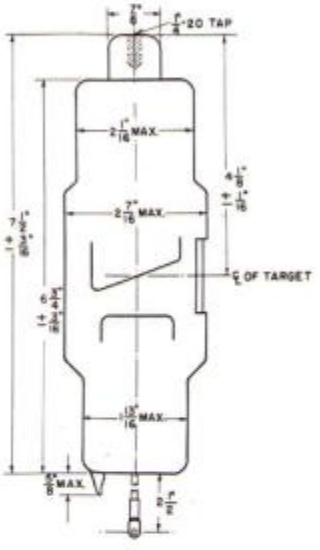


OIL INSULATED 110 KV RADIOGRAPHIC X-RAY TUBES TYPES WL5519, 5520, 5521, 5522 AND 5523

VOLTAGE RATINGS

FULL WAVE RECTIFIED	110 KVP
HALF WAVE RECTIFIED	100 KVP
SELF RECTIFIED	90 KVP USEFUL, 100 KVP INVERSE

APPLICATION

Westinghouse oil insulated 110 kvp tubes are designed for use in cable connected heads at techniques up to 250 ma at 100 kvp and 195 ma at 110 kvp.

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.

TUBE TYPE	FOCAL SPOT PROJECTED SIZE
WL5519	2.1 & 4.2 mm^2
WL5520	1.5 mm^2
WL5521	2.1 mm^2
WL5522	3.0 mm^2
WL5523	4.2 mm^2

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.

RATING DATA:

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

FLUOROSCOPY: *85 kvp, 6 ma or 110 kvp, 4.5 ma to heat capacity of head.*

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.

WESTINGHOUSE X-RAY TUBES

GENERAL DESIGN INFORMATION

ANODE:

The design and processing of the heavy copper anodes provides maximum conduction of heat from the target, made of Westinghouse tungsten, to the oil.

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 with controlled window thickness contributing to low inherent filtration and maximum x-ray output.

COOLING AND HEATING CHART

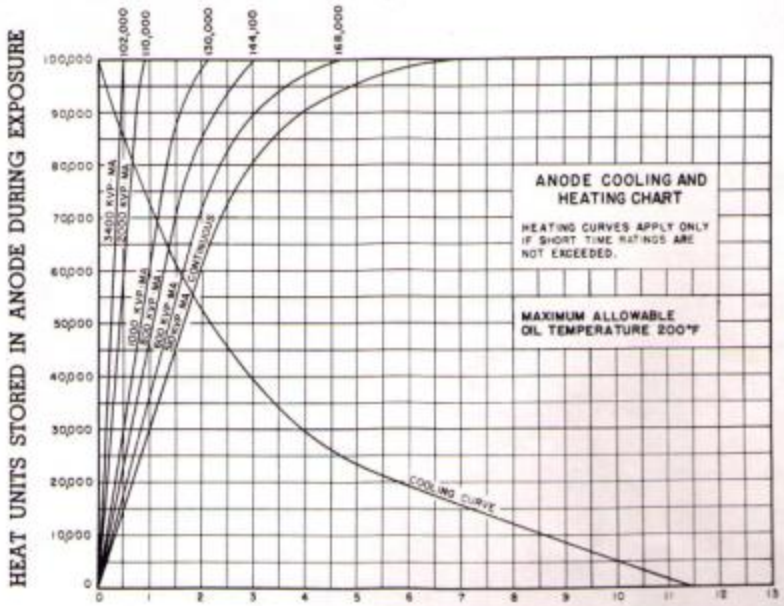
Proper use of the Anode Cooling and Heating Chart and Short Time Rating Charts permits maximum service to be obtained without exceeding tube ratings.

The cooling curve indicates the number of heat units (kvp x ma x sec) which are dissipated by the anode to the oil 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 42 seconds 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 84 seconds 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 4.7 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



