

Minnesota Rules, Chapter 4732 X-ray Revision

PROPOSED DRAFT NON-MEDICAL HAND-HELD X-RAY SYSTEMS, 1.0

4732.#### NON-MEDICAL HAND-HELD X-RAY SYSTEMS.

Subpart 1. **Applicability.** A registrant's non-medical hand-held x-ray system must comply with the requirements of this part.

X-RAY SYSTEMS

Subp. 2. **Safety device.** A registrant is responsible for the requirements of this subpart.

The exposure switch of a non-medical hand-held x-ray system must:

- A. be able to terminate the exposure at any time during an exposure of greater than 0.5 seconds; and
- B. prevent an exposure when the timer is set to "zero" or "off" position if either position is provided.

Subp. 3. **Warning lights and devices.**

- A. A discernible and visible warning light, labeled with the x-ray words "X-RAY ON", or words having similar meaning, must be:
 - (1) located on or near the x-ray source and its controls; and
 - (2) illuminated when the x-ray source is energized.

Commented [BB(1)]: •Similar: NE, NC, ME, UT,
•SSRCR: Sec.H.8 (open beam lists as they should consider having safety device if RGD does not permit)
•Exempts Safety device: TX, RI, OH,

Commented [BB(2)]: Ohio

3701:1-68-03 **Commented [JC(3)]:** Ohio

3701:1-68-03

Commented [JC(4)]: Ohio 3701:1-68-03

Commented [BB(5)]: •Common wording: warning devices shall be labeled so that their purpose is easily identified. On equipment installed after effective date of these regulations, warning devices shall have a fail-safe design.
•Similar: OH, RI, PA, UT

B. The x-ray tube "on-off" status must be located near the radiation source housing. This requirement may be met if the warning lights are discernible and viewable by anyone near the useful beam.

Commented [BB(6): •SSRCR H8.(b)(i)
•Similar: OH, TX, RI, ME, UT

C. Warning devices must be labeled so that the purpose is easily identified. For equipment that is installed after the effective date of this part, a warning device must have a fail-safe design.

D. The shutter "open-closed" status must be located near each collimator on the x-ray source housing if the useful beam is controlled with a shutter.

Commented [JC(7): •Ohio
3701:1-68-04 Similar: TX, ME, RI, UT

Subp. 4. Beam ports. Unused beam ports on radiation source housings must be secured in the closed position to prevent opening.

Commented [JC(8): •SSRCR; page H13, Section H.8
OH, RI, ME, UT

Subp. 5. Shutters. For a non-medical hand-held x-ray system designed with shutters, each beam port on the radiation source housing must be equipped with shutters that cannot be opened unless either a collimator or a coupling has been connected to the beam port.

Commented [JC(9): •SSRCR H.8 (p. 13);
•Similar: OH, ME, UT, RI

Commented [JC(10): Focus Group: Is beam port needed here?

Subp. 6. Labeling. A registrant is responsible for labeling a non-medical hand-held x-ray system according to this subpart.

A. A non-medical hand-held x-ray system must be labeled near any switch that energizes an x-ray tube with a visible and discernible sign bearing the radiation symbol and the words "CAUTION RADIATION - THIS EQUIPMENT PRODUCES IONIZING RADIATION WHEN ENERGIZED", or other words having similar meaning.

Commented [JC(11): Similar: OH, ME, UT

- B. A non-medical hand-held x-ray system must be labeled at or near the x-ray beam port to identify the location of the beam with the words "CAUTION - HIGH INTENSITY X-RAY BEAM", or other words having similar meaning.

Commented [BB(12)]: Similar: OH, ME, UT

Subp. 7. Safety device evaluation. A registrant is responsible for the evaluation of a safety device for a non-medical hand-held x-ray system:

Commented [JC(13)]: SSRRCR; page H6, Section H.6 (j);

- A. upon installation; and
- B. at intervals not to exceed 180 days.
- C. A safety device evaluation includes:
- (1) safety device under subpart 2;
 - (2) warning lights;
 - (3) warning devices; and
 - (4) shutters, if applicable.
- D. A safety device evaluation must verify that:
- (1) a non-medical hand-held x-ray safety device is functioning as designed; and
 - (2) all labels are legible and visible.
- E. If a non-medical hand-held x-ray safety device is not functioning as designed, then it must be:
- (1) labeled immediately as defective; and
 - (2) removed from service until the safety device is repaired.
- F. A registrant must maintain a record of safety device evaluations for a non-medical hand-held x-ray system. The record must include:
- (1) the dates of evaluations;

Commented [JC(14)]: NC: 3 months

Commented [JC(15)]: SSRRCR; page H9, Section H.6 (j)

- (2) a list of the safety devices evaluated;
- (3) the results of the evaluation;
- (4) the name of the individual performing the evaluation; and
- (5) corrective actions recommended and performed for any safety device that fails the required evaluation.

