

# **Guidance in Bold Text**

## Rule 3701:1-68-03    Effective 06/30/2023

### Non-medical radiographic systems

In addition to the applicable rules in this chapter and Chapter 3701:1-38 of the Administrative Code, handlers of radiographic systems will comply with the following:

(A) Radiographic systems will meet the following equipment standards:

(1) A lock designed to prevent unauthorized or accidental production of ionizing radiation will be provided.

**Each non-medical radiographic unit needs to be provided with a security locking system.**

**Typically, this is a key or password that is activated from the control panel. However, a locked entry to the room that houses the control panel may also meet this requirement.**

(2) A readily visible warning light, labeled with the words "X-RAY ON" or words or symbols having a similar intent, will be located on or near the x-ray source and its controls and will be illuminated when the x-ray source is energized.

**Warning lights labeled "X-ray On" or similar wording, need to be located on or near the x-ray source and need to function properly.**

(3) All radiographic systems will be labeled with a readily discernible sign or signs bearing the radiation symbol and the words:

(a) "CAUTION - HIGH INTENSITY X-RAY BEAM," or appropriate words having a similar intent, on or near the x-ray source housing; and

(b) "CAUTION - THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED," or appropriate words having a similar intent, near any switch or control that directly energizes the unit.

**Non-medical radiographic systems need to have a "CAUTION - HIGH INTENSITY X-RAY BEAM" label, or words that have a similar meaning on or near the x-ray source housing.**

(4) Permanent radiographic installations will be equipped with the following:

**Non-medical permanent radiographic installations are radiographic systems enclosed in a shielded room, cell, or vault.**

**A high radiation area - means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of one millisievert (0.1 rem) in one hour at thirty centimeters from the radiation source or thirty centimeters from any surface that the radiation penetrates.**

(a) Failsafe interlocks at each entrance used for personnel access to the high radiation area;

**Failsafe interlocks need to be located at each high radiation area personnel entrance for permanent radiographic equipment.**

**A 'failsafe' interlock is one that will prevent the emergence of the primary beam upon failure of the interlock, according to 68-01(B)(10).**

(b) A visible signal that is activated when radiation is produced; and

**Visible signals need to be activated when radiation is produced by a permanent radiographic equipment. This visible signal is outside the shielded room, cell, or vault, typically over each entrance used for personnel access.**

- (c) An audible signal that is activated when an attempt is made to enter the high radiation area while radiation is being produced.

**Audible signals need to be activated while radiation is being produced by a permanent radiographic equipment and an attempt to enter the area is made.**

(5) The exposure switch of hand-held radiographic systems will meet the following:

- (a) The switch will be of the "dead-man" type;

**Hand-held radiographic systems exposure switches need to terminate exposure when the button is no longer pressed.**

- (b) The operator will be able to terminate the exposure at any time during an exposure of greater than one-half second; and

**Operators need to be able to terminate an exposure lasting longer than one-half second, whether by dead-man switch or a "Stop or Off Button."**

- (c) It will not be possible to make an exposure when the timer is set to "zero" or "off" position if either position is provided.

**Hand-held radiographic should not operate in the "zero" or "off" setting.**

(B) Handlers of radiographic systems will comply with the following radiation safety obligations:

- (1) Sufficient calibrated and operable radiation survey instruments will be maintained to make physical radiation surveys as obligated by this rule and rule 3701:1-38-14 of the Administrative Code. Radiation survey instruments obligated by this rule will have a range such that 0.2 millisievert (two millirem) per hour through 0.01 sievert (one rem) per hour can be measured.

**Sufficient calibrated and operable radiation survey instruments need to be maintained. Multiple radiographic rooms may require additional devices if operated simultaneously. The survey instruments need to have a range of 0.2 mSv/hr to 0.01 Sv/hr.**

**If radiation surveys are completed by the handler (facility). The facility will have onsite:**

- The radiation survey instrument(s) used for in-house and mobile radiation surveys.
- The radiation survey instruments need to measure a range of 2 millirem to 1 rem per hour.
- Current calibration records of the radiation survey instrument(s) used that meet the calibration requirements of rule 3701:1-68- 02(B).

