



Application to Register Radiation Emitting Device
 Occupational Safety and Health Regulations 2009 (Section 156c)
 The Radiation Act 1972

Section A. Operator/Owner Information

Name of Owner:			
	<i>First Initial</i>	<i>Middle Initial</i>	<i>Surname</i>
Business Address:			
	<i>Building #</i>	<i>Address</i>	
Parish and Postal Code:			
Phone:			
	<i>Business No.</i>	<i>Cellular No.</i>	<i>Fax No.</i>
E-mail:			
Name for Billing if Different			

Name of Operator:			
	<i>First Initial</i>	<i>Middle Initial</i>	<i>Surname</i>
Business Address:			
	<i>Building #</i>	<i>Address</i>	
Parish and Postal Code:			
Phone:			
	<i>Business No.</i>	<i>Cellular No.</i>	<i>Fax No.</i>
E-mail:			
Radiation Safety Person (same as above?)	<u>YES/NO</u>		
If NO, provide additional contact information.			

Section B. Equipment/ Machine Information

Enter the NUMBER of radiation machines (X-RAY tube heads, radioisotopes...) in the applicable block(s).

1. MEDICAL X-RAYS AND MRI

- Radiographic -----
- Fluoroscopic -----
- Radiographic/Fluoro (one tube) -----
- Mammographic -----
- Bone Densitometer -----
- CT Scanner -----
- MRI -----
- Therapy -----
- Other (describe in C below) -----

2. DENTAL X-RAYS

- Intra-oral -----
- Panoramic, Cephalometric, Combination -----

3. MEDICAL ACCELERATOR (describe in C below)

- Electron linear -----

4. VETERINARY X-RAYS -----

5. RADIOISOTOPES MEDICAL (Enclose list in C)

- Sealed Sources -----
- Open Sources -----
- Built in the equipment -----

6. INDUSTRIAL/EDUCATIONAL X-RAYS (Non-human use)

Industrial radiographers must submit copy of operating and safety procedures, training program, radiographer qualifications

- Non-cabinet Radiographic -----
- Non-cabinet Fluoroscopic -----
- Diffraction -----
- Spectrometry -----
- Fluorescence -----
- Gauge -----
- Cabinet -----
- Ion Implanter (< 1 MeV) -----
- Baggage -----
- Other (explain in comments) -----

7. RADIOISOTOPES INDUSTRY, EDUCATION AND RESEARCH (Enclose list in C)

- Sealed Sources -----
- Open Sources -----
- Built in the equipment -----

8. ELECTROMAGNETIC RADIATION IN COMMUNICATIONS

- Broadcast RF facility -----
- Open field RF heating devices -----

Enter Yes (Y) /No (N) in the applicable block(s) below.

1. Enclosed copy of the specifications of the machine ---	4. Facility designed by an architect -----
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Licenses and licensing conditions are to be displayed in a prominent position visible to clients.

Important: Any changes to the address or operator information must be reported to the Department of Health.

X-ray equipment operators and users of radioactive materials should:

- Be aware of the radiation hazards associated with their work
- Know their duty to protect themselves, their patients and others
- Have a thorough understanding of their profession, of safe working methods and of special techniques
- Be conscientious in the use of prepare techniques and procedures, strive to eliminate or reduce to lowest practical values all patient and staff exposures.

By the signature below, the registrant acknowledges this is an accurate record of the equipment and intended use.

Signature

Position

Print Name

Date

Office Use Only

Bermuda Radiation Device Number(s)_____

Bermuda Radiation Office Number_____

Appendix A: Shielding Calculations

In addition to the completed application and information provided please utilize the checklist on the following pages to provide the information necessary for the calculation of appropriate shielding.

Factors Used for Calculation

Typical Workloads Table (NCRP 2004)

	Total Workload per patient (mA min/patient)	Typical Number of Patients (per 40 hour week)		Total Workload per week (mA min/week)	
		Average	Busy	Average	Busy
Radiographic Room (chest)	0.6	120	160	75	100
Radiographic Room (other)	1.9	120	160	240	320
Dedicated Chest Room	0.22	200	400	50	100
R and F ^a Room (radioscopic system)	13	20	30	260	400
R and F ^a Room (radiographic system)	1.5	25	40	40	40
Angiography Room (cardiac)	160	20	30	3,200	4,800
Angiography Room (other vascular)	64	20	30	1,300	2,000

Occupancy Factors Table

T=1	Administrative offices and receptionist areas, laboratories, pharmacies and other areas fully occupied by an individual, attended waiting rooms, children's indoor play areas, adjacent X-ray rooms, image viewing areas, nurses' stations, X-ray control rooms, living quarters.
T=1/2	Rooms used for patient examinations and treatments.
T=1/5	Corridors, patient rooms, staff lounges, staff rest rooms.
T=1/8	Corridor doors.
T=1/20	Public toilets, unattended vending areas, storage rooms, outdoor areas with seating, unattended waiting rooms, patient holding areas.
T=1/40	Outdoor areas with only transient pedestrian or vehicular traffic, unattended parking lots, vehicular drop off areas (unattended), attics, stairways, unattended elevators, janitor's closets.

