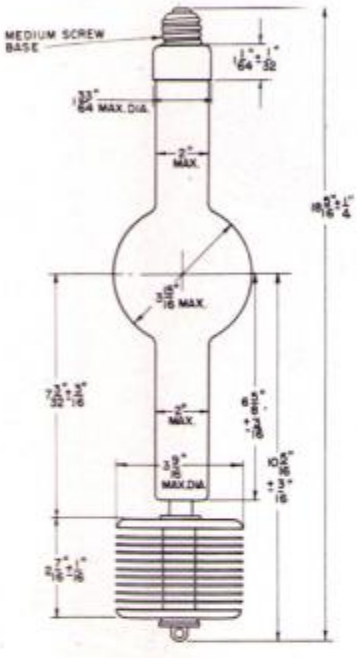
AIR INSULATED 100 KV
RADIOGRAPHIC X-RAY TUBES

TYPES WL327, 341, & 342*



VOLTAGE RATINGS

FULL WAVE RECTIFIED	100 KVP
HALF WAVE RECTIFIED	100 KVP
SELF RECTIFIED	90 KVP USEFUL, 100 KVP INVERSE

APPLICATION

This series of Westinghouse tubes is of the conventional type designed to fit open or closed lead glass and composition x-ray shields. They are used for general radiographic purposes up to 250 ma, 100 kvp techniques. The WL327 type is widely used in fluoroscopic applications and the WL342 type in the same application permits spot-film work at high ma.

SPECIFICATIONS

FOCAL SPOTS:

The 20° line focus feature produces a projected focal spot 1/3 the actual area. Single and double focal spot sizes are listed below.

SINGLE FOCUS TUBES

TUBE TYPE	FOCAL SPOT PROJECTED SIZE
WL327	2.6 mm²
WL341	4.2 mm²

DOUBLE FOCUS TUBES

TUBE TYPE	FOCAL SPOT PROJECTED SIZE
WL342	2.1 & 4.2 mm²

FILAMENT CHARACTERISTICS:

Individual filament settings depend upon the exposure technique used. The range of currents is from 3.5 to 5.5 amperes and the voltage range from 3.5 to 10.0 volts. When taking a series of exposures, tube life is conserved by turning the filament off between exposures unless the next exposure is to follow immediately.

*WL342 Outline Drawing on Page 4

RATING DATA:

VOLTAGE: *See above.* CURRENT: *Maximum ratings given on pages 3 & 4.*

FLUOROSCOPIC: *85 kvp, 5 ma, 7 min. or 100 kvp, 4 ma, 7 min.*

ANODE HEAT CAPACITY: *100,000 H. U. See cooling chart on page 2.*

TIME BETWEEN EXPOSURES AT MAXIMUM RATING: *Under 1/10 second—3 seconds, over 1/10 second—5 seconds. In Stereoradiography the total time of the two exposures is to be used as the basis for determining the ratings permitted by the chart. In general the ratings allowed will be 90% of that allowed for a single exposure.*

FRACTIONAL SECOND EXPOSURES:

The possibility of damaging the target during high milliamperage fractional second exposures on a cold tube is greatly minimized if a preliminary "warm up" exposure of about 20,000 H.U. is made at 10 to 15 ma. When establishing settings to be used for high ma exposures, in order to avoid damaging the focal spot, care must be exercised not to exceed ratings.

GENERAL DESIGN INFORMATION

ANODE:

The design and processing of the anodes provides efficient conduction of heat from the target, made of Westinghouse tungsten, to the radiator.

KOVAR:

Anode seals are made of Westinghouse developed Kovar which has won wide acceptance for glass to metal seals in the electronics industry because of the high degree of quality control exercised in our plants during its manufacture. The use of Kovar provides a rugged construction so that the full thickness of metal is maintained at the edge of the glass seal insuring maximum strength and freedom from leaks through the metal, thus increasing the life expectancy of the tube. This sealing operation is performed by radio frequency.

GETTER:

The most advanced techniques are used in pretreatment of parts and exhaust but in addition, the use of an efficient getter within a specially shielded chamber in the tube insures maintenance of a high degree of vacuum during tube life. This reduces the possibility of gas flashes and insures maximum stability even with a hot anode. The latter effect is particularly noticeable during fluoroscopic operation where the usual drop in tube current is minimized.

