

WESTINGHOUSE

INFORMATION BULLETIN

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WESTINGHOUSE PHOTOTUBES

Phototubes are the simplest yet the most useful tool that the electronic industry has at its command.

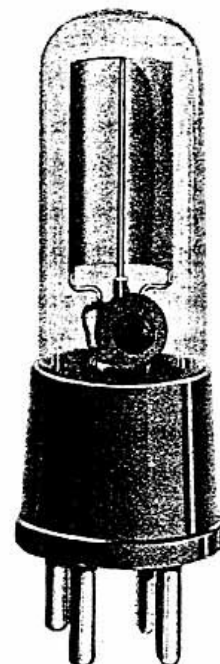
Westinghouse pioneered in the art and has steadily furthered the progress by the development of Phototubes suitable for any application. Continued improvement in the design and the manufacturing technique has been responsible for producing Phototubes whose characteristics remain constant throughout life. Their uniformity of sensitivity and their exceptionally wide range of frequency response are unexcelled in the industry today.

The uses of Westinghouse Phototubes are innumerable, and applications are being developed daily. Phototubes may be used to actuate mechanisms for such simple operations as switching light circuits on and off, or they may be used for the most complicated circuit arrangements such as are used in initiating control operations in the largest steel mills.

The reliability of the Phototube has been an important factor in its use for automatic light control, for the routing and distribution of manufactured products in the production line, for the providing of safety protection for large presses, and for the sorting of imperfect from perfect

articles. Other applications for Westinghouse Phototubes include flashover protection of rotary converters and generators, and the control and the counting of traffic. They can also be used for smoke density measurements and the control of automatic machinery.

It is a significant fact that all of the numerous installations in which Westinghouse Phototubes have been adopted have been made only after exhaustive studies have demonstrated that way to be the best



TYPE SR-50, SR-51
SR-53, SK-60, SK61
& SK63 PHOTOTUBE

and most economical method. The economics in each case have also taken into account the many advantages of using tubes of proved long life which tends to keep the operating expense at a minimum. Scarcely less important is the fact that several circuits have been developed which make it conveniently possible to operate the Phototube and its entire auxiliary circuit from an alternating current supply system.

Westinghouse Phototubes are used extensively in the sound pick-up systems of motion picture equipment. In this application Phototubes must have a uniform sensitivity over the entire cathode surface and a frequency response which embraces the entire audio-frequency range without any apparent diminishing of sensitivity. Westinghouse has developed Phototubes which combine these requirements with the added important feature of long life.

As the operation of the Phototube is entirely electronic, the response to light variations, either by an increase or by a decrease, is practically instantaneous. This characteristic, which is one of the most unique in the realm of Physics, applies to abrupt changes in the light falling on the sensitive surface, as well as when slight changes are made in the intensity of the incident light.

Westinghouse Phototubes have been designed and constructed to eliminate the danger of leakage. The effect of leakage is that it seriously reduces the sensitivity response characteristic of the tube; hence all leakage must be eliminated both in the tube and in the associated circuit.

In the extension of the response characteristics, Westinghouse has again pioneered by introducing several types of Phototubes which are peculiarly and solely responsive to predetermined bands of fre-

quency of radiations within the ultra-violet portion of the spectrum. These ultra-violet Phototubes thus provide an absolute and convenient method of measuring the ultra-violet energy of sunlight and of other artificial sources.

D E S C R I P T I O N

There are two distinct types of Phototubes; namely the vacuum type and the gas-filled type. The two types are identical as to structure but differ in that the high vacuum of the vacuum type is replaced with an inert gas at a very low pressure in the gas-filled type. The chief advantage of the vacuum type of Phototube is the light-current linear response characteristic; however, the total current consists of only the primary electrons emitted from the light sensitive surface of the cathode. In the gas-filled type, greater effective response is obtained due to the gas amplification of the primary electrons and the additional emission caused by the positive ion bombardment of the cathode.

The SR-50 Phototube and other light sensitive vacuum Phototubes are used in measurement and instrument work where the greatest constancy of characteristics is desired. The SR-53 tube is recommended where a higher degree of sensitivity is required in the same size bulb. The SR-58 Phototube has a much larger cathode and the output current is therefore several times as large as that of the SR-50. The SR-58 is used chiefly in automatic light control and other similar installations.

