



Guideline for Determining X-ray Shielding Requirements for a Chiropractic Radiographic Facility

This guideline may be used to determine the shielding required for a new installation or when modifying an existing one, provided the following criteria apply to the installation. Before using the guideline, first read the Explanatory Notes provided. If the following Criteria do not apply, contact the Radiation Protection Services office for assistance. Note: the shielding specified in this guideline is designed to protect workers outside the x-ray room to the WorkSafeBC Action Level* (1 mSv/year) rather than to the Dose Limit (20 mSv/year). Owners wishing to shield to a level greater than 1 mSv/year outside the room should not use this guideline and should be aware of the regulatory implication if the Action Level is or may be exceeded.

Criteria

- The current/future x-ray workload in the room does not exceed 20 exposures (films) in a 40-hour work week schedule, with the primary beam directed to an upright bucky. In addition, a workload of up to 2 exposures per week for radiographing extremities can be included, provided the primary beam is directed vertically down to the floor of the room
- The x-ray unit is operated at up to 100 kVp, with a maximum film (cassette) size of 35cm x 43cm (14" x 17").
- The room containing the unit has dimensions no smaller than 2m x 4.5m.
- Unexposed x-ray film is stored in a film bin, lined with at least 0.8mm (2 lb/ft²) lead.
- Shielding is required to provide protection outside the room, a) for workers, to meet the Action Level of 1mSv/year, as specified in the WorkSafeBC *Occupational Health and Safety Regulation* (see WSBC website: <http://www2.worksafebc.com/Publications/OHSRegulation/Home.asp>), and b) for members of the public not to exceed the recommended public dose limit of 1 mSv/year.
- For workers directly involved in the taking of x-rays, this guideline provides an option for shielding the control booth to either 20 mSv/year (the maximum permissible dose) or to 1 mSv/year (the WCB Action Level). Note that control booth shielding is based on providing protection against secondary radiation (i.e. leakage & scatter) only, not the primary beam.
- Occupancy outside barriers: the shielding options (over) allow for consideration of the amount of time (occupancy) spent by persons outside each of the barriers (i.e. walls/doors)
 - **Full occupancy** applies to areas occupied by workers or other persons for a total of more than 30 minutes per day, and applies to adjacent rooms and tenanted facilities.
 - **Partial occupancy** applies to areas occupied by workers and other persons for a total of no more than 30 minutes per day, and applies to areas such as adjacent stairwells, parkades and parking lots, lanes, gardens and infrequently used rooms (storage). Areas that can be converted from **Partial Occupancy** to **Full Occupancy** (e.g. from storage to office) should be considered as **Full Occupancy** for shielding requirements.
- If the facility has accessible areas (e.g. rooms) above and/or below the x-ray room, protection for these areas must be provided in the intervening floors (see over). For confirmation of construction material requirements for the intervening floor, above and/or below the x-ray room, please refer to the current BC Building Code.

If your facility design and use meets the above criteria, you can use the shielding information (over) to determine the thickness of materials required for the barriers. Complete the assessment and provide a copy to the responsible person carrying out the installation.

N.B. Building plans are NOT required to be submitted to the Radiation Protection Services.

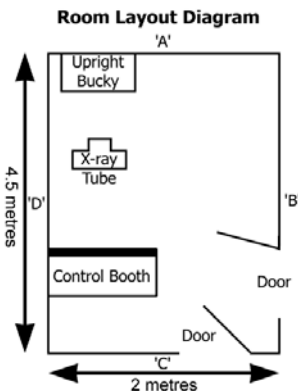
(over)



Table 1: Shielding* Requirements (20 Bucky & 2 Extremity Exposures/Week)

Area (see Room Layout Diagram below)	Shielding Required	Check <input checked="" type="checkbox"/> one per Area
Control Booth		
<i>or</i> Shielding (to 1 mSv/year)	0.8 mm (2 lb/ft ²) lead and equivalent for view window	<input type="checkbox"/>
Shielding (to 20 mSv/year)	2.5 cm (1") standard drywall construction and 1.5 cm (5/8") plate glass window	<input type="checkbox"/>
Wall Labeled 'A'		
<i>or</i> Full Occupancy (1 mSv/year)	0.8 mm (2 lb/ft ²) lead	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	2.5 cm (1") standard drywall construction	<input type="checkbox"/>
Wall labeled 'B'		
<i>or</i> Full Occupancy (1 mSv/year)	0.8 mm (2 lb/ft ²) lead	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	2.5 cm (1") standard drywall construction	<input type="checkbox"/>
Door on Wall 'B'		
<i>or</i> Full Occupancy (to 1 mSv/year)	1.3 mm steel	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	Standard door material adequate	<input type="checkbox"/>
Wall labeled 'C'		
<i>or</i> Full Occupancy (1 mSv/year)	2.5 cm (1") standard drywall construction	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	2.5 cm (1") standard drywall construction	<input type="checkbox"/>
Door on Wall 'C'		
<i>or</i> Full Occupancy (to 1 mSv/year)	1.0 mm steel	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	Standard door material adequate	<input type="checkbox"/>
Wall labeled 'D'		
<i>or</i> Full Occupancy (1 mSv/year)	0.8 mm (2 lb/ft ²) lead from Wall 'A' as far as control booth	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	2.5 cm (1") standard drywall construction	<input type="checkbox"/>
Intervening Floor (above)		
<i>or</i> Full Occupancy (1 mSv/year)	No occupancy space above x-ray room – no shielding	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	5 cm (2") solid concrete or 0.8 mm (2 lb/ft ²) lead	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	No additional shielding required	<input type="checkbox"/>
Intervening Floor (below)		
<i>or</i> Full Occupancy (1 mSv/year)	No occupancy space below x-ray room – no shielding	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	5 cm (2") solid concrete or 0.8 mm (2 lb/ft ²) lead	<input type="checkbox"/>
Partial Occupancy (1 mSv/year)	No additional shielding required	<input type="checkbox"/>

* **Note:** For shielding installation procedures, see additional information given in the "Guideline & Checklist for Installation of Lead Shielding in a Diagnostic X-ray Facility".



Chiropractic Facility Name & Address:

Number of Exposures per Week: _____

Date: _____

Signed: _____

Name: _____

Keep a copy of this signed document on record for future reference/inspection. Attach a copy of room plan showing adjacent areas and their function with this document.