



OIL INSULATED 125 KV

HOODED ANODE

RADIOGRAPHIC X-RAY TUBES

TYPES WL5599, 5600, 5601 AND 5602

VOLTAGE RATINGS

FULL WAVE RECTIFIED.....	125 KVP
HALF WAVE RECTIFIED.....	100 KVP
SELF RECTIFIED.....	90 KVP USEFUL, 100 KVP INVERSE

APPLICATION

Westinghouse oil insulated 125 kv tubes are designed for radiographic use in cable connected heads at techniques up to 250 ma at 100 kv and 150 ma at 125 kv. Superficial therapy may be performed at 3.4 ma, 125 kv.

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. Double focal spots are superimposed.

TUBE TYPE	FOCAL SPOT PROJECTED SIZE
WL5599	2.1 mm ²
WL5600	3.0 mm ²
WL5601	4.2 mm ²
WL5602 (Superimposed)	2.1 & 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.

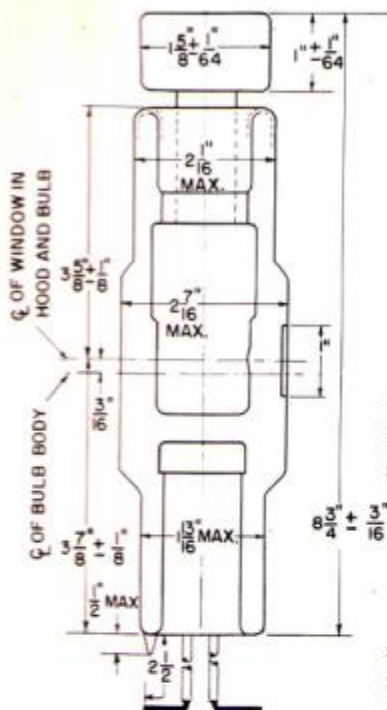
FLUOROSCOPY & THERAPY: 85 kvp, 5 ma or 125 kvp, 3.4 ma to heat capacity of head.

ANODE HEAT CAPACITY: 150,000 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 for each of the exposures 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

HOODED ANODE:

The hooded anode design permits the use of a smaller envelope than would usually be required for an x-ray tube of this voltage rating.

By reducing electron bombardment of the envelope possibility of puncture is decreased, enhancing tube life and permitting the use of a relatively thin x-ray window.

Stray or stem radiation as well as non-useful primary radiation is reduced by a 3 mm thick copper hood thus improving definition and reducing the amount of lead protection required in the tube head.

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.

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 150,000 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 150,000 H.U. have been applied and the next exposure totals 30,000 H.U., the required cooling interval would be 1.2 minutes to stay within the heat capacity of the tube. Similarly, if 90,000 H.U. have been ap-

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.

RADIATOR:

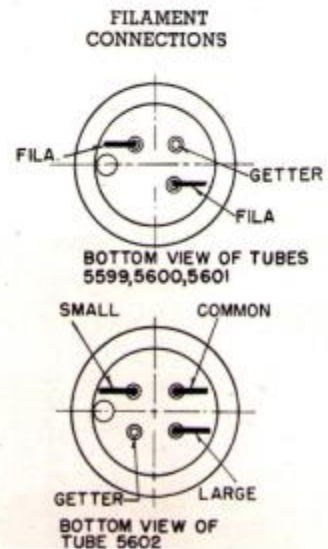
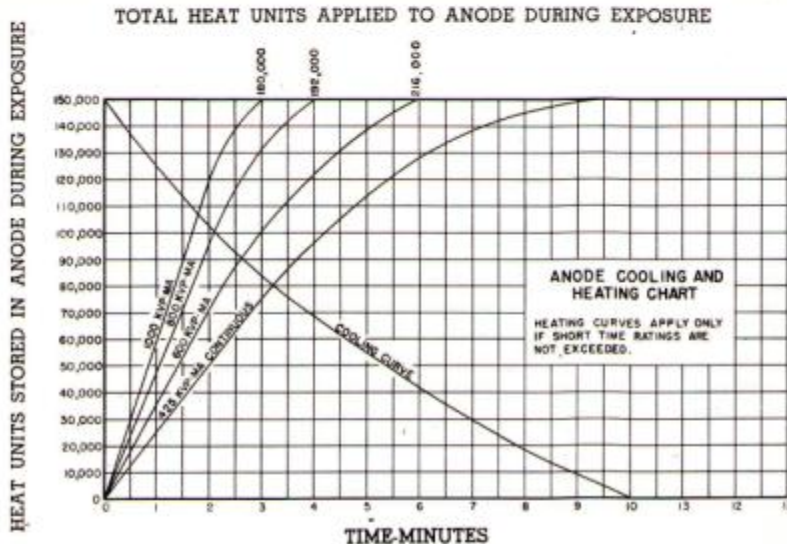
All surfaces of the radiator and rod which come in contact with the oil are nickel plated, thus avoiding damage to the oil from chemical reaction with the copper.