The gaseous type of Phototube in general has a higher sensitivity and produces more electrons for the same amount of light falling on the sensitive surface of the cathode than does the vacuum types. This permits the SK-60 Phototube to deliv-

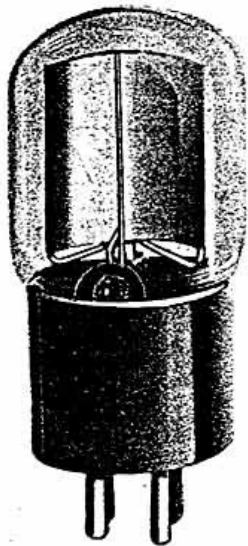
er a relatively larger output current than that of the vacuum type SR - 50 tube which it duplicates in mechanical design and structure. However, the presence of gas in the various types of gas Phototubes limits the potentials at which they may be used to 90 volts, otherwise ionization of the gas will occur and cause a glow discharge which may impair the cathode sensitivity. For somewhat higher sensitivity than that provided by the SK - 60, the SK-63 is recommended, which uses the same size bulb. The SK-68 Phototube is able to deliver several times the output current of that of the other gaseous Phototubes due to its larger cathode surface.

The WL-734 and WL-735 tubes are both equipped with the UX type of base, but are otherwise identical in characteristics with the SR - 50 and SK - 60 types, respectively. The WL - 737 is quite similar to the WL-735 type except that the WL-737 has a somewhat shorter and wider cathode construction which makes it particularly adaptable in certain sound equipments de-

signed to use Phototubes of this size. The WL - 770 Phototube has a UX type of base and has a color response similar to that of the eye sensitivity which makes it particularly valuable in photometric applications.

For other applications it may be found desirable to use Phototubes whose color response is similar to that of the eye sensitivity for color matching. For such applications the SR-51 and SK-61 tubes are available in the vacuum and gaseous types respectively.

This summary of Westinghouse Phototubes has necessarily been brief and devoid of detail, however, further details concerning Westinghouse Phototubes or of circuits in which they may be used, will gladly be supplied upon request.



TYPE WL-737
GAS FILLED
PHOTOTUBE



TYPE WL-734
& WL-735
PHOTOTUBE



TYPE WL-770
VACUUM
PHOTOTUBE

WESTINGHOUSE LIGHT SENSITIVE PHOTOTUBES

Design Data and Ratings

Type	Description	Spectral Region of Max. Response	Typical Sensitivity Microamps Per Lumen	Approx. Size of Cathode Inches
SR-50	Vacuum	Deep red and violet	15.0	13/16 x 1-3/8
SR-51	Vacuum	Violet	15.0	13/16 x 1-3/8
SR-53	Vacuum	Deep red and violet	25.0	13/16 x 1-3/8
SR-58	Vacuum	Deep red and violet	15.0	1-5/8 x 3-1/2
SK-60	Gas	Deep red and violet	60.0	13/16 x 1-3/8
SK-61	Gas	Violet	60.0	13/16 x 1-3/8
SK-63	Gas	Deep red and violet	125.0	13/16 x 1-3/8
SK-68	Gas	Deep red and violet	60.0	1-5/8 x 3-1/2
WL-734	Vacuum	Deep red and violet	15.0	13/16 x 1-3/8
WL-735	Gas	Deep red and violet	60.0	13/16 x 1-3/8
WL-737	Gas	Deep red and violet	60.0	1 x 1-1/4
WL-770	Vacuum	Near ultra-violet	0.75	1-3/4 dia.

INFORMATION BULLETINS PUBLISHED DURING
1936
COPIES OF WHICH ARE STILL AVAILABLE

- Information Bulletin No. 1 describing the Westinghouse Lenard Ray Tube, Type WL-785, issued June, 1936.
- Information Bulletin No. 2 describing the Westinghouse Ultra-violet Meter, issued June, 1936.
- Information Bulletin No. 3 describing the Westinghouse Demonstration Triode Tube, Type WL-787, issued June, 1936.
- Information Bulletin No. 4 describing the Westinghouse High Frequency Tubes, issued July, 1936.
- Information Bulletin No. 5 describing the Westinghouse Sterilamp, issued August, 1936.
- Information Bulletin No. 6 describing the Westinghouse Amplifier and Oscillator Tubes, issued September, 1936.
- Information Bulletin No. 7 describing the Westinghouse Rectifier Tubes, issued November, 1936.

For prices and further information write to

WESTINGHOUSE  LAMP DIVISION
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