**Note:**

- o In accordance with rule 3701:1-68-02(A)(10), the record of the radiation survey will include the data and test results.
- o In accordance with rule 3701:1-68-02(A)(13), the records of radiation surveys will be kept until the director terminates the registration.

**If the radiation surveys are completed by a third-party. The facility will have onsite:**

- **Current calibration records of the radiation survey instrument(s) used that meet the calibration requirements of rule 3701:1-68- 02(B).**
- **Evidence (specification documents) that the radiation survey instrument(s) used can measure a range of 2 millirem to 1 rem per hour.**

**Note:**

- o **In accordance with rule 3701:1-68-02(A)(10), the record of the radiation survey will include the data and test results.**
- o **In accordance with rule 3701:1-68-02(A)(13), the records of radiation surveys will be kept until the director terminates the registration.**

(2) Radiation area surveys will be performed and the results recorded to confirm compliance with paragraph (A) of rule 3701:1-38-14 of the Administrative Code in accordance with the following:

(a) Upon installation;

**A radiation area survey will be performed, and results recorded upon installation to confirm compliance with the dose limits of Chapter 3701:1-38, as required by rule 3701:1-38-14(A).**

**A radiation area survey will be performed, and the results recorded annually after the initial radiation area survey to confirm compliance with the dose limits of Chapter 3701:1-38, as required by rule 3701:1-38-14(A).**

**Dose Limits:**

- **Rule 3701:1-38-12(A) requires the licensee or registrant to limit the occupational dose to an adult, as follows:**

- o **An annual limit, which is the more limiting of:**

- ♣ **The total effective dose equivalent being equal to 0.05 Sievert (five rem); or**
- ♣ **The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 Sievert (fifty rem).**

- o **The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are:**

- ♣ **A lens dose equivalent of 0.15 Sievert (fifteen rem); and**
- ♣ **A shallow-dose equivalent of 0.5 sievert (fifty rem) to the skin of the whole body or to the skin of any extremity.**

- **Rule 3701:1-38-13(A)(1) requires total effective dose equivalent to individual members of the public from the licensed or registered operation does not exceed one millisievert (0.1 rem) in a year.**

- **Rule 3701:1-38-13(A)(2) requires the dose in any unrestricted area from external radiation sources not exceed 0.02 millisievert (0.002 rem) in any one hour.**

**Rule 3701:1-68-02(A)(10) requires radiation survey records to include the data and test results of the evaluations of the shielding and surroundings.**

**Rule 3701:1-68-02(A)(13), requires radiation survey records to be maintained until the director terminates the registration.**

- (b) After any changes in shielding or the radiographic system that is part of permanent radiographic installation; and

**A radiation survey needs to be performed after changes in the shielding or the permanent radiographic system to confirm compliance with the dose limits of Chapter 3701:1-38, as required by rule 3701:1-38- 14(A).**

- (c) Each time the radiographic system has been moved to an area that has yet to be evaluated for radiation levels at temporary job sites.

**A radiation survey needs to be performed every time the radiographic system is moved to an un-evaluated area at a temporary job site to confirm compliance with the dose limits of Chapter 3701:1-38, as required by rule 3701:1-38- 14(A).**

- (3) A physical radiation survey will be made after each radiographic exposure to verify that the radiation-generating equipment is not still producing radiation unless:

**A physical radiation survey needs to be made after each exposure to ensure the exposure is properly terminated, unless appropriate monitoring devices have been utilized such as a stationary area monitor or a personnel monitoring device with an audible signal**

- (a) Personnel devices providing an audible signal when activated by radiation and proper operation of the audible detection device is checked and recorded daily;

**If personnel devices providing audible signal are used for the physical radiation entry surveys, the devices need to be checked and recorded daily.**

