

**MN STATE SHIELDING REQUIREMENTS NEW 4732 Radiation Rule**

**4732.0355. GENERAL REQUIREMENTS FOR SHIELDING AGAINST IONIZING RADIATION.** This part applies to all facilities constructed or structurally remodeled after New Rule approval.

Subpart 1. **Applicability.** The registrant must ensure that the applicable structural shielding requirements specified in parts 4732.0355 through 4732.0380 are met. If an analysis of operating conditions indicates the possibility of an individual receiving an occupational dose or a dose to the public in excess of the limits in part 4732.0400 through 4732.0430, structural shielding modifications must be made.

Subp. 2. **Shielding details.** The shielding must be constructed so that the protection is not impaired by joints, by openings for ducts, pipes, etc. passing through the barriers, or by conduits, service boxes, etc. embedded in the barriers. The primary and secondary barriers must meet the dose limits in 4732.0400 through 4732.0430. This includes, but is not limited to, areas of walls containing wall-mounted image receptors.

Subp. 3. **Operator's booth design requirements.** The operator's booth, exposure control and viewing system must meet the following specifications:

A. Must have no less than 7.5 square feet (0.7 square meters) of unobstructed floor space with no dimension less than two feet (0.6 meters);

B. Must be located and constructed so the unattenuated direct scattered radiation does not reach the operator in the booth;

C. The booth walls must be permanently fixed barriers at least seven feet (2.1 meters) high.

D. The radiation exposure control placement must:

(1) be fixed within the booth;

(2) be at least 39 inches (one meter) from the edge of the control booth; and

(3) be placed to allow the operator to use the viewing window or other viewing device from within the booth.

E. The viewing system must be designed so that:

(1) each booth has at least one viewing device that will be placed so that the operator at the control panel may directly observe the patient, any other individual in the room, and any doorway into the room;

(2) if the viewing system is a window, the window must satisfy the following additional requirements:

(a) it must have the same lead equivalency as required in the booth's wall in which it is mounted;

(b) it must be a minimum viewing area of 350 square inches and must be constructed to afford x-ray operators an unobstructed view of the patient and all entrances into the room;

(c) it must be designed so the operator's expected viewing position is at least 18 inches (0.46 meters) from the edge of the booth.

Subp. 4. **Records.** The registrant must maintain all records of shielding plans and results of radiation surveys at the facility in accordance with 4732.0330.

**4732.0360. SHIELDING PLAN.** The registrant is required to have a shielding plan complete for new constructions or structural remodeling of their radiation producing equipment area(s).

Subpart 1. **Shielding plan requirements.** The shielding plan must show all basic assumptions used in the development of the shielding specifications and showing, as a minimum, the following:

- A. The dimensions of the room(s) concerned;
- B. The normal location of the radiation producing system's x-ray tube's general direction of the useful beam and the tube's travel and transverse limits;
- C. Locations of any windows, doors or other openings;
- D. The location of the operator's booth and the location of the control panel;
- E. The structural composition and thickness or lead equivalent of all walls, doors, partitions, and, if occupied spaces above or below, the floor and ceiling of the room(s) concerned;
- F. The make and model of the equipment;
- G. The maximum technique factors and the energy waveform (single phase, three phase, etc);
- H. The type of examination(s) or treatment(s) that will be performed with the equipment;
- I. Information on the anticipated workload of the system(s) in mA-minutes per week; and
- J. The use of areas adjacent and an estimation of the extent of occupancy in such areas.

Subp. 2. **Modifications.** The review of shielding plans must not preclude the requirement of additional modifications should a subsequent analysis of operating conditions indicate the possibility of an individual receiving a dose in excess of the dose limits prescribed in 4732.0400 through 4732.0430 of these rules.

Subp. 3. **Radiation survey.** After installation of radiation producing equipment, the registrant must perform or have performed a detailed radiation survey covering radiation levels at the operator position and at pertinent points outside the room during normal operation. The registrant must retain the results of the radiation survey as required by subpart 6.

Subp. 4. **Shielding review.** After January 1, 2007, the shielding plan must be submitted to the commissioner prior to any new construction or structural remodeling.

Subp. 5. **Exemptions.** The following are exempted from a shielding review:

- A. Dental facilities with only intraoral capabilities;
- B. Bone densitometry units including the pQCT units;
- C. Podiatry units;
- D. If the replacement of a piece of radiation producing equipment does not increase the risk of radiation beyond the dose limits in 4732.0400 through 4732.0430;
- E. Self-shielded x-ray systems, such as cabinet x-ray units, x-ray diffraction or fluorescence units with interlocked shield barriers; and
- F. For a self-shielded accelerator, the applicant need not submit an evaluation of a shielding design if an evaluation by an appropriate regulatory authority has been performed. The applicant must reference the evaluation and maintain a copy of the evaluated shielding design for commissioner review.

Subp. 6. **Records.** The following shielding plan documentation must be maintained on a permanent basis by the registrant of the facility:

- A. Shielding design data including all assumptions and specifications;
- B. Construction, or as-built, documents showing location and amounts of shielding material installed;
- C. Post-construction radiation survey reports;
- D. Information regarding remedies, if any was required;
- E. All reevaluations of the room shielding relative to changes in utilization, etc. that have been made.
- F. The shielding plan information must include the name of the individual completing the plan and the date on which it was completed.

Subp. 7. **Permanent placard.** A permanent placard must be mounted by the contractor in the room specifying the amount and type of shielding in each of the walls.

**4732.0365. ADDITIONAL SHIELDING REQUIREMENTS FOR DENTAL FACILITIES.**

The following shielding requirements are in addition to 4732.0355 and 4732.0360.

- A. When radiographic systems are installed in adjacent rooms or areas, protective barriers must be provided between the rooms or areas to ensure that the doses are as low as reasonably achievable (ALARA) and do not exceed the dose limits in 4732.0440 through 4732.0430.
- B. Each installation must be provided with a protective barrier for the operator or must be arranged so the operator can stand at least six feet from the patient and the tube head and not be in the path of the useful beam.
- C. Protective barriers must be arranged such that the operator is able to view the patient during the exposure.