



Minnesota Rules, Chapter 4732 X-ray Revision

DRAFT NON-MEDICAL HAND-HELD X-RAY SYSTEMS, 2.0

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

Summary of Changes

MDH made a number of changes to the Non-Medical Hand-Held X-ray Systems v1.0 rule draft based on the industrial focus group's review and feedback at the February 9, 2018 meeting. The changes are described below.

Subp. 3. Warning lights and devices

- Deleted item 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.”

Subp. 4. Beam ports.

- Deleted this subpart.

Subp. 4. Labeling. [Renumbered]

- No changes.

Subp. 5. Shutters.

- Deleted this subpart.

Subp. 5. Safety device evaluation. [Renumbered]

- Revised item A.

Subp. 6. Radiation emission limit. [Renumbered]

- No changes.

Subp. 7. Area survey. [Renumbered]

- Form changes.
- Added new item C – “An x-ray fluorescence non-medical hand-held x-ray system is exempt from this subpart.”

Subp. 8. Safety procedures. [Renumbered]

- Item B. Revisions to subitem (3) in bold: “responding to equipment malfunctions”

Subp. 10. Utilization data [New]

- Added new subpart.

Subp. 11. Storage and security; notification in event of theft or loss. [Renumbered]

- No changes.

Subp. 12. Operator protection. [Renumbered]

- Added "other than the operator" to **item D** (formerly item E).
- Added new **item F**. Requirement to use a tube stand in certain situations.
- Revised **item G** (formerly item F) to include internal reference to items D and E.

Subp. 13. Records. [Renumbered]

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 visible and discernible 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.
- 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 visible and discernible by anyone near the useful beam.

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)]: Similar: OH, RI, PA, UT

Commented [TP(6)]: Advisory Committee

discussion: This wording is used in Industrial Radiography. Discussion on this: X-ray source vs. Switch

(1) located near a switch that energizes an x-ray tube

Commented [BB(7)]: •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.

Subp. 4. 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(8)]: Similar: OH, ME, UT

- B. A non-medical hand-held x-ray system must be labeled at or near the x-ray exit 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(9)]: Similar: OH, ME, UT

Subp. 5. Safety device evaluation. A registrant is responsible for a safety device evaluation of a non-medical hand-held x-ray system:

Commented [JC(10)]: SSRCR; page H6, Section H.6 (j);

- A. upon arrival; and
- B. at intervals not to exceed 180 days.
- C. For purposes of this subpart, a safety device evaluation includes:
- (1) safety device under subpart 2;
 - (2) warning lights;
 - (3) warning devices; and
 - (4) shutters, if applicable.

Commented [JC(11)]: NC: 3 months

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 visible and discernible.

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;
- (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. When 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 [JC(12)]: SSRCR; page H9, Section H.6 (j)

Commented [BB(13)]: Similar: OH

Subp. 6. **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

Commented [BB(14)]: Similar: OH, RI, ME, UT

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.

AREA SURVEY REQUIREMENTS

Subp. 7. Area survey.

- A. 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 6.
- B. Qualified personnel must perform an area survey with radiation survey instruments calibrated according to part 4732.####.
- C. An x-ray fluorescence non-medical hand-held x-ray system is exempt from this subpart.

CONDITIONS OF OPERATION

Subp. 8. Safety Procedures. A registrant must develop and comply with operating and emergency procedures for a non-medical hand-held x-ray system.

Commented [BB(15)]: 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 non-medical 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) daily visual and operability checks of the non-medical hand-held x-ray system before use on each day to verify that

- a) the equipment is in good working condition; and
- b) required labeling under subpart 4 is present.
- c) If equipment problems are found during a daily check, then the equipment must be removed from service until it is repaired.

(3) responding to 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 non-medical 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.

Commented [BB(16)]: SSRCR; page H8, section H.6. (h)

D. Operating and emergency procedures must be available to an operator of a hand-held x-ray system.

Commented [BB(17)]: SSRCR, Sec. I.10 (f),

Subp.9. 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. 10. Utilization data. A registrant must maintain utilization data for a non-medical hand-held x-ray system when used off-site. Utilization data include:

Commented [BB(18)]: Ohio 3701:1-68-03
Similar: NJ, NC

- A. manufacturer, model number, and serial number;
- B. location and dates of use; and
- C. identity and authorization or signature of the operator.
- D. Utilization data for a non-medical hand-held x-ray system may be maintained in electronic or written form.

Subp. 11. Storage and security; notification in event of theft or loss.

- A. A registrant must develop and implement written procedures for storage and security of a non-medical handheld x-ray system to prevent unauthorized use or removal when an x-ray system for non-medical handheld x-ray system is not under the control and constant surveillance of an operator or the registrant.
- 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. 12. 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 individual, other than the operator, must maintain a distance of at least 6 feet (1.8 meters) from the tube housing assembly and the useful beam while

Commented [JC(19)]: OH has a similar provision.

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exposures are made using a 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; and

E. 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.

F. If an operator is using a non-medical hand-held x-ray unit in a position that increases the operator's exposure to scatter radiation, then the operator must be protected from the scatter radiation by using a tube stand.

G. An x-ray fluorescence non-medical hand-held x-ray system is exempt from items D and E.

Subp. 13. Records.