

PART B

REGISTRATION OF RADIATION MACHINES ~~AND FACILITIES [AND SERVICES]~~

See Rule B.1 - Purpose and Scope.

- a. This ~~Part part~~ provides for the registration of ~~ionizing~~ radiation machines. ~~facilities [and for the registration of persons providing radiation machine installation, servicing, and/or services].~~ A particle accelerator, whether used primarily for x-ray production or other purposes, shall be considered a radiation machine.

Part 135 does not provide authority to register x-ray services.

Several states specify if an accelerator is to be registered or licensed. Michigan has historically required registration of accelerators. It is the intent to continue to require registration of accelerators. Additional language was added to specify that particle accelerators are subject to registration as a radiation machine. The production of radioactive material from a particle accelerator is subject to applicable licensing requirements.

- b. In addition to the requirements of this ~~Part part~~, all registrants are subject to the applicable provisions of ~~other parts of these rules, the General Provisions (Part A), Standards for Protection (Part D) and Notices, Instructions and Reports (Part J) of these regulations.~~ In addition, some registrants are subject to provisions of the regulations for Industrial Radiography (Part E), Healing Arts (Part F), Analytical Equipment (Part H) or Particle Accelerators (Part I).

Simplified for clarity.

See Rule B.2 - Definitions.

As used in this part:

~~"Facility"~~ means the location, building, vehicle, or complex under one administrative control, ~~at which where~~ one or more radiation machines are installed ~~or located, located, and/or used.~~

~~"Storage" means a condition in which a device or source is not being used for an extended period of time, and has been made inoperable.~~

See Rule B.3 - Exemptions.

- a. ~~Electronic equipment, unless~~ Unless specifically covered elsewhere in these rules, electronic equipment that produces radiation incidental to its operation for other purposes is exempt from the registration and notification requirements of this ~~Part part~~ provided that if the dose equivalent rate averaged over an area of 10 square centimeters does not exceed 5 ~~μSv~~ microsievert (0.5 millirem) per hour at 5 centimeters from any accessible surface of ~~such the~~ the equipment. The production, testing, or factory servicing of ~~such the~~ the equipment shall not be exempt.

- 40
41 b. Radiation machines that are electrically disconnected pending sale, transfer of ownership, or
42 destructive disposal or that are made inoperable while in transit or storage incident thereto
43 are exempt from the requirements of this ~~Part~~ part. An inoperable radiation machine is one
44 that cannot be energized when connected to a power supply without repair or modification.
45
46 c. Domestic television receivers and video display monitors are exempt from the requirements
47 of this ~~Part~~ part.
48
49 d. Electron microscopes are exempt from this part if the instrument is not capable of exceeding
50 an operating voltage of 50 kilovolts.
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Changes were made to rule B.3 to clarify what conditions must be met to be exempt from registration.

52
53 Rule B.X - Responsibility for Compliance with Rules.
54

55 The owner or registrant, the person effectively in control of radiation machines not exempt under
56 rule B.3, and the person who, pursuant to rule B.5, is designated as the radiation safety officer shall
57 be responsible for full compliance with all provisions of these rules.
58

Responsibility for compliance is from rule 183 of the current *Ionizing Radiation Rules* (IRR). It is the department's intent to use the term "radiation safety officer" instead of "radiation protection supervisor".

59
60 **General Regulatory Provisions**
61

62 ~~See~~ Rule B.4 - Shielding Plan Review.
63

- 64 a. ~~Prior to construction~~Before registration, the floor plans, shielding specifications, and
65 equipment arrangement of all new installations, or modifications of existing installations,
66 utilizing using a ionizing radiation machines, shall be submitted to the Agency department
67 for review and approval. Application for a radiation shielding plan review shall be
68 completed on forms department Form BHS/HFS-852, in accordance with the instructions
69 contained in that form, or on a similar form containing all the information required by Form
70 BHS/HFS-852 provided by the department and shall contain all the information required by
71 the form and associated instructions. The required information is denoted in Appendices A
72 and B of this Part. Radiation shielding plans are not required to be submitted for the
73 following:
74
75 i. Dental intraoral or panoramic machines used in dental clinical facilities.
76
77 ii. Cabinet x-ray systems, analytical systems, process or control gauges, or cold-cathode
78 gas discharge tubes.
79
80 iii. Bone densitometers.
81

82 iv. Mobile or portable radiographic machines unless routinely used in one location.

