tube features a signal-to-noise ratio and contrast range commensurate with the requirements of color reproduction.

RCA's 7034/4X150A and 7035/4X150D Give Improved Performance

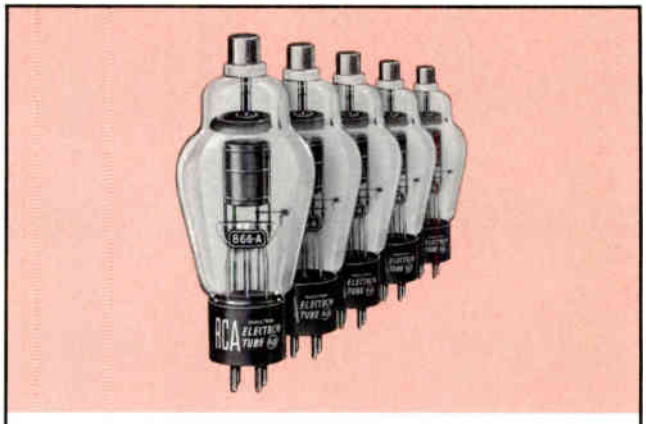
Broadcasters should be interested to note that the new RCA-7034/4X150A and -7035/4X150D beam power tube types are designed for use at frequencies up to 500 megacycles and are unilaterally interchangeable, respectively, with the RCA-4X150A and the RCA-4X150D.

In comparison with the 4X150A, the 7034/4X150A offers substantially higher power-output capability at frequencies up to 150 Mc because of its higher plate-voltage rating of 2000 volts compared with 1250 volts for the older types. Furthermore, the specially designed, high-efficiency radiator, which is hard soldered directly to the plate of the 7034 for better heat transfer, makes possible a maximum plate-dissipation rating of 250 watts up to 150 Mc with excellent tube reliability.

The terminal arrangement of the 7034 facilitates use of the tube with tank circuits of coaxial type. Effective isolation of the output circuit from the input circuit is provided at the higher frequencies by the ring terminal for grid No. 2. A base-pin termination for grid No. 2 is also available for operation of the 7034 beam power tube at the lower frequencies.

The 7034/4X150A is designed for use as an af power amplifier and modulator, a wide-band amplifier in video applications, a linear rf power amplifier in single-sideband suppressed-carrier equipment, and a class C amplifier or oscillator.

Except for its heater rating of 26.5 volts, 0.58 ampere, the 7035/4X150D is identical with the 7034/4X150A. The heater rating of the 7034 is 6.0 volts, 2.6 amperes.



How to Get More Hours from an RCA-866-A Rectifier Tube

The life of an RCA-866-A half-wave mercury-vapor rectifier tube can be increased if these seven simple procedures are followed:

- Hold filament voltage at 2.5 volts—at tube terminals. (Safety note: Do not measure filament voltage with the high-voltage transformer turned "on.")
- Hold condensed-mercury temperature within minimum and maximum ratings (20° C to 80° C with maximum peak inverse anode voltage of 2.5 Kv; 20° C to 70° C with maximum peak inverse anode voltage of 5 Kv; 20° C to 60° C with maximum peak inverse anode voltage of 10 Kv). Condensed-mercury temperature can be measured at the bottom of the glass envelope, close to the base, with a small thermometer attached to the glass with a minimum amount of putty. Recommended operational temperature: 40°±5° C.
- Heat filament fully before applying anode voltage (15 seconds under normal conditions).
- After transporting tube, do not apply anode voltage until mercury has been redistributed (by heating filament only for 30 minutes).
- After idle periods, raise anode voltage slowly to the normal operating value.
- Keep rf out of rectifier compartment.
- Operate 866-A within ratings as shown in the RCA Transmitting Tube Manual TT-4. This manual is available at $1.00 a copy from RCA Commercial Engineering, 415 S. 5th St., Harrison, N. J.

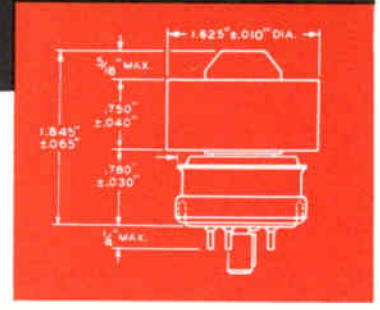
New RCA Beam Power Tubes With New High-Efficiency Radiator

RCA-7034/4X150A

with 6V, 2.6A Heater

RCA-7035/4X150D

with 26.5V, 0.58A Heater



Higher Power Output... 370 Watts up to 150 Mc
Higher Plate Dissipation... 250 Watts up to 500 Mc

Unilaterally interchangeable with the 4X150A and 4X150D, these superior new RCA tubes feature a new specially designed, high-efficiency radiator which is hard soldered directly to the plate for better heat transfer. The 7034 and 7035 offer substantially higher power output capability at frequencies up to 150 Mc, and reliable operation with higher plate dissipation at frequencies up to 500 Mc.

Small and compact, the RCA-7034/4X150A and the RCA-7035/4X150D are useful as af power amplifiers and modulators, wide-band amplifiers in video applications, linear rf power amplifiers in single-sideband suppressed-carrier equipment, and class C amplifiers or oscillators.

Your RCA Field Representative at the RCA Office nearest you will be glad to give you sales information on these new types. For technical bulletin on RCA-7034/4X150A and RCA-7035 '4X150D, write RCA Commercial Engineering, Section....., Harrison, N. J.

TYPICAL CCS OPERATION
RF Power Amp. & Osc.—Class C Telegraphy

Up to 150 Mc.		
DC Plate Volts	1500	2000
DC Plate Ma.	250	250
Driving Power (watts)	1.5	2.5
Power Output (watts)	260	370
At 500 Mc.		
DC Plate Volts	600	1250
DC Plate Ma.	170	200
Driver Power Output (watts)	15	30
Useful Power Output (watts)	50	140

RCA Field Offices

East: HUmboldt 5-3900
744 Broad Street, Newark 2, N. J.

Midwest: WHitehall 4-2900—Suite 1181
Merchandise Mart Plaza, Chicago 54, Illinois

West: RAymond 3-8361—6355 E.Washington Blvd.
Los Angeles 22, California

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