BULB:

Bulbs are made of hard high transmission glass to withstand thermal shock and high operating temperatures and provide maximum x-ray output due to low inherent filtration.

COOLING AND HEATING CHART

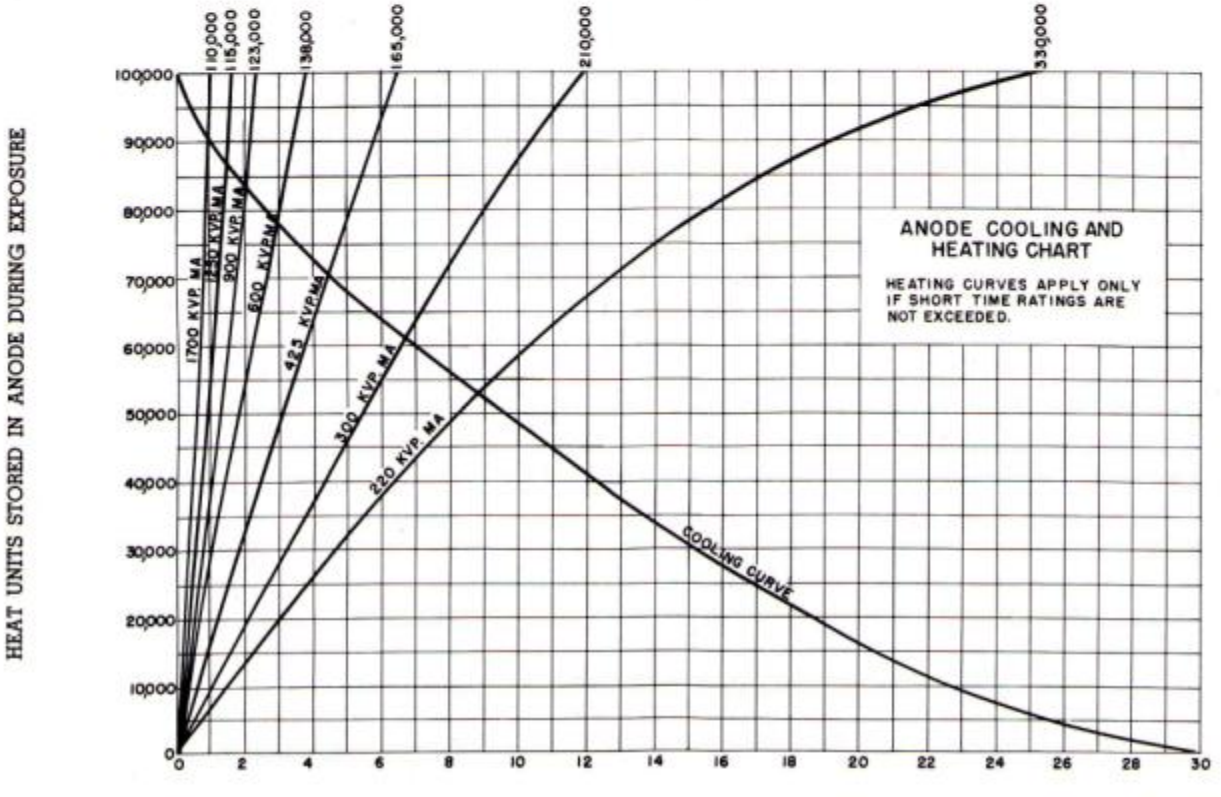
Proper use of the Anode Cooling and Heating Chart and Short Time Rating Charts permits maximum service to be obtained without exceeding tube ratings.

The cooling curve indicates the number of heat units (kvp x ma x sec) which are dissipated by the anode to the air as a function of cooling time. In order to insure continued stable operation it is necessary to limit the number of heat units (H.U.) in the anode to its capacity or 100,000 H.U. For this reason the number of H.U. applied to the tube must be totaled for successive exposures and after reaching the heat capacity of the tube, a definite interval of cooling time dependent upon the H.U. in the next exposure must be observed.

For instance, if in a series of exposures 100,000 H.U. have been applied and the next exposure totals 20,000 H.U., the required cooling interval would be 2.6 minutes to stay within the heat capacity of the tube. Similarly, if 60,000 H.U. have been applied and the next exposure totals 60,000 H.U., the cooling interval of 5.3 minutes is the time required for the anode to cool from 60,000 H.U. to 40,000 H.U. in order to permit the additional 60,000 H.U. exposure to be made.