83
84 v. C-arm fluoroscopic systems having a maximum source-image receptor distance of
85 less than 45 centimeters that are used for extremity use only.

86
Changed “Prior to construction” to “Before registration”. Although it is more appropriate to submit shielding plans prior to construction, the department’s goal is to ensure that a shielding plan is submitted and reviewed prior to approving registration of a machine. Guidance for plan reviews will suggest that plans be submitted prior to construction. Language was added specifying that plans must be submitted on forms provided by the department. Language was added to identify what “uses” do not require departmental review of shielding plans. For c-arm fluoroscopy machines, shielding plans or shielding evaluations should be submitted (except for the smaller extremity use only units). Although shielding may not be required in all cases, it is the registrant’s responsibility to evaluate the adequacy of the shielding for each location where a c-arm fluoroscope will be used. If it is determined additional shielding is not necessary, submission of a report that supports those conclusions would be acceptable.

87
88 b. The ~~Agency department~~ may require the applicant to ~~utilize use~~ the services of a ~~qualified~~
89 ~~expertqualified health physicist or qualified medical physicist~~ to determine the shielding
90 requirements ~~prior to before~~ the ~~department’s~~ plan review and approval.

91
Definitions for health physicist and medical physicist will be added later.

92
93 c. The ~~department’s~~ approval of ~~such a~~ plans shall not preclude the requirement of additional
94 modifications ~~should if~~ a subsequent analysis ~~of operating conditions indicate the possibility~~
95 ~~of shows~~ an individual ~~receiving could receive~~ a dose ~~in excess exceeding of~~ the limits
96 ~~prescribed in D.201, D.205-208, D.301 and D.302 part D~~ of these ~~regulations rules~~.

97
Modified for clarity.

98
99 d. Shielding design goals of 0.1 millisievert (10 millirem) per week for controlled areas and
100 0.02 millisievert (2 millirem) per week and 0.02 millisievert (2 millirem) in any one hour for
101 uncontrolled areas shall be applied to new facilities and to new construction in existing
102 facilities.

103
104 i. For the purpose of this subrule, “controlled area” means a limited access area where
105 the occupational exposure of personnel to radiation is under the supervision of an
106 individual in charge of radiation protection. In a controlled area, the access,
107 occupancy, and working conditions are controlled for the purpose of radiation
108 protection.

109
110 ii. For the purpose of this subrule, “uncontrolled area” means all areas of the facility and
111 the surrounding environs that are not controlled for the purpose of radiation
112 protection.

113
Rule B4.d specifies the shielding design goals. The design goals and definitions for controlled and

uncontrolled area are from NCRP Report # 147 and # 151.

114
115 ~~ed.~~ ~~After installation of a radiation machine~~For machines installed after *(insert the effective date*
116 *of these rules)*, the registrant shall maintain for inspection by the ~~Agency~~ department:

117
118 i. ~~_____~~The maximum rated technique factors of each machine;

119
120 ii. ~~_____~~A a scale drawing of the room ~~in which~~ where a stationary radiation machine system is
121 located ~~with such~~ The drawing ~~indicating~~ shall show the use of areas adjacent to the room
122 and ~~an estimation~~ contain an estimate of the ~~extent of~~ occupancy ~~by an individual~~ in ~~such~~
123 ~~each~~ areas. In addition, the drawing shall include ~~at least one of the following~~:

124
125 i.(1) ~~_____~~ The type and thickness of materials, or lead equivalency, of each protective
126 barrier. ~~The results of a survey for radiation levels present at the operator's position~~
127 ~~and at pertinent points outside the room at specified test conditions; or~~

128
129 ii.(2) ~~_____~~ The results of a survey for radiation levels at the operator's position and at pertinent
130 points outside the room under specified test conditions. ~~The type and thickness of~~
131 ~~materials, or lead equivalency, of each protective barrier.~~]

132
133 ~~fe.~~ ~~_____~~ The department may withhold initial registration of a radiation machine pending receipt of
134 ~~the following~~:

135
136 i. ~~_____~~ Plans and specifications for room design and shielding and approval of those plans
137 and specifications.

138
139 ii. ~~_____~~ Documentation from the applicant that a certificate of need (CON) has been issued by
140 the department if the use of that machine is a covered clinical service as defined in
141 part 222 of 1978 PA 368, as amended, MCL 333.22201 to 333.22260.

142
Rules B.4.f.i. and B.4.f.ii. will allow the department to withhold a registration if an applicant has not submitted and obtained approval of shielding plans and obtained CON approval if required.

143
144 ~~See Rule~~ B.5 - Registration of Radiation Machines ~~Facilities~~.

145
Part 135 authorizes the registration of radiation machines, not facilities.

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147 Each person ~~having a with 1 or more~~ radiation machines ~~facility~~ shall:

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149 a. Apply for registration of ~~such facility~~ each radiation machine with the ~~Agency~~ department
150 ~~within 30 days following the effective date of these regulations or thereafter prior to the~~
151 ~~operation of a radiation~~ before operating the machine ~~facility~~. Application for registration
152 shall be completed on ~~department~~ forms BHS/HFS-555i ~~furnished by the Agency~~ and shall
153 contain all the information required by the form and ~~accompanying associated~~ instructions;
154 The appropriate registration fee specified in rule B.XXX shall be submitted with the
155 application.

A 30-day grace period is no longer needed. Registration has been required since 1975. Language was added to specify which department form to use for registration.

- 157
158 b. Designate a radiation safety officer on the application form ~~an individual~~ to be responsible
159 for radiation protection and ensure that the individual:
160
161 i. Has completed a radiation safety officer training course, completed educational
162 courses related to ionizing radiation safety, or has experience in the use and
163 familiarity with the type of equipment used. Licensed members of the healing arts
164 shall be deemed to have met this requirement.
165
166 ii. Is knowledgeable about the hazards and precautions in the handling of the radiation
167 machines for which this individual is responsible.
168
169 iii. Has read and understands the applicable requirements of these rules.
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171 iv. Authorizes operation of radiation machines only by individuals who have received
172 instructions in their safe use. Such instructions shall include, but are not limited to,
173 the proper use of personnel monitoring devices, the registrant's operating and safety
174 procedures, and all other applicable rules governing the use of the radiation machine
175 that the individual will be operating.
176
177 v. Have the authority to make or cause to be made radiation surveys and other
178 procedures as may be necessary to demonstrate compliance with these rules.
179
180 vi. Has the authority to make or cause to be made changes as may be necessary to
181 comply with these rules.
182

Requirements and duties of the radiation safety officer are from the current IRR and from the updated SSRCR part B (May 2009).

Subrule i. specifies the minimum training for a RSO. Guidance will be provided specifying what other individuals will be considered to have met the requirements outlined in this subrule, such as board certified physicists.

Subrule iv. specifies the minimum training for individuals operating x-ray machines.

