

**WAC 246-225A-060 General requirements for all dental X-ray systems.** Registrants shall use only dental X-ray systems and medical X-ray systems for dental imaging that meet the following requirements:

(1) The leakage radiation from the tube housing assembly, measured at a distance of one meter in any direction from the source, must not exceed 100 milliroentgens in one hour when the X-ray tube is operated at its leakage technique factors. The department will determine compliance by measuring leakage averaged over an area of 100 square centimeters with no dimension of that area greater than 20 centimeters.

(2) The HVL of the useful beam for a given X-ray tube potential must not be less than the values shown in Table 1 of this section. To determine the HVL at an X-ray tube potential which is not listed in Table 1 of this section, linear interpolation or extrapolation may be made.

Table 1

Design operating range (kVp)	Measured potential (kVp)	HVL (millimeters of aluminum equivalent)
70 and below	70 and below	1.5
Above 70	71	2.1
	80	2.3
	90	2.5
	100	2.7

(3) If two or more X-ray tubes are controlled by one X-ray exposure button, the tube or tubes in operation must be clearly marked before an exposure, on both the X-ray control panel and near or on the selected tube housing assembly.

(4) The tube housing assembly supports of a stationary, portable, or mobile X-ray system must be adjusted so that the tube housing assembly remains stable and does not drift during an exposure unless the tube housing movement during exposure is a designed function of the X-ray system. Except for X-ray systems specifically designed to be hand-held, an X-ray system or tube housing assembly must not be hand-held by anyone during the exposure.

(5) Except for CT X-ray systems that have a scram button, each X-ray control must have a dead-man button.

(6) Technique indicators must be set as follows:

(a) All exposure technique factors must be set on the control panel before the exposure begins, except when automatic exposure controls are used. When automatic exposure controls are used, any preselected settings for each exposure must be indicated.

(b) On equipment having fixed technique factors, the requirement in (a) of this subsection may be met by permanent markings or labels.

(7) Linearity must be measured and met as follows:

(a) The difference between the ratio of milliroentgens (mR) exposure to mAs at one mA or mAs setting and the ratio of mR exposure to mAs at another mA or mAs setting must not exceed 0.1 times the sum of the ratios. This is written as:

$$X_1 - X_2 \leq 0.10 (X_1 + X_2)$$

Where X1 and X2 are the ratios (mR/mAs) for each mA or mAs setting.

(b) The measurement must be performed at any selection of mA or mAs without regard to focal spot size, provided neither focal spot size is less than 0.45 millimeters.

(8) When four exposures are made at identical operating settings, the difference between the maximum exposure ( $E_{max}$ ) and the minimum exposure ( $E_{min}$ ) must be less than or equal to ten percent of the average exposure ( $E$ ). This is written as:

$$(E_{max} - E_{min}) \leq 0.1E$$

(9) The difference between the kVp indicated on an X-ray system and the measured kVp must not be greater than ten percent of the indicated kVp.

(10) Timers must be able to:

(a) Stop the exposure at a preset time interval, a preset product of current and time, a preset number of pulses, or a preset radiation exposure to the image receptor; and

(b) Reset automatically to the initial setting or to zero when the exposure is stopped.

(11) X-ray equipment must not be capable of making an exposure when the timer is set to the zero or off position if either position is provided.

(12) Each X-ray control must have a visual indicator (such as a light) or audible signal so that the operator knows that X-rays are being produced or the exposure is occurring or has ended.

(13) Registrants shall not use dental fluoroscopy without electronic amplification.

[Statutory Authority: RCW 70.98.050 and 70.98.080. WSR 11-19-013, § 246-225A-060, filed 9/7/11, effective 10/8/11; WSR 08-14-074, § 246-225A-060, filed 6/26/08, effective 7/27/08.]