- (i) The audible device will be designed so as to clearly indicate entry into a 0.02 mSv (two mrem) per hour or greater radiation field; and

**If personnel devices providing audible signal are used for the physical radiation entry surveys, the devices need to be designed to detect entry into a two mrem per hour or greater radiation field.**

- (ii) All personnel working with the radiation-generating equipment will be provided with such a device; or

**If personnel devices providing audible signal are used for the physical radiation entry surveys, all personnel working with the RGE are required to have and use the device.**

- (b) Stationary area monitors providing an audible signal when activated by radiation will be acceptable and proper operation of the stationary detection device is checked and recorded daily;

**If stationary area monitors are used for physical radiation entry surveys, the proper operation of the monitors need to be checked and recorded daily.**

- (i) The stationary device will be designed so as to clearly indicate entry into a 0.02 mSv (two mrem) per hour or greater radiation field; and

**If stationary area monitors are used for physical radiation entry surveys, the monitors need to be designed to detect entry into a two mrem per hour or greater radiation field.**

- (ii) Stationary area monitors will be evaluated annually to verify that the audible signal activates in a 0.02 mSv (two mrem) per hour radiation field.

**If stationary area monitors are used for physical radiation entry surveys, the monitors need to be evaluated annually to determine that the audible signal operates in a two mrem per hour radiation field.**

(4) A utilization log will be maintained between inspections showing the following information for each radiographic system used:

- (a) Manufacturer, model number, and serial number;
- (b) Locations and dates of use;
- (c) Operating voltage, tube current, and exposure time for each radiographic exposure; and
- (d) Identity of the operator.

**A utilization log needs to be maintained between inspections. The log needs to contain the equipment information, location, dates of use, operating parameters used and the identity of the operator.**

(5) Operating and emergency procedures will include instructions in at least the following:

- (a) Inspection, maintenance and operability checks of radiographic systems and radiation survey instruments;

**The operating and emergency procedures need to include inspection, maintenance and operability checks of radiographic systems and radiation survey instruments.**

- (b) Minimizing additional exposure of individuals in the event of an accident;

**The operating and emergency procedures need to address methods to minimize additional exposure of personnel in the event of an accident.**

- (c) Notifying proper personnel in the event of an accident; and

**The operating and emergency procedures need to address notifying proper personnel in the event of an accident.**

- (d) Identifying and reporting defects and noncompliance according to the obligations of rule 3701:1-38-23 of the Administrative Code, involving:

- (i) The failure of any component, which is critical to safe operation of the device to properly perform its intended function;
- (ii) The failure of an indicator on non-medical radiation-generating equipment to show that radiation is being produced;
- (iii) The failure of an exposure switch to terminate production of radiation when turned to the off position; or
- (iv) The failure of a safety interlock to terminate x-ray production.

**The operating and emergency procedures need to address identifying and reporting defects and noncompliance.**

**Defects and Noncompliance's Include:**

- **Failure of any component critical to safe operation of the x-ray device.**
- **Failure of an x-ray on indicator.**
- **Failure of an exposure switch.**
- **Failure of a safety interlock.**

(6) At least two qualified individuals will be present at a temporary job site when a radiographic system is being used. At least one of the individuals will be the radiographer to whom the radiographic system is assigned and the other individual will be either a radiographer or a radiographer's assistant.

**Radiographic equipment operated at a temporary job site requires two qualified individuals to operate it. A radiographer will be one of those individuals and the other can either be a radiographer or radiographer's assistant.**

(7) No individual other than a radiographer or a radiographer's assistant who is under the personal supervision of a radiographer will manipulate controls or operate equipment used in radiographic operations. The personal supervision will include:

- (a) The radiographer's physical presence at the site where the radiographic system is being used;
- (b) The availability of the radiographer to give immediate assistance if obligated; and
- (c) The radiographer's direct observation of the radiographer's assistant's performance of the operations referred to in this rule.