The group of heat curves labeled with heat input rates (kvp.ma) provide a means for taking into consideration the heat dissipation which occurs during exposures averaging 20 ma or less. Thus if a continuous load averaging 600 kvp.ma (which is equivalent to 36,000 H.U./min) is applied, the heating curve indicates that this may be continued for a total of 3.7 minutes. The cooling curve will then determine the cooling interval required before further exposures can be made.

TOTAL HEAT UNITS APPLIED TO ANODE DURING EXPOSURE

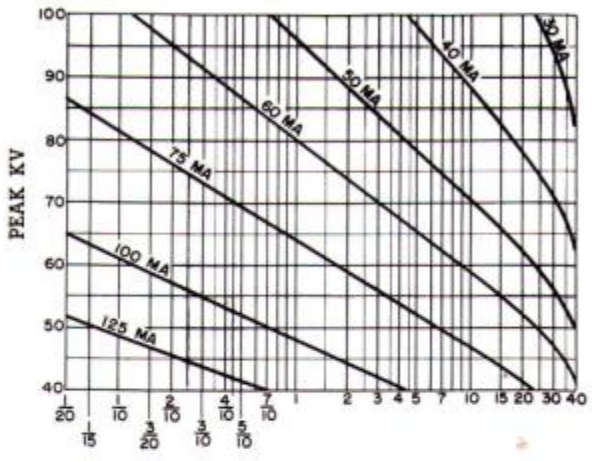


WESTINGHOUSE X-RAY TUBES

AIR INSULATED 100 KV RADIOGRAPHIC X-RAY TUBES
