Kansas Administrative Regulations

Department of Health and Environment

Article 35.—Radiation

28-35-242a. Administrative requirements.

(a) Radiation safety requirements. Each registrant shall be responsible for directing the operation of each X-ray system under the registrant's administrative control. The registrant or the registrant's agent shall ensure that the requirements of this part, which shall include the following requirements, are met.

(1) An X-ray system not meeting the provisions of these regulations shall not be operated for diagnostic purposes.

(2) Each individual who operates any X-ray system shall be instructed in the safe operating procedures and shall be competent in the safe use of the equipment. This instruction shall include the relevant topics specified in K.A.R. 28-35-256. Any combination of interview, observation, and testing may be used by the secretary to determine compliance. Each individual that operates an X-ray system shall be licensed if required by the board of healing arts.

(3) A chart shall be made available to the operator of each diagnostic X-ray system that specifies, for each examination performed with the system, the following information:

(A) The technique factors to be utilized, taking into account the patient's body part and anatomical size, body part thickness, and age;

(B) the type and size of the film or film-screen combination to be used;

(C) the type and focal distance of the grid to be used, if any;

(D) the source-image receptor distance to be used, except for dental intraoral radiography; and

(E) the type and placement of patient shielding to be used.

(4) The registrant of a facility shall create and make available to all X-ray operators written safety procedures, including patient holding procedures and any restrictions on the operating techniques required for the safe operation of the particular X-ray system.

The registrant shall ensure that the operator demonstrates familiarity with these procedures.

(5) Except for patients who cannot be moved out of the room, only the staff, ancillary personnel, and any other individuals required for the medical procedure or training shall be in the room during the radiographic exposure. All of the following requirements shall be met for each individual other than the patient being examined:

(A) Each individual shall be positioned so that no part of the body will be struck by the useful beam unless the body part is protected by not less than 0.5 millimeter of lead-equivalent material.

(B) The X-ray operator, other staff, ancillary personnel, and all other individuals required for the medical procedure shall be protected from the direct scattered radiation by protective aprons or whole-body protective barriers of not less than 0.25 millimeter of lead-equivalent material.

(C) All human patients who cannot be removed from the room shall be protected from the direct scattered radiation by whole-body protective barriers of not less than 0.25 millimeter of lead-equivalent material or shall be positioned so that the nearest portion of the body is at least two meters from both the tube head and the nearest edge of the image receptor.

(6) Gonad shielding of not less than 0.5 millimeter of lead-equivalent material shall be used during radiographic procedures in which the gonads are in the useful beam for all human patients who have not passed the reproductive age, except for cases in which this shielding would interfere with the diagnostic procedure.

(7) If a patient or film requires auxiliary support during a radiation exposure, all of the following safety requirements shall be met:

(A) Mechanical holding devices shall be used when the technique permits the use of these devices. The written safety procedures required by this regulation shall list the individual techniques for which holding devices cannot be utilized.

(B) The written safety procedures required by this regulation shall indicate the requirements for selecting a human holder and the procedure that the holder shall follow.

(C) The human holder shall be instructed in personal radiation safety and shall be protected in accordance with these regulations.

(D) No individual shall be used routinely to hold film or patients.

(E) If the patient holds the film, each portion of the body other than the area of clinical interest struck by the useful beam shall be protected by not less than 0.5 millimeter of lead-equivalent material, except during intraoral examinations.

(F) Each facility shall have a sufficient number of leaded aprons and gloves available to provide protection to all personnel who are involved with X-ray operations and who are otherwise not shielded.

(8) The procedures and auxiliary equipment designed to minimize patient and personnel exposure shall be commensurate with the needed diagnostic information and shall be utilized according to all of the following requirements:

(A) The speed of the screen and film combinations used shall be the fastest speed that is consistent with the diagnostic objective of the examinations. Film cassettes without intensifying screens shall not be used for any routine diagnostic imaging, with the exception of veterinary radiography and standard film packets for intraoral use in dental radiography.

(B) The radiation exposure to the patient shall be the minimum exposure required to produce images of good diagnostic quality.

(C) Portable or mobile X-ray equipment shall be used only for examinations during which transferring the patient or patients to a stationary X-ray installation is impractical.

(D) X-ray systems other than fluoroscopic dental intraoral systems and computed tomography X-ray systems shall not be utilized in any procedure in which the source-to-patient distance is less than 30 centimeters, unless specifically approved by the FDA. Veterinary systems shall not be subject to this limitation.

(E) If grids are used between the patient and the image receptor to decrease the amount of scattered radiation to the film and improve contrast, the grid shall be as follows:

(i) Positioned properly, including the tube side facing the right direction, with the grid centered to the central ray; and

(ii) if of the focused type, positioned at the proper focal distance for the SIDs being used.

(9) Each individual who is associated with the operation of an X-ray system shall be subject to the requirements of part 4 of these regulations.