**Non-medical radiographic equipment needs to be operated by a radiographer or a radiographer under the direct observation of a radiographer. A radiographer needs to be physically present on site and available to provide immediate assistance.**

(8) The handler will not permit any individual to act as a radiographer or as a radiographer's assistant unless, at all times during radiographic operations, each such individual wears, on the trunk of the body, an appropriate direct reading dosimeter and a personnel dosimeter. Analog pocket dosimeters will be recharged at the start of each shift. Electronic dosimeters will be battery-tested at the beginning of each shift. Each personnel dosimeter will be assigned to and worn by only one individual and the handler will assure that:

**All non-medical equipment operators need to be provided with both a direct read dosimeter and a personnel dosimeter. Direct read monitors need to be checked at the start of each shift. Each operator should have their own dosimeter.**

**The handler needs to ensure that:**

- **Each radiographer and radiographer assistant wear the direct reading and personnel dosimeters on the trunk of their bodies.**
- **Analog pocket dosimeters are recharged at the start of each shift.**
- **Electronic dosimeters are battery-tested at the beginning of each shift.**

**The results of checks, tests, or evaluations need to be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (a) Direct reading dosimeters are read and exposures are recorded at the beginning and end of each shift.

**Direct reading dosimeters need to be read, and the exposures recorded at the beginning and end of each shift.**

**The results of checks, tests, or evaluations will be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (b) If an individual's pocket dosimeter is found to be off-scale, or the electronic personnel dosimeter reads greater than two millisieverts (two hundred mrem), the individual's personnel dosimeter will be sent for processing within twenty-four hours. In addition, the individual will not resume work associated with the use of x-ray sources until a determination of the individual's radiation exposure has been made. This determination will be made by the individual responsible for radiation protection (IRRP) or the IRRP's designee and the results of this determination will be recorded.

**If an individual's pocket dosimeter or electronic dosimeter is found off scale or exceeds 200 mrem, the personnel dosimeter needs to be sent for processing within 24 hours. The affected individuals should not resume work until the personnel dosimeter is processed. The results need to be recorded.**

**The record of the determination of the individual's radiation exposure will be maintained until the registration is terminated by the Director, as required by rule 3701:1-68-02(13)(a).**

- (9) The handler will not permit any individual to perform radiographic operations unless, at all times during radiographic operations, each such individual wears, on the trunk of the body, a personnel monitoring device that will be calibrated for the x-ray energies being utilized.

**Personnel monitoring devices need to be supplied to each radiographic operator and the devices need to be calibrated for the x-ray energies emitted by the radiation generating unit.**

**The handler needs to ensure that each radiographer and radiographer assistant wear the personnel monitoring device on the trunk of his/her body.**

- (a) Personnel dosimeters will be exchanged monthly unless the IRRP has performed an evaluation that indicates a longer frequency is adequate; in this instance the frequency will not exceed three months.

**Personnel dosimeters need to be exchanged monthly, unless the IRRP deems a longer frequency is adequate. Exchange time needs to be at a minimum every three months.**

- (b) If a personnel dosimeter is lost or damaged, the worker will cease work immediately until a replacement personnel dosimeter is provided and the exposure is calculated for the time period from issuance to loss or damage of the personnel dosimeter. This calculation will be made by the IRRP or the IRRP's designee. The results of the calculated exposure and the time period for which the personnel dosimeter was lost or damaged will be recorded.
- (i) After replacement, each personnel dosimeter will be returned to the supplier for processing within fourteen calendar days of the end of the monitoring period; or
- (ii) In circumstances that make it impossible to return each personnel dosimeter in fourteen calendar days, such circumstances will be recorded.