plied and the next exposure totals 90,000 H.U., the cooling interval of 2 minutes is the time required for the anode to cool from 90,000 H.U. to 60,000 H.U. in order to permit the additional 90,000 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 6.0 minutes. The cooling curve will then determine the cooling interval required before further exposures can be made.

The 425 kvp.ma curve shows the continuous rating.

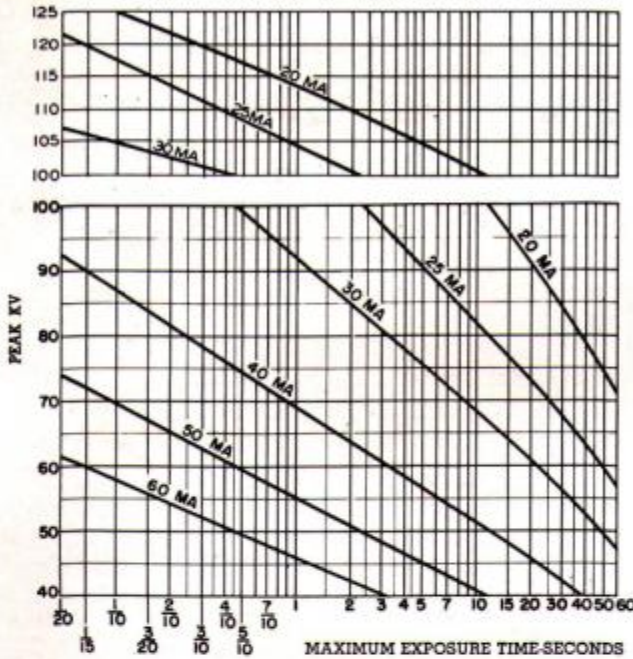
These ratings are predicated on the ability of the head to dissipate these loadings at an oil temperature of 200°F or less.