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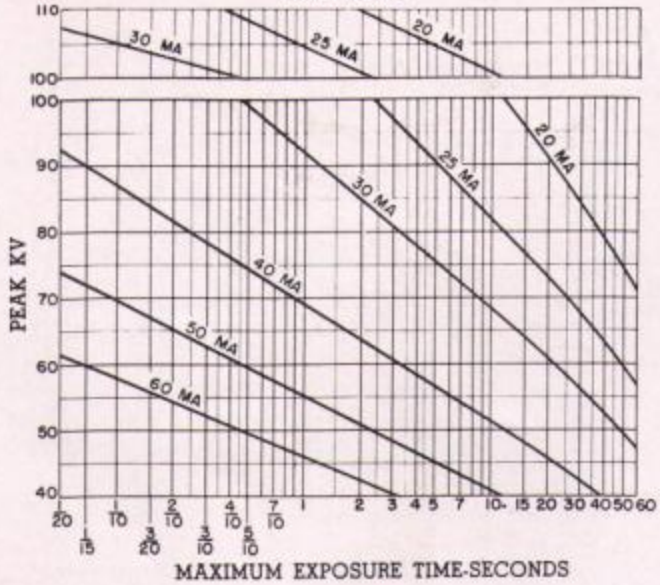
Electronic Tube Sales Department
BLOOMFIELD, NEW JERSEY