**If a personnel dosimeter is lost or damaged, the affected worker needs to cease working until a replacement dosimeter is provided and the exposure is calculated by the IRRP. Replacement dosimeters need to be returned to the supplier for processing within 14 calendar days. If it is not possible to return the dosimeters within 14 days, the reason needs to be recorded.**

**Records regarding an individual's exposure and dosimeters, are to be maintained until registration is terminated by the Director as required by 3701:1-68-02(13)(a), (b) and (c).**

(10) During each radiographic operation, the radiographer, radiographer's assistant or operator will maintain surveillance of the operation to protect against unauthorized entry into a high radiation area, except:

- (a) When the high radiation area is equipped with interlocks and signals as described in paragraph (A)(4) of this rule; or

**A radiographer or radiographer's assistant needs to observe the operation of the x-ray unit to protect against unauthorized entry into a high radiation area, unless the enclosed radiographic system has interlocks and visual signals prior to entry.**

**A high radiation area - means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of one millisievert (0.1 rem) in one hour at thirty centimeters from the radiation source or thirty centimeters from any surface that the radiation penetrates.**

- (b) When the high radiation area is locked to protect against unauthorized or accidental entry.

**A radiographer or radiographer's assistant needs to observe the operation of the x-ray unit to protect against unauthorized entry into a high radiation area, unless the entry to an enclosed radiographic system is locked to protect against unauthorized entry.**

**A high radiation area - means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of one millisievert (0.1 rem) in one hour at thirty centimeters from the radiation source or thirty centimeters from any surface that the radiation penetrates.**

(11) When performing radiographic operations at a location other than a permanent radiographic installation having the control devices specified in paragraph (B)(10) of this rule, the industrial radiographer will be responsible for:

- (a) Posting signs bearing the radiation symbol and the words "CAUTION HIGH RADIATION AREA" at the perimeter of the calculated high radiation area;

**For radiographic equipment that is not operated in an enclosed shielded room, cell or vault, the radiographer needs to post signs bearing the radiation symbol and the words "CAUTION HIGH RADIATION AREA " at the perimeter of the calculated high radiation area.**

**A high radiation area - means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of one millisievert (0.1 rem) in one hour at thirty centimeters from the radiation source or thirty centimeters from any surface that the radiation penetrates.**

- (b) Restricting access by using appropriate barriers, such as rope or tape, and posting signs bearing the radiation symbol and the words "CAUTION RADIATION AREA" at the perimeter of the restricted area; and



**For radiographic equipment that is not operated in an enclosed shielded room, cell or vault, the radiographer needs to restrict access to radiation areas by using appropriate barriers, such as rope or tape and posting signs bearing the radiation symbol and the words "CAUTION RADIATION AREA " at the perimeter of the restricted area.**

- (c) Maintaining constant visual surveillance of the restricted area boundary to prevent access by unauthorized personnel.

**The radiographer needs to constantly survey the restricted area boundaries to prevent unauthorized access by unauthorized personnel.**

- (C) In addition to the radiation protection obligations in rule 3701:1-68-02 of the Administrative Code, handlers of radiographic systems will comply with the following:

- (1) Radiation survey instrumentation described in paragraph (B)(1) of this rule will be checked and the results recorded at the beginning of each work shift using check sources or other appropriate means to ensure it is operating accurately. If any check conducted reveals the radiation survey instrumentation is not operating accurately, the instrument will not be used to meet the survey obligations of paragraph (B)(2) of this rule.

**The handler's written radiation protection program needs to include procedures for checking survey instruments and recording the results of the check at the beginning of each shift for proper functionality. The procedures need to identify that if the check reveals that the radiation survey instrument is not functioning properly the survey instrument cannot be used for radiation surveys.**

**The results of checks, tests, or evaluations need to be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (2) Radiographic systems will be checked and the results recorded prior to each shift of use to ensure all necessary labeling is present and identify any obvious defects. If any check conducted reveals damage to components critical to radiation safety, the device will be locked out and tagged "DO NOT USE" until repairs have been made.

**The handler's written quality assurance program needs to be include procedures for checking required radiation warning labels and components of radiographic systems and recording the results of the checks at the beginning of each shift. The procedures need to identify that if the check reveals damage to components critical to radiation safety, the radiographic system will be locked out and tagged "DO NOT USE" until repairs have been made.**

**The results of checks, tests, or evaluations need to be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (3) Entrance interlocks and signals described in paragraph (A)(4) of this rule, will be tested and the results recorded at the beginning of each day of equipment use to ensure proper operation. If an entrance interlock or signal is operating improperly, it will be immediately labeled as defective and repaired or replaced within seven calendar days. The facility may continue operations during this seven-day period, provided the handler implements the continuous surveillance obligations of this rule.