SHORT TIME RATINGS

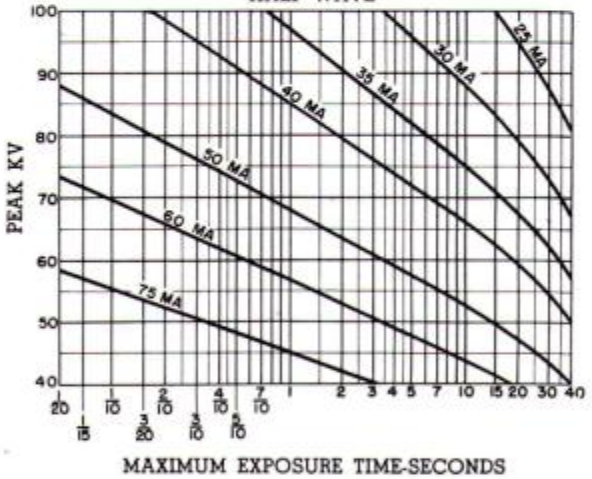
2.1 mm² PROJECTED FOCAL SPOT SIZE

FULL WAVE



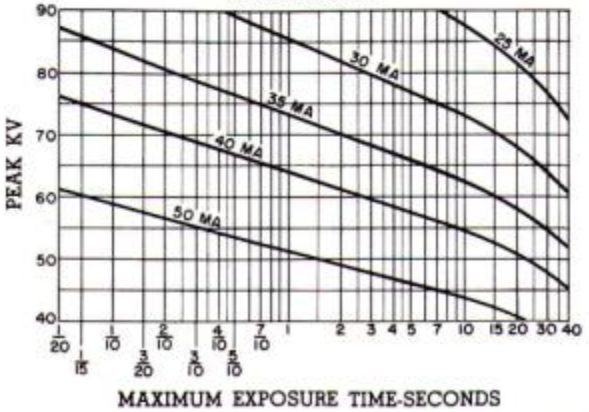
MAXIMUM EXPOSURE TIME-SECONDS

HALF WAVE



MAXIMUM EXPOSURE TIME-SECONDS

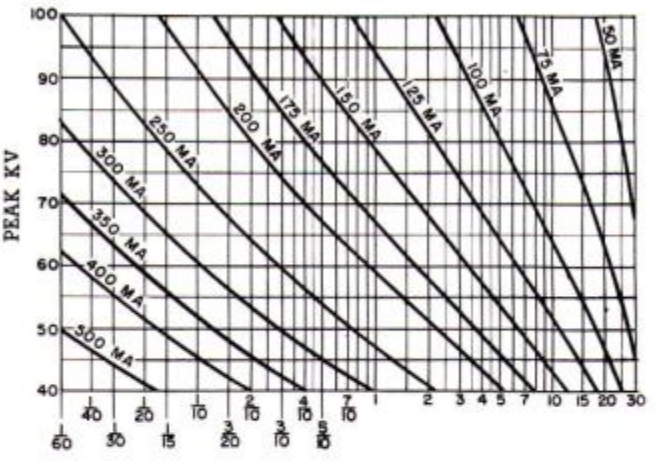
SELF-RECTIFIED



MAXIMUM EXPOSURE TIME-SECONDS

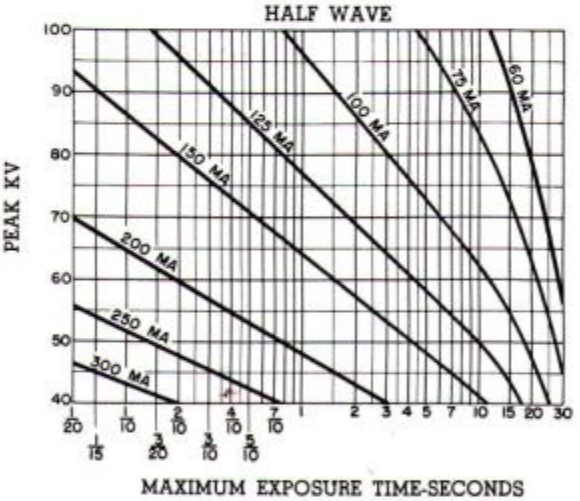
4.2 mm² PROJECTED FOCAL SPOT SIZE

FULL WAVE



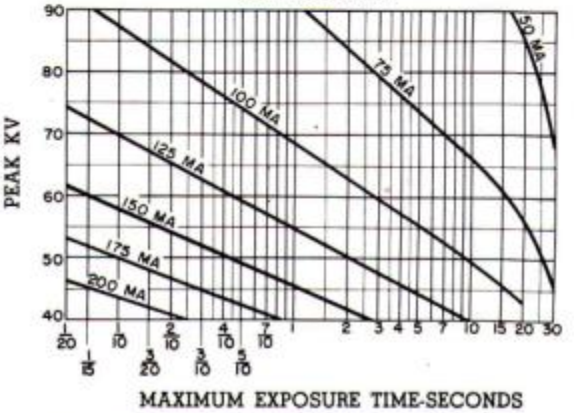
MAXIMUM EXPOSURE TIME-SECONDS

HALF WAVE



MAXIMUM EXPOSURE TIME-SECONDS

SELF-RECTIFIED



MAXIMUM EXPOSURE TIME-SECONDS

WESTINGHOUSE ELECTRIC CORPORATION
Electronic Tube Sales Department
BLOOMFIELD, NEW JERSEY