- 183
184 ~~[e. Prohibit any person from furnishing radiation machine servicing or services as described in~~
185 ~~B.6d. to his radiation machine facility until such person provides evidence that he has been~~
186 ~~registered with the Agency as a provider of services in accordance with B.6.]~~
187
188 ~~[Sec. B.6 — Application for Registration of Servicing and Services.]~~
189
190 ~~[a. Each person who is engaged in the business of installing or offering to install radiation~~
191 ~~machines or is engaged in the business of furnishing or offering to furnish radiation machine~~
192 ~~servicing or services in this State shall apply for registration of such services with the~~

- 193 ~~Agency within 30 days following the effective date of this regulation or thereafter prior to~~
194 ~~furnishing or offering to furnish any such services.]~~
195
196 ~~[b. Application for registration shall be completed on forms furnished by the Agency and shall~~
197 ~~contain all information required by the Agency as indicated on the forms and accompanying~~
198 ~~instructions.]~~
199
200 ~~[c. Each person applying for registration under this Part shall specify:~~
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202 ~~i. That he has read and understands the requirements of this and other applicable Parts;~~
203
204 ~~ii. The services for which he is applying for registration;~~
205
206 ~~iii. The training and experience that qualify him to discharge the services for which he is~~
207 ~~applying for registration;~~
208
209 ~~iv. The type of measurement instruments to be used, frequency of calibration, and source~~
210 ~~of calibration; and~~
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212 ~~v. The type of personnel dosimeters supplied, frequency of reading, and replacement or~~
213 ~~exchange schedule.]~~
214
215 ~~[d. For the purpose of B.6, services may include but shall not be limited to:~~
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217 ~~i. Installation and/or servicing of radiation machines and associated radiation machine~~
218 ~~components;~~
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220 ~~ii. Calibration of radiation machines or radiation measurement instruments or devices;~~
221
222 ~~iii. Radiation protection or health physics consultations or surveys; and~~
223
224 ~~iv. Personnel dosimetry services.]~~
225
226 ~~[e. No individual shall perform services which are not specifically stated for that individual on~~
227 ~~the notice of registration issued by the Agency.]~~
228

The Department is of the opinion that Part 135 does not authorize us to regulate radiation machine servicing or services. We have asked for an opinion on this issue from the Attorney General's office but have not yet received the opinion. Once we hear from the Attorney General, we will reconsider regulating servicing or services either with new rules or changes to the statute. The Radiation Safety Section is not convinced that the additional resources necessary for the regulation of these activities will provide additional protection to and improve the health of Michigan's citizens.

It should be noted that the Michigan Occupational Safety and Health Administration has rules that employers must follow regarding ionizing radiation, including a requirement for dosimetry if the worker is likely to exceed 25% of the dose limit or if the employee enters a high radiation area. In addition, a registrant is responsible for the safe operation of their machines and should ensure that service providers are following safe practices.

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Rule B.XX - Machine Registration Tags.

- a. The department shall issue a registration tag for each radiation machine when it is properly registered with the department. The tag shall include a registration number uniquely assigned to that specific machine.
- b. The registrant shall apply the registration tag in a visible location on the control panel of the specified radiation machine. If applying the registration tag to the control panel is not practical, the tag shall be placed in another visible location on a component of the machine not likely to be replaced.
- c. The registrant shall not authorize removal of the registration tag from the radiation machine unless instructed by the department. If the tag is removed or defaced, the registrant shall notify the department and request a replacement tag. The request shall specify the tag number and machine description from the certificate of registration.

Rule B.XX – Machine Registration Tags is from rule 185 of the current IRR. Wording was added to allow for placement of tags in another prominent location when it is not practical to place a tag on the control panel.

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~~See Rule B.7 - Issuance of Notice Certificates~~ of Registration.

- a. ~~Upon a determination that an applicant meets the requirements of the regulations, the~~The Agency department shall issue a ~~notice certificate~~ of registration: if it determines that an application meets the requirements of this part.
- b. The ~~Agency department~~ may incorporate in the ~~notice certificate~~ of registration ~~at the time of issuance or thereafter by appropriate rule, regulation, or order, such~~ additional requirements ~~and in the form of registration conditions with respect to regarding~~ the registrant's receipt, possession, and use, ~~and transfer~~ of a radiation machines as it ~~deems~~ considers appropriate or necessary. The registrant shall comply with all registration conditions.
- c. The certificate of registration shall list all radiation machines registered at a facility.