Primary Barrier Factors Table

Primary Barrier	
U=1	Floors of radiation rooms, walls containing a vertical image receptor; any other walls, doors or ceiling areas routinely exposed to the direct radiation beam.
U=1/4	Doors and wall areas of radiation rooms not routinely exposed to the direct radiation beam.
U= 1/16	Ceiling areas of radiation rooms not routinely exposed to the direct radiation beam.
Secondary barrier	
U=1	The use factor for secondary protective barriers is always taken to be 1.

Utilizing the checklist below please provide information on the following:

Information Required for Radiographic X-ray Systems	
Floor Plan (scaled blueprint or sketch) including:	
	Dimensions of the X-ray room, and location of the control booth if present
	Location(s) of the X-ray tube, X-ray table, wall mounted imaging device, CR reader, etc.
	Direction(s) of the radiation beam during normal operation
	Distance(s) between the areas to be shielded and the operational position of the X-ray tube
	Location of the control panel and irradiation switch
	Identification of all adjacent rooms, including those rooms located above and below, e.g., offices, storage rooms, crawl spaces, etc.
	The designation of the area to be shielded, controlled area (for radiation workers), or uncontrolled area (for non-radiation workers and the public)
	The Occupancy and Use factors for the areas to be shielded
Medical X-ray Equipment	
	Manufacturer, brand name and model number of the X-ray system(s)
	Maximum selectable tube voltage (kV)
	Maximum selectable tube current (mA) or maximum selectable tube current time product (mAs)
	Maximum selectable irradiation time (sec)
	<i>For film screen system:</i> the manufacturer, type and speed of film screen combination used
	<i>For CR system:</i> the manufacturer and brand name of CR reader and storage phosphor system used
Equipment Workload	
	Number of patients per week
	Average tube voltage per procedure (kV)
	Average current time product per patient (mAs)

continued.

Information Required for Radioscopic X-ray Systems	
Floor Plan (scaled blueprint or sketch) including:	
	Dimensions of the X-ray room, and location of the control booth if present
	Location(s) of the X-ray tube, X-ray table, image receptor, image display units, etc.
	Direction(s) of the radiation beam during normal operation
	Distance(s) between the areas to be shielded and the operational position of the X-ray tube
	Location of the control panel and irradiation switches
	Identification of all adjacent rooms, including those rooms located above and below, e.g., offices, storage rooms, crawl spaces, etc.
	The designation of the area to be shielded, controlled area (for radiation workers), or uncontrolled area (for non-radiation workers and the public)
	The Occupancy factor for the areas to be shielded
Medical X-ray Equipment	
	Manufacturer, brand name and model number of the X-ray system(s)
	Maximum tube voltage (kV)
	Maximum tube current time product (mAs)
	Number of X-ray tubes on the system
Equipment Workload	
	Number of patients per week
	Average tube voltage per procedure (kV)
	Average current time product per patient (mAs)

continued.

Information Required for CT Systems	
Floor Plan (scaled blueprint or sketch) including:	
	Dimensions of the X-ray room, and location of the control booth
	Location(s) of the gantry, patient support, etc.
	Distance(s) between the areas to be shielded and the position of the gantry
	Location of the control panel and irradiation control
	Identification of all adjacent rooms, including those rooms located above and below, e.g., offices, storage rooms, crawl spaces, etc.
	The designation of the area to be shielded, controlled area (for radiation workers), or uncontrolled area (for non-radiation workers and the public)
	The Occupancy factor for the areas to be shielded
Medical X-ray Equipment	
	Manufacturer, brand name and model number of the CT system
	Maximum tube voltage (kV)
	Maximum tube current time product (mAs)
	Isodose curve for the system (to be provided by the manufacturer)
Equipment Workload	
	Number of patients per procedure type per week
	Average tube voltage per procedure (kV)
	CDTI ₁₀₀ and DLP values, if known

For information only:

Thickness		Thickness Weight in Pounds for 1 Square Foot Section	
Inches	Millimetre Equivalent	Nominal Weight	Actual Weight
1/64	0.40	1	0.92
3/128	0.60	1 1/2	1.38
1/32	0.79	2	1.85
5/128	1.00	2 1/2	2.31
3/64	1.19	3	2.76
7/128	1.39	3 1/2	3.22
-	1.50	-	3.48
1/16	1.58	4	3.69
5/64	1.98	5	4.60
3/32	2.38	6	5.53
-	2.50	-	5.80
-	3.00	-	6.98
1/8	3.17	8	7.38
5/32	3.97	10	9.22
3/16	4.76	12	11.06
7/32	5.55	14	12.90
1/4	6.35	16	14.75
1/3	8.47	20	19.66
2/5	10.76	24	23.60
1/2	12.70	30	29.50
2/3	16.93	40	39.33
1	25.40	60	59.00

Notes:

1. The density of commercially rolled lead is 11.36 g cm⁻³.
2. The commercial tolerances are ± 0.005 inches for lead up to 7/128 and $\pm 1/32$ for heavier sheets.
3. Lead sheets less than 1/32 inches thick are frequently more expensive than heavier sheets in cost of material and cost of installation.

Tables and Forms are adopted from Canada Safety Code 35
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