(b) Records. Each registrant shall maintain the following minimum information for each X-ray system, for inspection by the department:

(1) The maximum rating of technique factors;

(2) the model and serial numbers of all certifiable components;

(3) the aluminum-equivalent filtration of the useful beam, including any routine variation;

(4) tube rating charts and cooling curves;

(5) records of surveys, calibrations, maintenance, and modifications performed on the X-ray system after the effective date of this regulation, with the name of each person who performed these services;

(6) a scale drawing of the room in which a stationary X-ray system is located, indicating the use of areas adjacent to the room and an estimation of the extent of occupancy by any individuals in these areas. In addition, the drawing shall include one of the following:

(A) The results of a survey for radiation levels present at the operator's position and at pertinent points outside the room at specified test conditions; or

(B) the type of thickness of materials, or lead equivalency, of each system; and

(7) a copy of all correspondence with the department regarding that X-ray system.

(c) X-ray utilization log. Except for veterinary facilities, each registrant shall maintain an X-ray log containing each patient's identifier, the type of each examination, and the date on which each examination was performed. When the patient or film is provided with human auxiliary support, the name of the human holder shall be recorded.

(d) X-ray film-processing facilities and practice.

(1) Each facility using a radiographic X-ray system and analog image receptors shall have available suitable equipment for handling and processing radiographic film in accordance with all of the following requirements:

(A) Each manual film-developing system shall meet all of the following requirements:

(i) The processing tanks shall be constructed of mechanically rigid, corrosion-resistant material.

(ii) The temperature of the solutions in the tanks shall be maintained within the range of 60° F to 80° F. All film shall be developed in accordance with the time-temperature relationships recommended by the film manufacturer or, in the absence of these recommendations, with the following time-temperature chart:

Time-Temperature Chart

Thermometer Reading (Degrees)		Minimum Developing Time (Minutes)
°C	**°F**	
26.7	80	2
26.1	79	2
25.6	78	2½
25.0	77	2½
24.4	76	3
23.9	75	3
23.3	74	3½
22.8	73	3½
22.2	72	4
21.7	71	4
21.1	70	4½
20.6	69	4½
20.0	68	5
19.4	67	5½
18.9	66	5½

18.3	65	6
17.8	64	6½
17.2	63	7
16.7	62	8
16.1	61	8½
15.6	60	9½

(iii) Devices shall be utilized that indicate the actual temperature of the developer and signal the passage of a preset time appropriate to the developing time required.

(B) Each automatic processor and any other closed processing system shall meet all of the following requirements:

(i) All film shall be developed in accordance with the time-temperature relationships recommended by the film manufacturer. In the absence of these recommendations, the film shall be developed using the following chart:

Developer Temperature		**Minimum Immersion Time[a]**
°C	**°F**	**Seconds**
35.5	96	19
35	95	20
34.5	94	21
34	93	22
33.5	92	23
33	91	24
32	90	25
31.5	89	26
31	88	27
30.5	87	28
30	86	29

29.5	85	30

[a] *Reflects immersion time only, with no crossover time included.*

(ii) The specified developer temperature and immersion time shall be posted in the darkroom or on the automatic processor.

(C) Each deviation from any requirements specified in paragraph (e)(1) shall be documented by the registrant in such a manner that the requirements are shown to be met or exceeded.

(2) In addition to the requirements specified in paragraph (e)(1), all of the following requirements shall be met:

(A) Pass boxes, if provided, shall be constructed to exclude light from the darkroom when cassettes are placed in or removed from the boxes and shall incorporate shielding from stray radiation to prevent any exposure of undeveloped film.

(B) The darkroom shall be lighttight and shall use safe lighting so that any film type exposed in a cassette to X-radiation sufficient to produce an optical density measuring from one to two when processed does not exhibit an increase in density greater than 0.1 when exposed in the darkroom for two minutes with all safe lights on. If daylight film-handling boxes are used, these boxes shall prevent any fogging of the film.

(C) Each darkroom typically used by more than one individual shall be equipped with a method to prevent accidental entry while undeveloped film is handled or processed.

(D) All film shall be stored in a cool, dry place and shall be protected from exposure to stray radiation. Film in open packages shall be stored in a lighttight container.

(E) All film cassettes and intensifying screens shall be inspected periodically and shall be cleaned or replaced as necessary to ensure radiographs of good diagnostic quality.

(F) Outdated X-ray film shall not be used for diagnostic radiographs, unless the film has been stored in accordance with the manufacturer's recommendations and a sample of the film passes a sensitometric test for the normal range of the base optical density plus fogging for the film speed.

(G) All film-developing solutions shall be maintained in strength by replenishment or renewal so that full development is accomplished within the time frame specified by the manufacturer.

(Authorized by and implementing K.S.A. 48-1607; effective Dec. 30, 2005.)