WESTINGHOUSE X-RAY TUBES

OIL INSULATED 110 KV RADIOGRAPHIC X-RAY TUBES
SHORT TIME RATINGS

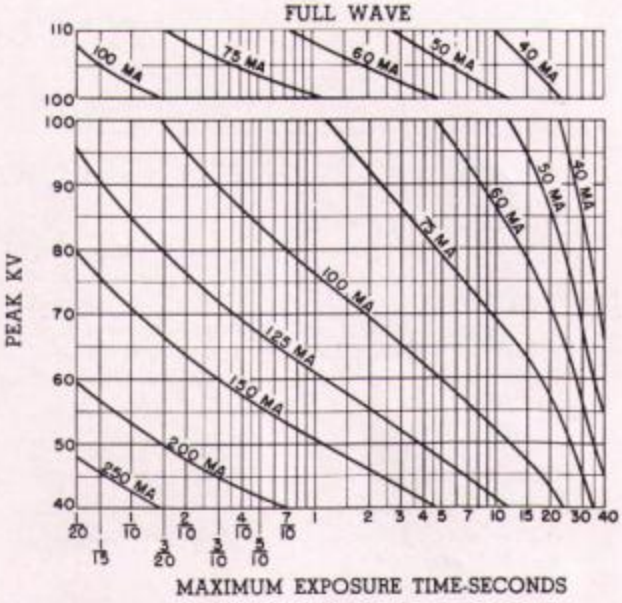
1.5 mm² PROJECTED FOCAL SPOT SIZE

FULL WAVE

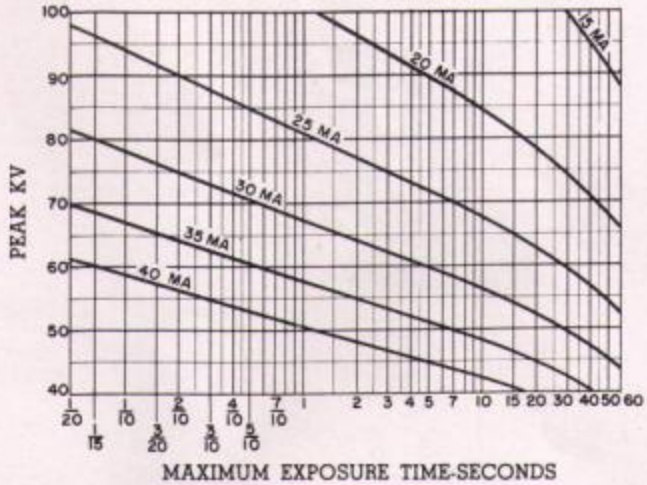


3.0 mm² PROJECTED FOCAL SPOT SIZE

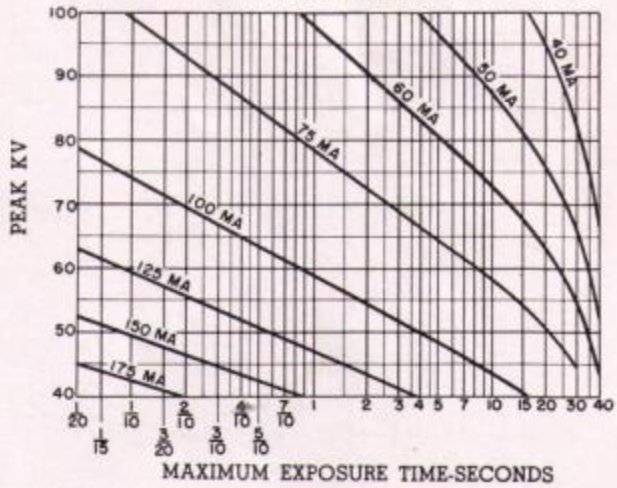
FULL WAVE



HALF WAVE



HALF WAVE



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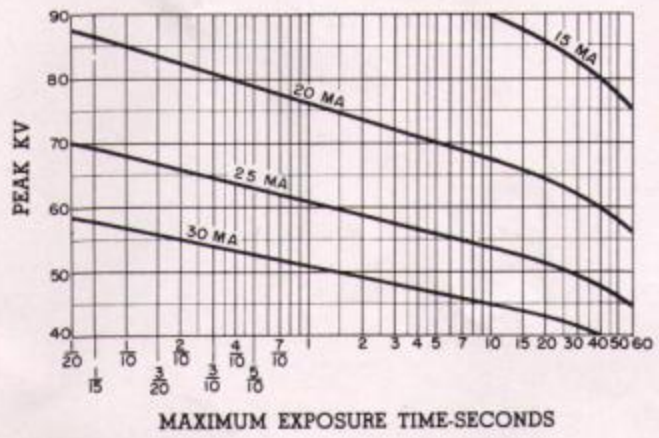

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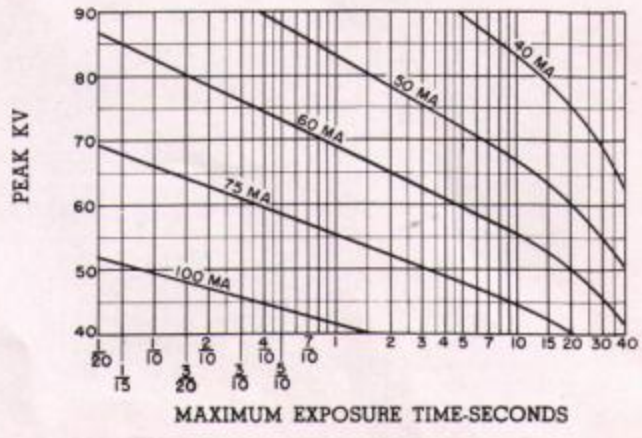

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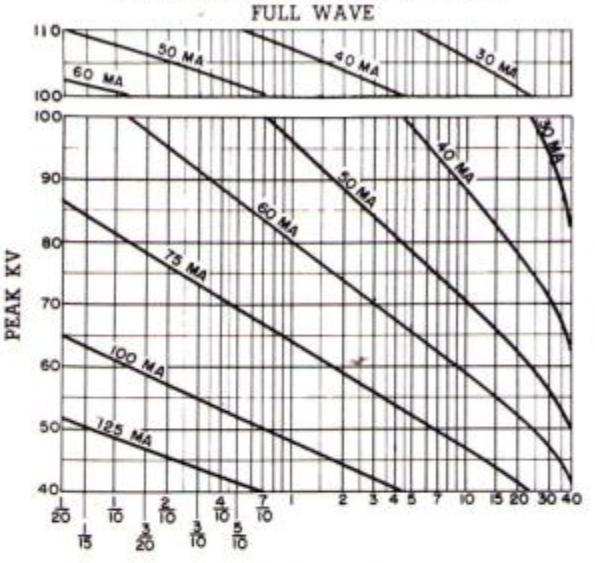
WESTINGHOUSE X-RAY TUBES