**The handler's written quality assurance program needs to include procedures for testing entrance interlocks and signals of permanent radiographic installations and recording the results of the checks at the beginning of each shift. The procedures will identify that if any**

components of the entrance interlocks or signals are found defective,

- **The components will be immediately labeled as defective, and if the permanent radiographic system is to continue to be used, it will be under continuous surveillance and the component(s) repaired or replaced within 7 calendar days.**
- **Otherwise, the components will be immediately labeled as defective, and the permanent radiographic system shall not be used until the components are repaired or replaced.**

(4) The following documents and records will be available for inspection at each temporary job site:

(a) Appropriate certificate of registration;

**The handler needs to provide a certificate of registration at each temporary job site here non-medical radiographic equipment is operated.**

(b) Operating and emergency procedures;

**The handler needs to provide a copy of the operating and emergency procedures at each temporary job site where non-medical radiographic equipment is operated.**

(c) Applicable rules promulgated pursuant to Chapter 3748. of the Revised Code;

**The handler needs to provide a copy of all applicable rules at each temporary job site where non-medical radiographic equipment is operated.**

(d) Surveys obligated pursuant to this rule and rule 3701:1-38-14 of the Administrative Code for the period of operation at the site;

**The handler needs to provide a copy of required surveys at each temporary job site where non-medical radiographic equipment is operated.**

(e) Daily dosimetry for the period of operation at the site;

**The handler needs to provide daily dosimetry records for temporary job sites where non-medical radiographic equipment is operated.**

(f) The latest calibration records for the specific survey instruments and direct reading dosimeters in use at the site. Acceptable records include tags or labels which are affixed to the survey instrument or dosimeter; and

**The handler needs to provide a copy of the latest calibration records for each survey instrument and direct reading dosimeter used at a temporary job site where non-medical radiographic systems are operated. Calibration tags and labels affixed to the survey instrument or dosimeter are acceptable to meet this requirement.**

(g) Radiation survey instrumentation checks and radiographic system checks for devices in use at the site.

**The handler needs to provide a copy of radiation survey instrument checks and radiographic system checks for each radiation survey instrument and radiographic system used at the temporary job site.**

(D) Handlers of radiographic systems used for bomb detection purposes:

- (1) Will be exempt from paragraphs (B)(1) to (B)(3), (B)(6) to (B)(11), (C)(1) to (C)(3) and (C)(4)(d) to (C)(4)(g) of this rule.

**Handlers of bomb detection units are exempt from some specific rules:**

- They do not have to conduct a quarterly inventory.
- They do not have to maintain calibrated radiation survey equipment.
- They do not have to maintain a whole-body personnel dosimeter.
- They do not have to maintain an operable, calibrated direct reading dosimeter
- They do not have to use personnel monitoring equipment or worry about being "off-scale".
- There do not have to be two qualified individuals at the TJS, an industrial radiographer/industrial radiographer assistant.
- There do not have to be pocket dosimeters or dosimetry reports.
- They do not have to perform physical radiation surveys after each radiographic exposure to see if the unit is still producing radiation.
- They do not have to maintain surveillance of the operation to protect against unauthorized entry into a high radiation area.
- They do not have to post "caution high radiation area" signs at perimeter of the high radiation area.
- The survey instrument does not have to be checked for obvious defects.
- There will be no daily dosimeter records on site.
- Two thousand hours of hands-on experience not required.
- Training in establishment and maintenance of rad protection program not required.
- The operators do not have to be certified by USNRC, CRCPD, or ASNT.