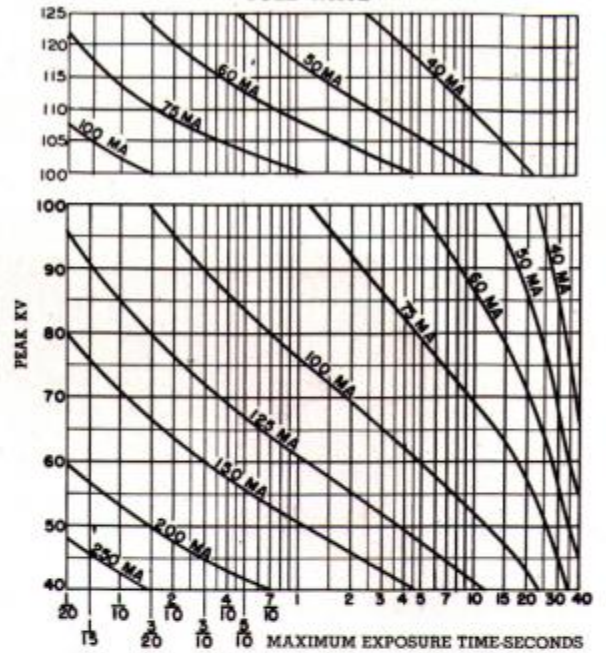


OIL INSULATED 125 KV RADIOGRAPHIC X-RAY TUBES SHORT TIME RATINGS

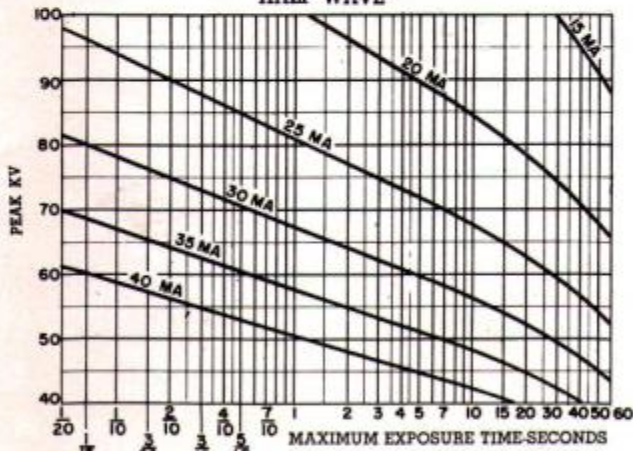
1.5 mm² PROJECTED FOCAL SPOT SIZE
FULL WAVE



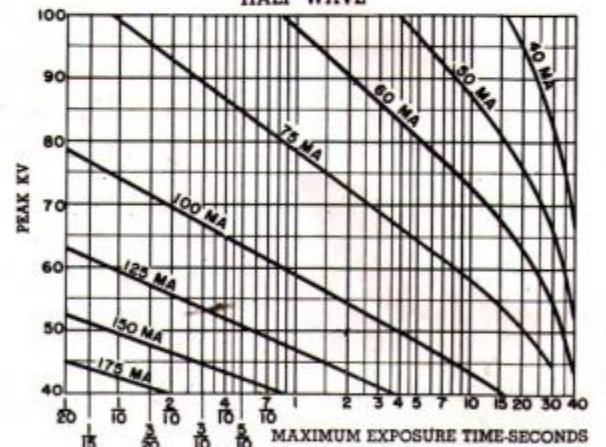
3.0 mm² PROJECTED FOCAL SPOT SIZE
FULL WAVE