Changes to rules B.7.a. and B.7.b. were made for clarity.

Imposing registration conditions as specified in Rule B.7b is already authorized under Rule A.7. The language of Rule B.7b was changed to clarify that the department intends to incorporate “registration conditions” if deemed appropriate. The department does not wish to change the language to B.7b. There are appeal processes available for those who disagree with any registration conditions that are imposed.

This is the wording of Rule A.7: “The department may impose, by rule, by order, or by license or registration conditions, on a licensee or registrant additional requirements that it considers appropriate or necessary to minimize danger to public health and safety, property, and the environment.”

Rule B.7.c. is new and was added to clarify that all machines will be listed on a certificate for a particular facility. This will not preclude a facility from having more than one certificate.

See:Rule B.8 - Expiration of ~~Notice~~ Registration.

Except as provided by rule B.9b., ~~each a notice~~ registration shall expire at the end of the specified day in the month and year stated ~~therein in the certificate of registration.~~

See:Rule B.9 - Renewal of ~~Notice of~~ Registration.

- a. The registrant shall annually file an application to renew the Application for renewal of registration shall be filed in accordance with pursuant to rule B.5 [or B.6] and shall submit the appropriate registration fee as specified in rule B.XXX with the application.
- b. If a registrant has filed an application to renew the registration in proper form In any case in which a registrant not less than 30 days prior to before the expiration of his the existing notice-registration has filed an application in proper form for renewal, such the existing notice-registration shall not expire until the application status has been finally is determined by the Agency department.

See:Rule B.10 - ~~Report~~Notice of Changes.

- a. The registrant shall notify the Agency department in writing before making any change which that would render the information contained in the application for registration, and/or the notice-certificate of registration, or both, no longer accurate. When a radiation machine is sold, transferred, or disposed, the notification shall specify the proposed recipient of the machine, or the location and method of disposal.
- b. A complete change in ownership, possession, or location of all machines listed on a certificate of registration terminates the certificate of record and requires a new application for registration except as provided in subrule d. of this rule.
- c. If there is a partial change, the department may terminate the certificate of registration of record and issue a new certificate pursuant to rule B.7.
- d. Notwithstanding subrule b. of this rule, replacement of all machines listed on a certificate of registration shall be considered a partial change if the name and address of the registrant and the name and address of the facility are not changed.

Additional language is from rule 188 of the current IRR.

See:Rule B.XXX - Fees.

- a. Pursuant to the act, fees for registration of radiation machines, fees for follow-up inspections due to noncompliance, fees for mammography machine inspections, and fees assessed in connection with mammography authorization shall be adjusted annually by an amount

determined by the state treasurer to reflect the cumulative annual percentage change in the Detroit consumer price index, not to exceed 5%. As used in this part, “Detroit consumer price index” means the most comprehensive index of consumer prices available for the Detroit area from the bureau of labor statistics of the United States Department of Labor.

b. Refund of a registration fee, in whole or in part, shall not be made due to a notice of change resulting in the deletion of the number of tubes, the number of machines or in the termination of the radiation machine registration certificate before the expiration date of the registration.

c. Specific registration fees depend on the number of x-ray tubes included in the application for registration or renewal of registration. As of October 1, 2009, the radiation machine registration fees are shown in table 1:

TABLE 1
SCHEDULE OF RADIATION MACHINE REGISTRATION FEES

<u>Type of X-Ray Tube</u>	<u>Each Individual X-ray Tube</u>
Nondental, nonveterinary.....	\$114.56
Dental or veterinary – first x-ray tube per facility.....	\$68.71
Dental or veterinary – additional x-ray tubes per facility.....	\$38.12

d. Inspection fees. As of October 1, 2009, the radiation machine inspection fees are shown in table 2:

TABLE 2
SCHEDULE OF RADIATION MACHINE INSPECTION FEES

<u>Type of Inspection</u>	<u>Each Inspection</u>
Follow-up inspection for noncompliance	\$152.78
Mammography machine inspection.....	\$152.78
Mammography machine authorization reinstatement.....	\$152.78

Section 13522(4) of Act 368 specifies that the department shall promulgate rules to establish a schedule of fees and that the fee structure currently in effect remain in effect until new rules are promulgated. The provisions outlined in rule B.XXX.a. are the same provisions included in the act

Current fees shown are for FY 2009/2010 and maintain the fee structure in effect when the act was amended.

~~See:Rule~~ B.11 - Approval Not Implied.

~~No~~A person, in any advertisement, shall not refer to the fact that ~~he or his~~ a facility is registered with the ~~Agency department~~ pursuant to ~~the provisions of B.5 [or B.6]; this part~~ and ~~no~~ a person shall not state or imply that ~~the department has approved~~ any activity under ~~such a~~ registration, ~~has been approved by the Agency.~~

~~See:Rule~~ B.12 - Assembler and/or Transfer Obligation.

a. ~~Any~~A person who sells, leases, transfers, lends, disposes, assembles, or installs a radiation machines in this ~~State state~~ shall notify the ~~Agency department in writing~~ within 15 days of the following:

- 338
339 i. The name and address of ~~persons~~ the person who ~~have~~ has received ~~these~~ the
340 machines~~s~~;
- 341
342 ii. The manufacturer, model, type, and ~~serial number~~ number of x-ray tubes of each
343 radiation machine transferred; ~~and~~.
- 344
345 iii. The date of transfer of each radiation machine.
- 346
347 iv. The department facility registration number and machine registration tag number, if
348 the facility is registered or if the machine was previously registered with the
349 department.
- 350
351 v. If a diagnostic x-ray system contains certified components, a copy of the assembler's
352 report, prepared in compliance with the federal performance standards for ionizing
353 radiation products, 21 C.F.R. 1020.30(d) (June 2006), shall be submitted in lieu of
354 subdivisions i thru iii. of this subrule.
- 355

Notifying the department within 15 days of installation is consistent with 21 C.F.R. 1020.30(d).

Subrule B.12v. will require an installer to provide a copy of Form 2579, if federal regulations require such a report to be filed.

- 356
357 b. ~~No~~ A person shall not make, sell, lease, transfer, lend, assemble, or install a radiation
358 machines or the supplies used ~~in connection~~ with ~~such a~~ machines, unless ~~such~~ the supplies
359 and equipment, when properly placed in operation and used, ~~shall~~ meet the requirements of
360 these ~~regulations~~ rules.

361
362 See Rule B.13 - Reciprocal Recognition of Out-of-State Radiation Machines.

363

Changes were made to Rule B.13 to clearly state that all machines must be registered with the department and to clearly state what information must be submitted to the department when an out of state machine is brought into the state for temporary use.

- 364
365 a. If a person brings a radiation machine into the state for any use, that person shall register the
366 machine with the department, comply with all applicable rules of the department, and supply
367 the department with other information as the department may request.
- 368
369 ab. Whenever ~~any~~ If a person plans to bring a radiation machine ~~is to be brought~~ into the
370 State ~~state~~; for ~~any~~ temporary use, ~~the person proposing to bring such machine into the State~~
371 shall give that person shall provide written notice to the ~~Agency~~ department ~~at least not less~~
372 than 2 3 working days] before ~~such~~ the machine is to be used in the State ~~state~~. The notice
373 shall include:
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375 i. The facility registration number.
- 376
377 ii. The machine registration number ~~The type of radiation machine~~;

