



Standard Operating Procedure RS-01 Revision 1.0

Lead Shielding Management

Purpose

This Standard Operating Procedure (SOP) provides guidance on the proper use, storage, inspection, and disposal of lead aprons and devices designed for shielding during radiographic procedures. This SOP shall cover other wearable radiation shielding devices containing lead including, but not limited to, gloves, thyroid shields, and gonadal shielding.

Proper Use

Lead aprons and other wearable lead shielding are used in medical facilities to protect workers and patients from unnecessary x-ray radiation exposure from diagnostic radiology procedures. These devices are protective garments which are designed to shield the body from harmful radiation, usually in the context of medical imaging. Facilities shall have a sufficient number of lead aprons, gloves, or other shielding devices for all personnel who are involved with x-ray operations and who are not otherwise shielded.

All personnel present during radiographic procedures shall utilize lead aprons, gloves, and other shielding devices as prescribed in the [Regulations for Control of Radiation in Mississippi](#) to keep doses ALARA (As Low As Reasonably Achievable). Lead aprons and other shielding devices shall be used at all times when x-ray radiation may be present.

Lead aprons shall protect personnel from direct scatter radiation and provide not less than 0.25 mm lead equivalency. When operating a handheld x-ray device with tube potentials exceeding 50 kV, protective aprons worn by the operator shall provide at least 0.5 mm lead equivalency at 100 kV. When a human patient must hold film or otherwise be exposed to the useful beam (except during intraoral examinations), any part of the patient's body outside of the clinical area of interest that is struck by the primary beam shall be protected with shielding that provides at least 0.5 mm lead equivalency. Gonad shielding shall have 0.5 mm lead equivalent material for human patients who have not passed the reproductive age during radiographic procedures in which the gonads are in the useful beam, except for cases in which this would interfere with the diagnostic procedures. ([15 Miss. Code R. 21-78-1.6.3](#))

Wearing lead aprons or other shielding devices may be exempt for situations where the use of lead shielding may cause an increased dose to the patient or negatively impact quality of radiographic images.



As is the case with many protective garments, it is important to remember that a lead apron is only effective when it is worn properly, matched with the appropriate radiation energy and is used in a safe and regularly inspected environment.

When an apron is being worn, dosimeters shall be worn on the exterior collar of the apron. Fetal dosimeters shall be worn under the apron at waist level.

Storage

Lead aprons shall be stored on appropriate hangers or laid flat on a surface such as a shelf or countertop. Lead aprons and other lead shielding devices should never be creased, folded, crumpled, or otherwise put in a position which may compromise the integrity of the lead.

Inventory

Shielding devices shall be labeled with unique identifiers for record keeping and inventory purposes. These devices will be labelled with barcode identifiers (Example: LA00001) and tracked as assets in Campus Optics under X-ray Shielding Devices. Barcode identifiers should be placed on the edge of the device with the identification number facing the outside.

Departments should contact Environmental Health & Safety – Radiation Safety to have new devices labeled and added to inventory.

Inspection of Lead Aprons

Personnel who are required to wear lead aprons or other similar radiation protection devices shall visually inspect these devices prior to each use for obvious signs of damage such as tears, creases or sagging of lead.

In addition to visually inspecting lead aprons and shielding devices prior to each use, all shielding garments shall be thoroughly inspected and documented at least annually following, at a minimum, the following procedure.

Personnel shall inspect aprons or other radiation protection devices for the date of last inspection and ensure an inspection has been completed within the last calendar year. Aprons and other devices shall be removed from service when the inspection due date has been exceeded until an inspection is completed.

Inspection Procedure

- The objective of this procedure is to identify any defects in apron and shielding devices that may be worn. This inspection is performed by using radiographic techniques (x-ray). The technique utilized on x-ray control system will ultimately be determined by licensed staff performing individual exposures, but shall be recorded



- 70-80 kVp at 5-10 mAs technique range may be used as a guideline. Radiograph exposure technique and system settings shall be documented
- Each apron or shielding device shall be placed directly on the x-ray detector and the imaged. If radiation shielding device is larger than the x-ray detector, several x-ray exposures shall be performed to ensure the entire device has been inspected.
- Radiographs shall be visually inspected to identify for defects (e.g., cracks, tears, etc.). Devices that exceed the following shall be considered defective:
 - Anything greater than 0.5mm (pin hole)
- Devices found to have defects less than 0.5mm may remain in service but shall be inspected again in six months to check the documented defect for stability.
- If defects of <0.5mm are observed, an increased biannual inspection frequency will be prompted in CampusOptics. While lead gloves will not be radiographed, they should be thoroughly visually inspected.
- Shielding devices shall be visibly inspected for:
 - Defects in closure components: Velcro, buckles, ties, etc. Broken components shall render the device defective unless it can be easily repaired and made functional.
 - Shielding devices that have visually exposed lead should be considered defective.
 - Shielding devices shall be inspected for lead dust as this is an indication of lead rot and should be considered defective.
- Defective aprons and other devices must be permanently removed from service.
- CampusOptics will send an annual inspection reminder in one year for all passing shielding devices.
 - Once the annual inspection date is reached, the shielding device shall be removed from service until inspection can be completed.
- If at any point a shielding device is suspected to have a defect prior to annual inspection, the device shall be removed immediately from service until it can be inspected.

Records

- Radiographs shall be retained for records and labeled to indicate specific radiation shielding device inspected, date of inspection, and areas of the device where radiographs were recorded (e.g., Apron – upper left, Apron – upper right, Gonads, etc.) Images will be stored as inspection attachments to the corresponding X-ray shielding device asset identifier (barcode) in CampusOptics.



- X-ray exposures of all radiation shielding devices shall be retained in CampusOptics for the life of the shielding device.
- All annual inspections shall be logged by completing the X-ray Shielding Devices Inspection form in CampusOptics.

Disposal of Lead-Containing Shielding Devices

Lead is a toxic heavy metal, and disposal is regulated by federal and state law. All lead-containing shielding devices shall be disposed of through proper channels, such as MSU Environmental Health and Safety Hazardous Waste disposal. Departments are responsible for disposal fees.

Disposal Procedure

- Once a shielding device is marked as “Fail,” the system will prompt a corrective action. This will provide a link to the [Hazardous/Universal Waste Pickup Request](#).
- Submission to the Hazardous/Universal Waste ticket will notify staff in Environmental Health & Safety.
 - Shielding devices shall be collected and disposed of hazardous waste.
 - Device will be marked as disposed in CampusOptics.

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Radiation Safety Committee Approved August 14th, 2026