OIL INSULATED 110 KV RADIOGRAPHIC X-RAY TUBES

SHORT TIME RATINGS

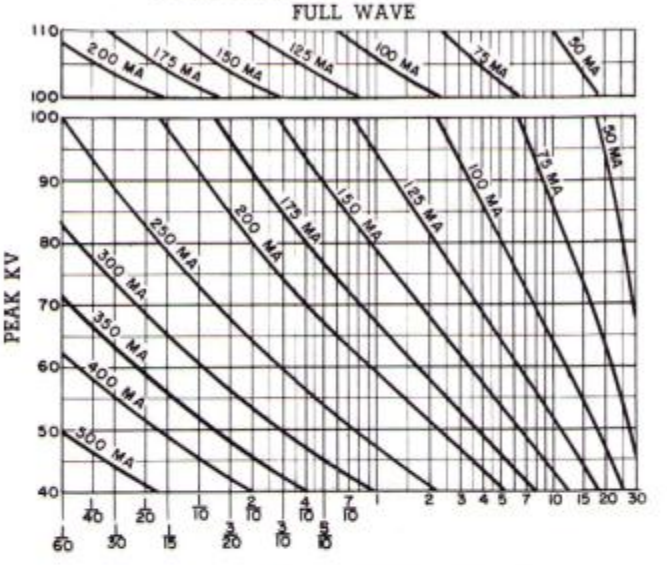
2.1 mm² PROJECTED FOCAL SPOT SIZE

FULL WAVE

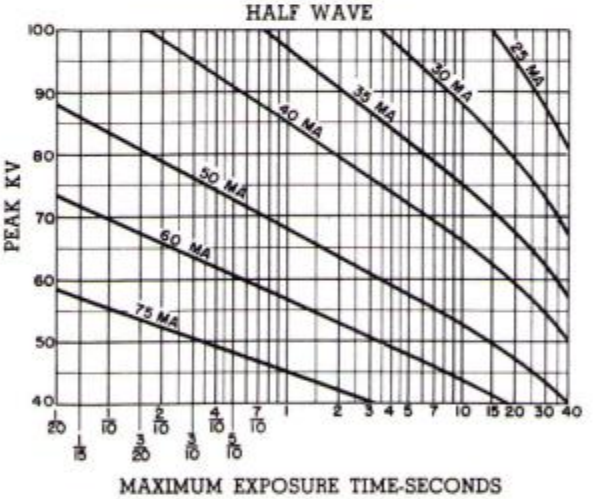


4.2 mm² PROJECTED FOCAL SPOT SIZE

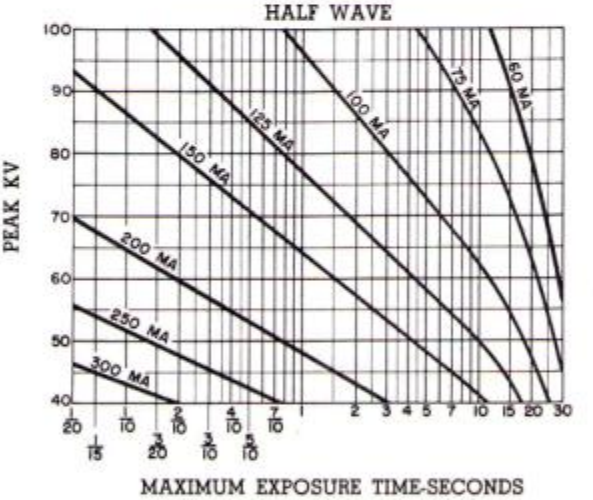
FULL WAVE



HALF WAVE



HALF WAVE



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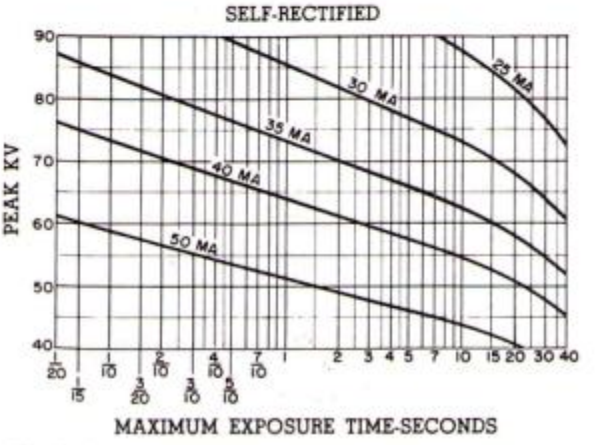

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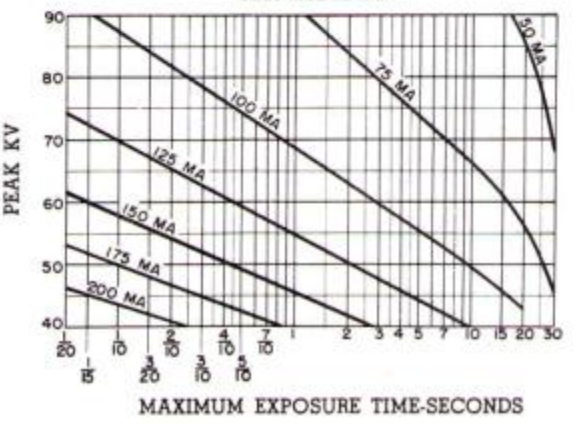

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