4732.0555 X-RAY FILM PROCESSING REQUIREMENTS.

Subpart 1. **Processing equipment.** A facility with a radiographic x-ray system using radiographic film must have available suitable equipment for handling and processing radiographic film according to the following provisions.

A. Manual processing:

(1) the temperature of solutions in the tanks must be maintained within the range of 60 degrees Fahrenheit to 80 degrees Fahrenheit (15.6 degrees Celsius to 16.7 degrees Celsius);

(2) film must be developed according to the time-temperature relationships recommended by the film and chemistry manufacturers, or in the absence of such recommendations, with the following time-temperature chart:

Time-Temperature Chart

Thermometer Reading Celsius Degrees	Thermometer Reading Fahrenheit Degrees	Minimum Developing Time (Minutes)
26.7	80	2
26.1	79	2
25.6	78	2-1/2
25.0	77	2-1/2
24.4	76	3
23.9	75	3
23.3	74	3-1/2
22.8	73	3-1/2
22.2	72	4
21.7	71	4
21.1	70	4-1/2
20.6	69	4-1/2
20.0	68	5
19.4	67	5-1/2
18.9	66	5-1/2
18.3	65	6
17.8	64	6-1/2

17.2	63	7
16.7	62	8
16.1	61	8-1/2
15.6	60	9-1/2

(3) thermometers must be used to indicate the actual temperature of the developer and a timer used to ensure the correct development time.

B. Automatic processing:

(1) films must be developed according to the time-temperature relationship recommended by the film and chemistry manufacturer;

(2) the registrant must have a copy of the film or chemical manufacturer's developing recommendations available for the operators. The developing recommendations must be available for inspection;

(3) thermometers must be used to verify the actual chemical temperatures to ensure they fall within manufacturer's specifications. If the processing equipment does not have a digital readout or ready light, the temperature must be checked daily, otherwise weekly temperature verification must be completed and documented.

Subp. 2. **Processing quality control.**

A. Processing quality control testing must be performed each day prior to any diagnostic films being processed at the facility. This is to be done by using:

(1) sensitometry and densitometry equipment;

(2) dental facilities with both extraoral and intraoral equipment using one processing method must use:

(a) a medical 11-step aluminum step wedge; or

(b) the automatic step wedge program installed on the panoramic equipment;

(3) dental facilities with only intraoral equipment must use a dental radiographic normalizing and monitoring device for the processor quality control test especially designed for intraoral processors;

(4) dental facilities with panoramic equipment with an automatic step wedge program installed by the manufacturer, must use that program for processor quality control;

(5) dental facilities with both extraoral and intraoral equipment that use two processing methods must use either subitem (2) and item B or subitems (2) and (3) depending on the type of extraoral equipment installed;

(6) medical or dental facilities that process less than ten patient films in a week may do the processing quality control test on the first day of the week; and

(7) exceptions to processing quality control tests are:

(a) all veterinary facilities; and

(b) dental facilities with only panoramic equipment without an automatic step wedge program installed by the manufacturer.

B. The sensitometry test in item A, subitem (1), must be performed and evaluated using the most sensitive clinical film or mammographic film if mammography films are processed in the same processor as other patient films.

Subp. 3. **Darkroom or glove box fog tests.**

A. The darkroom or glove box must be free of extraneous light and use proper safe lighting so that any film type in use when exposed to x-radiation will not suffer an increase in density during processing. If used, daylight film handling boxes must preclude fogging of the film.

B. The darkroom or glove box must be tested for film fog using the most sensitive clinical film or mammographic film if mammography films are processed in the same darkroom as other patient films. Tests for the film fog must be completed:

(1) at least every six months;

(2) anytime fog is suspected;

(3) anytime there is a filter or bulb change; and

(4) any other change in darkroom conditions.

C. In medical facilities, the amount of fog, the increase in optical density, for a two-minute test must not exceed 0.08 for radiographic film development.

D. In dental facilities with extraoral equipment, the amount of fog for a two-minute test must not exceed one step on either side of the designated step when using the step wedge for the fog test.

E. In dental facilities with intraoral equipment only, the amount of fog for a two-minute test must not allow visualization of the outline of a coin on the intraoral film.

Subp. 4. **Outdated x-ray film.** Outdated x-ray film must not be used for diagnostic radiographs, unless the film has been stored according to the manufacturer's recommendations and passes the sensitometric test, step wedge test, or the dental radiographic normalizing and monitoring device test for normal ranges of base plus fog and speed.

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