G. Before a non-medical hand-held x-ray system is returned to service after being locked-out and tagged, it must be evaluated before use if the date of the last safety device evaluation exceeds the 180-day interval under item B.

H. A non-medical hand-held x-ray system that is locked out and tagged "DO NOT USE" by the radiation safety officer is exempt from this subpart.

Commented [BB(16)]: Similar: OH

Subp. 8. **Radiation emission limit.** A non-medical hand-held x-ray system must be located and arranged to include sufficient shielding or access controls to prevent radiation emission that may result in a dose to an individual in excess of the dose limits under part 4732.####. The dose limits must be met at the maximum operating parameters.

Commented [BB(17)]: Similar: OH, RI, ME, UT

AREA SURVEY REQUIREMENTS

Subp. 9. **Area survey.** A registrant is responsible for an area survey of a non-medical hand-held x-ray system that complies with the radiation emission requirements under subpart

8. Qualified personnel must perform an area survey:

- A. after any maintenance that requires the disassembly or repair of the non-medical hand-held x-ray system; and
- B. with radiation survey instruments calibrated according to part 4732.####.

Commented [BB(18)]: Similar: OH, RI, PA, ME

CONDITIONS OF OPERATION

Subp. 10. **Safety Procedures.** A registrant must develop and comply with operating and emergency procedures for a non-medical hand-held x-ray system.

Commented [BB(19)]: SSRRCR; page H4, in definitions

- A. Operating and emergency procedures may be maintained in electronic or written form;
- B. Operating and emergency procedures must include:
 - (1) storage and security of a hand-held x-ray system to prevent unauthorized use, removal, or accidental production of ionizing radiation when the non-medical hand-held x-ray system is not under the control and constant surveillance of an operator or the registrant;
 - (2) verification of the operability and safety of the non-medical hand-held x-ray system before each use, and any corrective measures performed;
 - (3) equipment malfunctions;
 - (4) minimizing exposure of individuals in the event of an accident;
 - (5) notifying proper personnel in the event of an accident; and
 - (6) locked out and tagged.
- C. No individual may operate a hand-held x-ray system in any manner other than that specified in the operating procedures unless the individual has obtained approval from the radiation safety officer (RSO). Approval may be authorized electronically or in written form.
- D. Operating and emergency procedures must be available to an operator of a hand-held x-ray system.

Commented [BB(20)]: SSRRCR; page H8, section H.6. (h)

Commented [BB(21)]: SSRRCR, Sec. I.10 (f),

Subp.11. **Temporary job site.** A registrant must maintain copies of the following documents and records with a non-medical hand-held x-ray system:

- A. certificate of registration; and
- B. operating and emergency procedures.

Subp. 12. **Storage and security; notification in event of theft or loss.**

- A. A non-medical hand-held x-ray system must be:
 - (1) stored when not in use by being secured in a locked area of the facility; and
 - (2) secured against unauthorized or accidental use.
- B. A registrant must notify the commissioner of the theft or loss of a non-medical hand-held x-ray system according to part 4732.####.

Subp. 13. **Operator protection.** A registrant is responsible for the requirements of this subpart.

- A. An individual or an operator must not hold a sample while the non-medical hand-held x-ray system is operating;
- B. An operator must not aim the useful beam at any individual during operation of the non-medical hand-held x-ray system;
- C. The exposure switch of a non-medical hand-held x-ray system must be a "dead-man" type;
- D. An operator is not required to wear a lead apron while using a non-medical hand-held x-ray system if it is equipped with a backscatter shield; and
- E. An individual must maintain a distance of at least 6 feet (1.8 meters) from the tube housing assembly and the useful beam while exposures are made using a

Commented [JC(22)]: OH has a similar provision.

Commented [JC(23)]: Focus group: Open discussion around higher output hand-held industrial x-ray equipment.

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non-medical hand-held x-ray system. If an individual must be within 6 feet of the tube housing assembly, then the individual must wear a 0.5 millimeter lead equivalent apron.

F. An x-ray fluorescence hand-held system is exempt from item E.

Subp. 14. Records.