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- ~~(c) — The dimensions of the room(s) concerned;~~
- ~~(d) — The type of occupancy of all adjacent areas inclusive of space above and below the room(s) concerned. If there is an exterior wall, show distance to the closest area(s) where it is likely that individuals may be present;~~
- ~~(e) — The make and model of the equipment, the maximum technique factors, and the energy waveform (single phase, three phase, etc.);~~
- ~~(f) — The type of examination(s) or treatment(s) which will be performed with the equipment.~~

- ~~2. — Information on the anticipated workload of the system(s) in mA-minutes per week.~~
- ~~3. — A report showing all basic assumptions used in the development of the shielding specifications.]~~

PART B

APPENDIX B

DESIGN REQUIREMENTS FOR AN OPERATOR'S BOOTH

~~1. — Space Requirements:~~

- ~~(a) — The operator shall be allotted not less than 0.70 m² (7.5 square feet) of unobstructed floor space in the booth;~~
- ~~(b) — The operator's booth may be any geometric configuration with no dimension of less than 0.6 m (2 feet);~~
- ~~(c) — The space shall be allotted excluding any encumbrance by the x-ray control panel, such as overhang, cables, or other similar encroachments;~~
- ~~(d) — The booth shall be located or constructed such that unattenuated direct scatter radiation originating on the examination table or at the wall-mounted image receptor will not reach the operator's position in the booth.~~

~~2. — Structural Requirements:~~

- ~~(a) — The booth walls shall be permanently fixed barriers of at least 2 m (7 feet) high;~~

466 ~~(b) — When a door or movable panel is used as an integral part of the booth structure, it~~
467 ~~must have an interlock which will prevent an exposure when the door or panel is not~~
468 ~~closed;~~

469 ~~(c) — Shielding shall be provided to meet the requirements of Part D of these regulations.~~

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472 ~~3. — Radiation Exposure Control Placement:~~

473
474 ~~The radiation exposure control for the system shall be fixed within the booth and:~~

475
476 ~~(a) — Shall be at least 1.0 m (40 inches) from any point subject to direct scatter, leakage or~~
477 ~~primary beam radiation;~~

478
479 ~~(b) — Shall allow the operator to use the majority of the available viewing windows.~~

480
481 ~~4. — Viewing System Requirements:~~

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483 ~~(a) — Each booth shall have at least one viewing device which will:~~

484
485 ~~(1) — Be so placed that the operator can view the patient during any exposure; and~~

486
487 ~~(2) — Be so placed that the operator can have full view of any occupant of the room~~
488 ~~and should be so placed that the operator can view any entry into the room. If~~
489 ~~any door which allows access to the room cannot be seen from the booth, then~~
490 ~~outside that door there shall be an "x ray on" warning sign that will be lighted~~
491 ~~anytime the rotor of the x ray tube is activated. Alternatively, an interlock~~
492 ~~shall be present such that exposures are prevented unless the door is closed.~~

493
494 ~~(b) — When the viewing system is a window, the following requirements also apply:~~

495
496 ~~(1) — The window shall have a viewing area of at least 0.09 m² (1 square foot);~~

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498 ~~(2) — Regardless of size or shape, at least 0.09 m² (1 square foot) of the window~~
499 ~~area must be centered no less than 0.6 m (2 feet) from the open edge of the~~
500 ~~booth and no less than 1.5 m (5.0 feet) from the floor;~~

501
502 ~~(3) — The window shall have at least the same lead equivalence as that required in~~
503 ~~the booth's wall in which it is mounted.~~

504
505 ~~(c) — When the viewing system is by mirrors, the mirror(s) shall be so located as to~~
506 ~~accomplish the general requirements of Appendix B4.(a).~~

507
508 ~~(d) — When the viewing system is by electronic means:~~

509
510 ~~(1) — The camera shall be so located as to accomplish the general requirements of~~
511 ~~Appendix B4.(a); and~~

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513

~~(2) — There shall be an alternate viewing system as a backup for the primary system.]~~

514