



OIL INSULATED 80 KV SELF-RECTIFIED

RADIOGRAPHIC X-RAY TUBE

FOR DENTAL AND PORTABLE USE

TYPE WL 393

APPLICATION

This tube is designed for application in self-contained dental, portable and mobile oil filled equipments for low milliampere, high detail radiographic work.

SPECIFICATIONS

VOLTAGE: 80 kvp useful, 85 kvp maximum inverse.

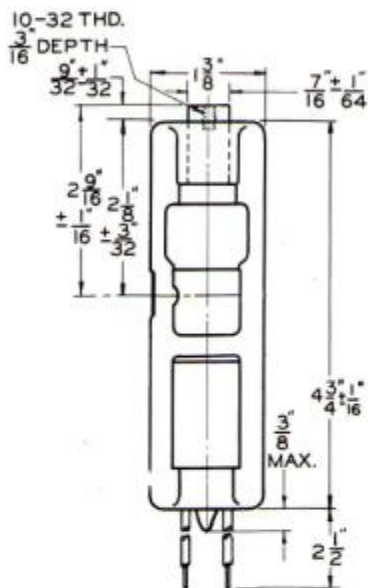
CURRENT: 20 ma maximum. See chart page 2.

Minimum time between successive exposures—5 Seconds.

FOCAL SPOT: 1.5 mm², 20° line focus design.

ANODE HEAT CAPACITY: 25,000 H.U. See cooling chart page 2.

FILAMENT: Current range 1.6-2.5 amperes, voltage range 4.2-6.5 volts.



GENERAL DESIGN INFORMATION

HOODED ANODE:

The hooded anode design has substantial advantages in an x-ray tube of small dimensions.

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 the 4 mm thick copper hood, thus improving definition and providing protection from stray radiation.

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. 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.

BULB:

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

COOLING ROD:

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



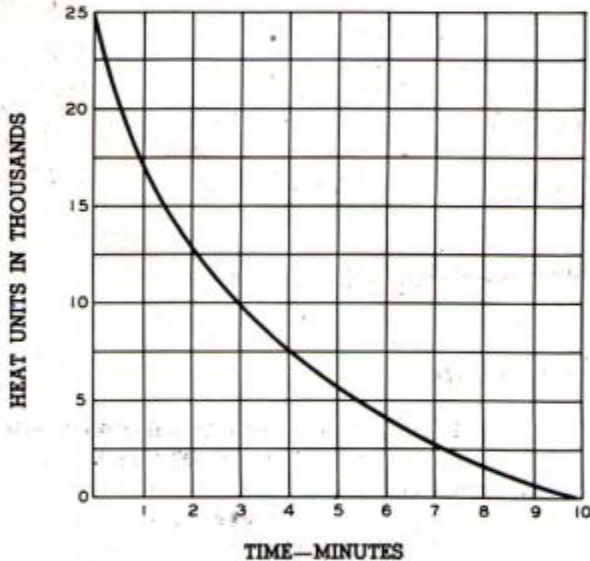
ANODE COOLING CHART

Proper use of the Anode Cooling Chart in conjunction with the Rating Chart permits maximum service to be obtained from the tube within its rating. The cooling curve indicates the number of heat units ($kvp \times ma \times sec$) 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 25,000. 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 25,000 H.U.

have been applied and the next exposure totals 10,000 H.U., the required cooling interval would be 1.4 minutes to stay within the heat capacity of the tube. Similarly, if 20,000 H.U. have been applied and the next exposure totals 20,000 H.U., the cooling interval of 4.9 minutes is the time required for the anode to cool from 20,000 H.U. to 5,000 H.U. in order to permit the additional 20,000 H.U. exposure to be made.

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.

ANODE COOLING CHART



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RATING CHART