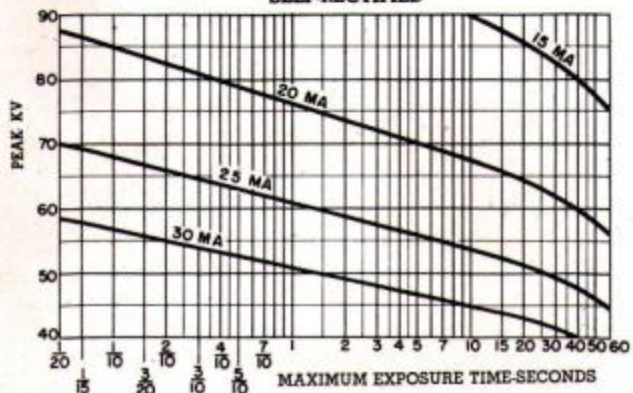
HALF WAVE



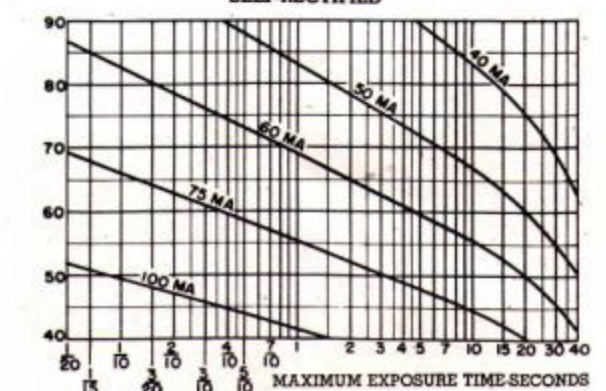
HALF WAVE



SELF-RECTIFIED



SELF-RECTIFIED





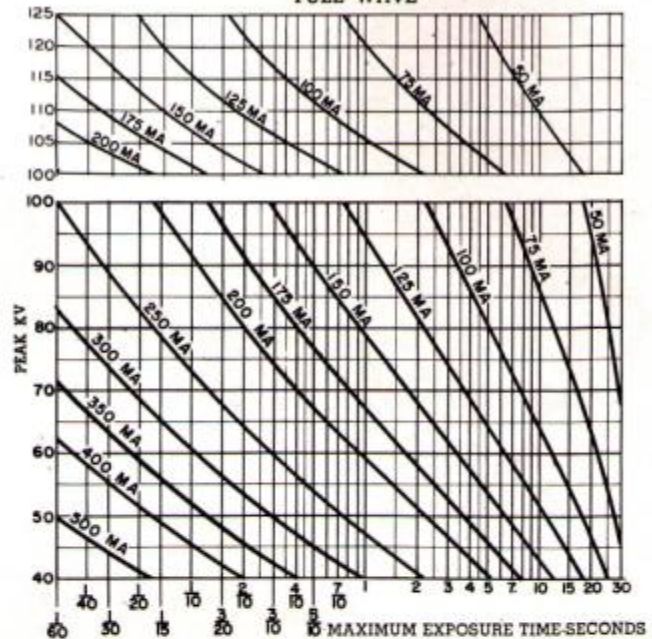
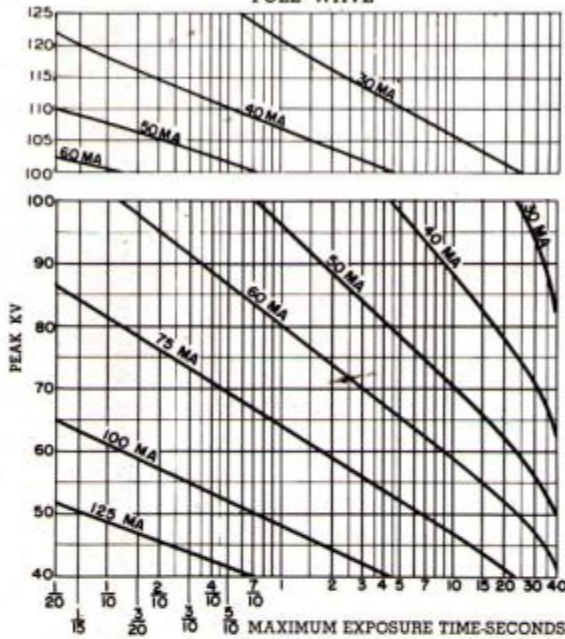
OIL INSULATED 125 KV RADIOGRAPHIC X-RAY TUBES
SHORT TIME RATINGS

2.1 mm² PROJECTED FOCAL SPOT SIZE

4.2 mm² PROJECTED FOCAL SPOT SIZE

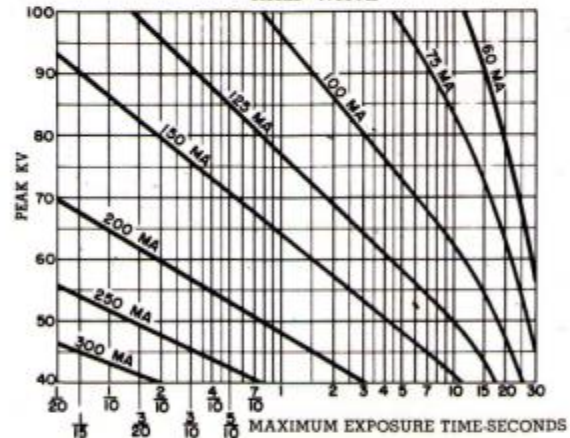
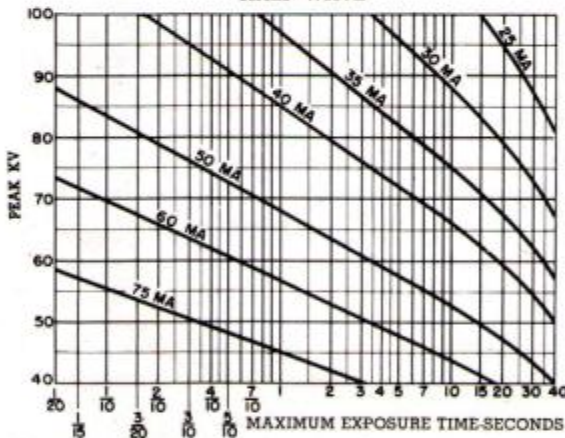
FULL WAVE

FULL WAVE



HALF WAVE

HALF WAVE



SELF-RECTIFIED

SELF-RECTIFIED

