**Section 360.90 Dental Radiographic Systems**

In addition to the provisions of Sections 360.10, 360.30 and 360.40 of this Part, the requirements of this Section apply to x-ray equipment and associated facilities used for dental radiography. Refer to Section 360.50 of this Part for requirements for dental fluoroscopic systems.

a) General Requirements

1) Timers. Means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, preset number of pulses or preset radiation exposure to the image receptor. Also, it shall not be possible to make an exposure when the timer is set to a zero or off position if either position is provided.

2) X-Ray Control. An x-ray control shall be incorporated into each x-ray system such that an exposure can be terminated by the operator at any time except for exposures of 0.5 second or less.

3) Exposure Switch Arrangement. The exposure switch shall be a dead-man switch and shall be arranged so that the operator can be behind a protective barrier or at least 1.83 meters (6 feet) from the patient and the tube housing during an exposure.

b) Additional Requirements for Dental Intraoral Systems

1) Source-Skin Distance (SSD). X-ray systems designed for use with an intraoral image receptor shall be provided with means to limit the SSD to not less than:

A) 18 centimeters if operable above 50 kVp; or

B) 10 centimeters if operable at 50 kVp and below.

2) Beam Limitation. Radiographic systems designed for use with an intraoral image receptor shall be provided with means to limit the x-ray beam such that the x-ray field, at the minimum SSD, shall be containable in a circle having a diameter of no more than 7 centimeters.

3) Dental Radiographic Exposure Limits (Single Film). The entrance exposure to an adult patient for a routine intraoral bitewing exam shall not exceed the limit specified for the kVp used in the table below. Exposures are specified as free-in-air exposures without backscatter.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tube Potential  (KVP) | "D" Speed Film | | "E" Speed Film | |
| (microC/kg) | (mR) | (microC/kg) | (mR) |
| 50 | 142 | 550 | 72 | 280 |
| 55 | 134 | 520 | 65 | 250 |
| 60 | 121 | 470 | 57 | 220 |
| 65 | 107 | 415 | 49 | 190 |
| 70 | 93 | 360 | 43 | 165 |
| 75 | 80 | 310 | 36 | 140 |
| 80 | 67 | 260 | 30 | 115 |
| 85 | 61 | 235 | 27 | 105 |
| 90 | 54 | 210 | 25 | 95 |
| 95 | 50 | 195 | 22 | 85 |
| 100 | 46 | 180 | 18 | 70 |

Linear extrapolation or interpolation shall be used for an x-ray tube potential (kVp) not listed in the table.

AGENCY NOTE: The exposures specified in the above table were empirically determined by a panel of dentists in a U.S. FDA study.

4) The kVp shall be measured at the time the entrance exposure is determined pursuant to subsection (b)(3) of this Section to determine the correct exposure limit to be applied.

c) Beam Limitation Requirements for Dental Extraoral Systems

1) Dental rotational panoramic systems shall be provided with means to limit the x-ray beam to the imaging slit in the transverse axis and shall not exceed a total of 13 millimeters (0.5 inch) larger than the imaging slit in the vertical axis.

2) All other dental extraoral radiographic systems (e.g., cephalometric) shall be provided with means to both size and align the x-ray field so that it does not exceed each dimension of the image receptor by more than two percent of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.

d) Additional Requirements for Dental Radiography

1) Patient and film holding devices shall be used when the techniques permit;

2) The tube housing and the position indicating device shall not be hand-held during an exposure;

3) The x-ray system shall be operated in such a manner that the useful beam at the patient's skin does not exceed the criteria specified in subsection (b)(2) of this Section;

4) Personnel Protection. The operator shall be behind a protective barrier or be provided with a protective apron of not less than 0.25 millimeter lead equivalent, or at least 1.83 meters (6 feet) from the patient and the tube housing during an exposure. Individuals whose presence is required in the room during an x-ray examination shall be protected from leakage and scatter radiation by protective aprons of not less than 0.25 millimeter lead equivalent or a protective barrier or shall be positioned at a sufficient distance to ensure that the individual does not receive a radiation dose in excess of the limits specified in 32 Ill. Adm. Code 340.310.

AGENCY NOTE: Strict adherence to radiation protection practices should minimize occupational dose and may eliminate the need for individual monitoring. The requirements for individual monitoring are specified in 32 Ill. Adm. Code 340.520.

(Source: Amended at 22 Ill. Reg. 5904, effective March 13, 1998)