



OIL INSULATED 85 KV SELF-RECTIFIED

RADIOGRAPHIC X-RAY TUBES

FOR PORTABLE AND MOBILE USE

TYPES WL349 & 384

APPLICATION

These tubes are designed for application in self-contained portable and mobile oil filled equipments for low milliamperes, high detail radiographic work.

SPECIFICATIONS

VOLTAGE: 85 kvp useful, 95 kvp maximum inverse.

CURRENT: WL349 50 ma max., WL384 30 ma max. See charts page 2.

Minimum time between successive exposures—5 seconds.

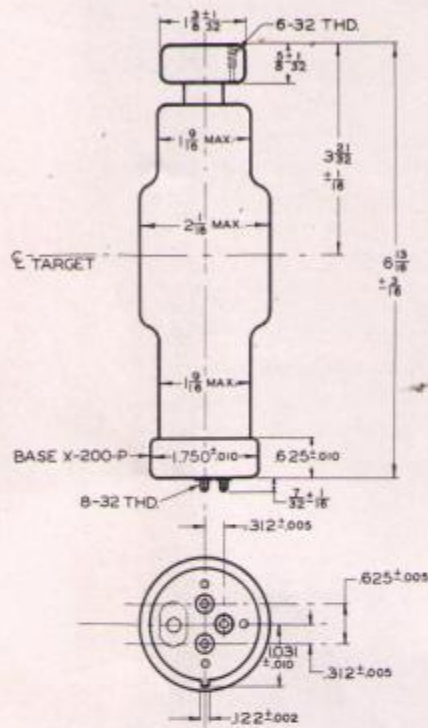
FLUOROSCOPY: 85 kvp, 5 ma, 3.4 Min.

FOCAL SPOTS: WL349, 2.1 mm², WL384, 1.5 mm²,
20° line focus design.

ANODE HEAT CAPACITY: 50,000 H.U. See chart page 2.

CONTINUOUS RATING: 18,000 H.U. per minute.

FILAMENT: Current 3.5-5.0 amperes, voltage 3.0-6.0 volts.



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.

BULB:

Bulbs are made of hard high transmission glass with controlled window thickness contributing to low inherent filtration and maximum x-ray output.

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 ROD:

The surfaces of the cooling rod which come in contact with the oil are nickel plated, thus avoiding damage to the oil from any chemical reaction occurring between it and copper.

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. The possibility of gas flashes is reduced insuring maximum stability even with a hot anode. The increased stability is particularly noticeable during fluoroscopic operation where the usual drop in tube current is minimized.



COOLING AND HEATING CHART

Proper use of the Anode Cooling and Heating Chart in conjunction with the 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 tube head in the intervals of time shown on the chart. 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 50,000. 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 50,000 H.U. have been applied and the next exposure totals 20,000 H.U., the required cooling interval would be 1.8 minutes to stay within the heat capacity of the tube. Similarly, if 30,000 H.U. have been applied and the next exposure totals 30,000 H.U., the cooling interval of 1.4

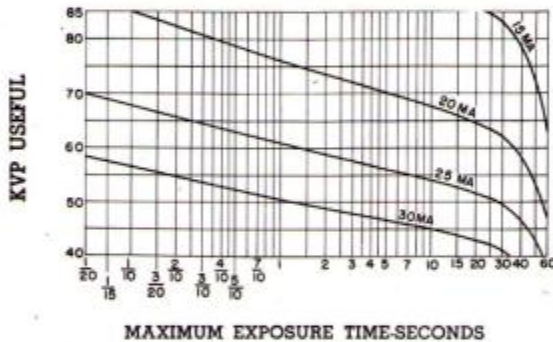
minutes is the time required for the anode to cool from 30,000 H.U. to 20,000 H.U. in order to permit the additional 30,000 H.U. exposure to be made.

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 1.8 minutes. The cooling curve will then determine the cooling interval required before further exposures can be made.

The 300 kvp.ma curve shows the continuous rating.

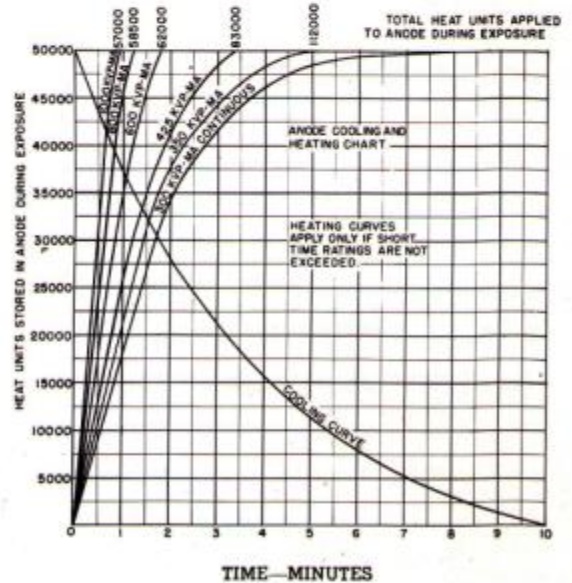
The values given by the Cooling Chart are predicated on the assumption that the heat capacity of the head will not be exceeded and that the oil temperature will not be allowed to exceed 200°F.

WL384 RATING CHART
1.5 mm² PROJECTED FOCAL SPOT SIZE



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ANODE COOLING AND HEATING CHART



WL349 RATING CHART
2.1 mm² PROJECTED FOCAL SPOT SIZE