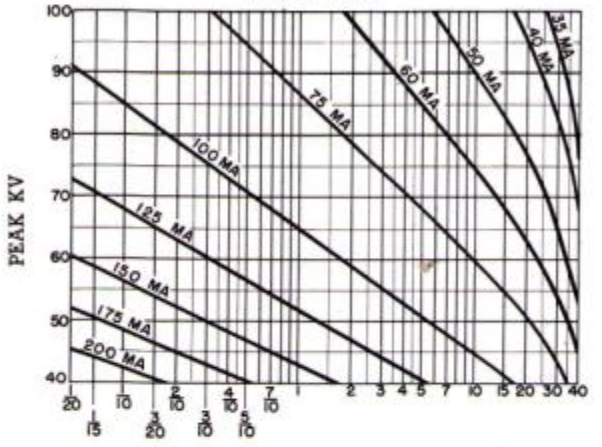
WESTINGHOUSE X-RAY TUBES

AIR INSULATED 100 KV RADIOGRAPHIC X-RAY TUBES

SHORT TIME RATINGS

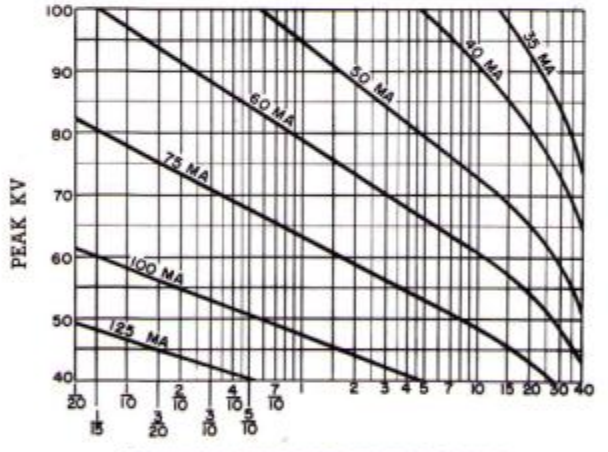
2.6 mm² PROJECTED FOCAL SPOT SIZE

FULL WAVE



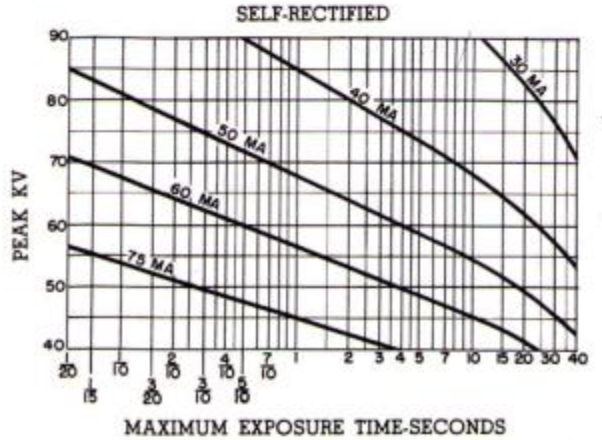
MAXIMUM EXPOSURE TIME-SECONDS

HALF WAVE



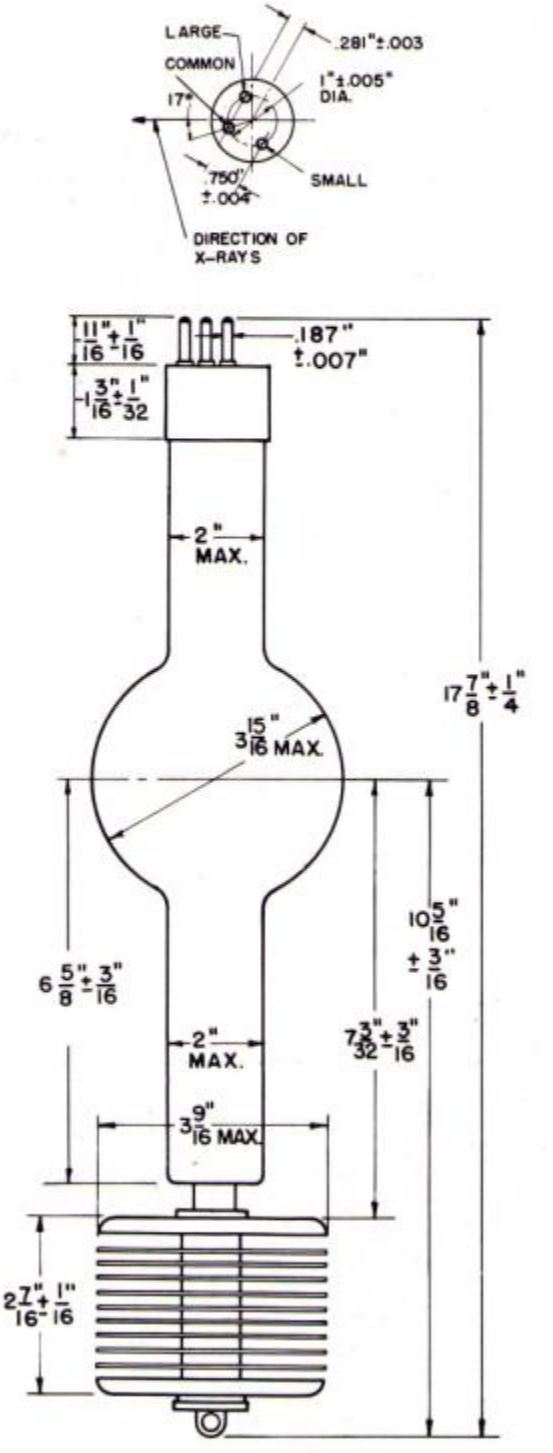
MAXIMUM EXPOSURE TIME-SECONDS

SELF-RECTIFIED



MAXIMUM EXPOSURE TIME-SECONDS

WL 342 OUTLINE DRAWING



Note—Focus selection switch style 980941 is available for use with this tube.

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Electronic Tube Sales Department
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