- (2) May change the interval for calibrating radiation survey instruments as specified in paragraph (B)(1)(b) of rule 3701:1-68-02 of the Administrative Code to annual; and

**Handlers may adjust the interval for calibrating radiation survey instruments used for bomb detection purposes from six months at temporary job sites and twelve months for permanent radiography job sites.**

- (3) Will evaluate radiographic systems and record the results of the evaluations, at least annually, to assure proper functioning of components important to safety unless the radiation-generating equipment has been locked out and tagged "DO NOT USE" and is under the administrative control of the IRRP.

**The handler needs to ensure that radiographic systems used for bomb detection purposes are evaluated, and the results recorded annually. This needs to occur unless the radiographic system is locked out and tagged "DO NOT USE" and is under the administrative control of the IRRP.**

**The results of checks, tests, or evaluations will be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (E) Handlers of hand-held radiographic systems will:

- (1) Be exempt from paragraphs (B)(1) to (B)(3), (B)(6) to (B)(11), (C)(1) to (C)(3) and (C)(4)(d) to (C)(4)(g) of this rule.

**Hand-held units are exempt from:**

- (B)(1) Radiation survey instruments available
- (B)(2) Completing Radiation area surveys
- (B)(3) Completing radiation survey after each radiographic exposure
- (B)(6) Having 2 qualified individuals present

- (B)(7) Operator being a radiographer or radiographer's assistant
- (B)(8)(9) Wearing direct reading and personnel dosimeters.
- (B)(10) Maintaining surveillance during operation
- (B)(11) Posting of Caution signs, ropes and barriers
- (C)(1)(2)(3) Completing a radiation survey at the being of each shift, checking unit for defects, and testing interlocks and signals.
- (C)(4)(d)(e)(f)(g) Having survey, dosimetry, calibration and radiation survey instrumentation checks available for review

- (2) Evaluate the radiographic systems and record the results of the evaluation, at least annually, to assure proper functioning of components important to safety unless the radiation-generating equipment has been locked out and tagged "DO NOT USE" and is under the administrative control of the IRRP.

**The handler needs to ensure that non-medical hand-held radiographic systems are evaluated, and the results recorded annually.**

**The results of checks, tests, or evaluations will be recorded in accordance with 3701:1-68-02(13)(g) and maintained for three years in accordance with rule 3701:1-68-02(13)(f).**

- (3) Obligate the IRRP to document and implement safe operating procedures to include, but not be limited to:

- (a) Using specific administrative controls to prevent unauthorized access or use of the system;

**The written safe operating procedures need to include a policy for preventing unauthorized access or use of the system.**

**Example: The unit will remain locked in the cabinet unless the operator is using it.**

- (b) Requiring the backscatter shield to be in place during all radiographic exposures, if the manufacturer of the hand-held radiation-generating equipment provides a backscatter shield; and

**The written safe operating procedures need to include a policy for the use of a backscatter shield if the manufacture of the hand-held radiographic system provides a backscatter shield for the hand-held radiographic system.**

- (c) Assuring that the system remains in direct control of the authorized operator and the operator will not aim the primary beam at him/herself or at any individual during exposure;

**The written safe operating procedures need to include a procedure for ensuring that the hand-held radiographic system is used only by the authorized operator and that the direct beam is not aimed at oneself or at any other person.**

- (d) Establishing and maintaining a restricted area of at least six feet opposite the side of the material being exposed;

**The written safe operating procedures need to include a procedure for ensuring that a six-foot radius is maintained around the held-held radiographic system during radiation exposures.**

- (e) Banning individuals from holding material or the image receptor in their hand during exposure;

**The written safe operating procedures need to include a procedure for prohibiting any individual to hold material or place their hands into the radiation beam.**

- (f) Operating of software and trigger lock; and

**The written safe operating procedures need to include a procedure to address the operation of the software and trigger locks of the handheld radiographic system.**

(g) Requiring operators to wear assigned ring badges on the hand closest to the primary beam.

**The written safe operating procedures need to include a procedure requiring the operator to wear a ring badge on the hand closest to the primary beam.**