

STATE OF COLORADO

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S. Laboratory Services Division
Denver, Colorado 80246-1530 8100 Lowry Blvd.
Phone (303) 692-2000 Denver, Colorado 80230-6928
TDD Line (303) 691-7700 (303) 692-3090
Located in Glendale, Colorado
<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

INTERPRETIVE GUIDANCE

Hazardous Materials and Waste Management Division
Radiation Control Program, X-Ray Certification Unit

SUBJECT: Use of Portable or Mobile X-Ray Units

Basis and Purpose:

The main concerns about the use of mobile or portable x-ray equipment is the potential for exposure to staff and other members of the public from use of portable equipment in areas not evaluated for shielding and the potential for poor image quality. The Department recognizes that infrequent use of a mobile or portable x-ray system in an area not evaluated for shielding is sometimes necessary for patient care. To ensure that the risk of radiation exposure is associated with the benefit of a high quality radiographic image, the use of portable or mobile x-ray machines for human diagnostic procedures is restricted to patients who cannot be transferred to a stationary machine. Human diagnostic radiographs should be obtained from the use of stationary x-ray units, as much as possible. Facilities that wish to use a portable or mobile x-ray machine as their primary imaging system must first obtain Department approval.

Recent changes to the Colorado *Rules and Regulations Pertaining to Radiation Control* reorganized the regulations regarding the use of x-ray machines. The purpose of this guidance is to identify regulatory requirements and clarify the Department's position on the use of mobile or portable x-ray equipment.

Scope:

This guidance defines the Departments position on the use of portable or mobile x-ray machines such as the GE AMX series, the MinXRay Medical units, the Siemens Mobilett, or any similar unit. This guidance does not address x-ray systems used in mobile coaches or hand-held dental units. The term "portable" is meant to include both portable and mobile systems.

Regulations:

Regulations related to diagnostic imaging systems used on humans apply to both portable and stationary systems. The following regulatory citations apply to portable systems specifically.

- 6.3.2.2 (1)(e) – A qualified expert shall review and modify shielding design, consistent with 6.3.2.1 and Appendices 6A, 6B and 6C, whenever mobile or non-handheld portable x-ray equipment is used regularly in the same location.
- 6.3.2.4 (2) – A facility area is exempt from the requirements of 6.3.2.1 (and consequently exempt from 6.3.2.2 and 6.3.2.3) if mobile or portable x-ray equipment is used infrequently not routinely in the same location.
- 6.6.2.6 – Beam limitation requirements for each X-ray system other than governed by 6.6.2.1 through 6.6.2.5
 - (1) Means shall be provided to limit the x-ray field in the plane of the image receptor so that such field does not exceed each dimension of the image receptor by more than two (2) percent of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
 - (2) Means shall be provided to align the center of the x-ray field with the center of the image receptor to within two (2) percent of the SID or means shall be provided to both size and align the x-ray field such that the x-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor.

- 6.6.3.2 (2) – X-Ray Control - Except for a bone densitometry system, each x-ray control shall be located in such a way as to meet the following requirements:
- (a) For stationary x-ray systems, and mobile or portable systems used routinely in one location, the x-ray control permanently mounted in a separated area behind a whole body protective barrier (of not less than 0.25 millimeter lead equivalent) where the operator is required to remain during the entire exposure.
 - (b) Mobile and portable x-ray systems not routinely used in one location shall be required to have an exposure switch so arranged that the operator can stand at least 2 meters (more than 6 feet) from the patient, the x-ray tube and the useful beam.
 - (i) Mobile and portable x-ray systems used in surgery are considered to be not routinely used in one location.

6.6.3.5 Source to Skin Distance – Each mobile or portable radiographic x-ray imaging system shall be provided with means to limit the source-skin distance to equal to or greater than 30 cm.

Interpretation:

Portable x-ray equipment shall be used only for examinations where it is impractical to transfer the patient(s) to a stationary x-ray installation, or when the mobile or portable equipment is most suitable for the diagnostic procedure. If a facility wishes to use portable equipment as their primary x-ray equipment, that facility must obtain Department approval prior to that use. The Department must ensure that the facility addresses the following issues:

Shielding Designs

Use of a portable or mobile system in only one or even a few locations in the facility is considered routine use, regardless of the frequency of use. For example, if a facility had only one exam room available, the use of a portable system is considered routine in that room, even if it was only used once a month. That facility would then be required to have a shielding design prepared by a Registered Medical Physicist for that area of use. The same is true if the facility had two or three rooms in which they wished to use a portable unit. Each of these areas will need a shielding design. An example of when this exemption applies is in a multi-room hospital in which a portable unit may be moved to a patient’s room for a radiographic procedure. In that example, the patient rooms would not need to have shielding designs prepared. Also, as mentioned in 6.6.3.2(2)(b)(i), use of portable systems in a surgical suite is not considered to be routine, and therefore, those suites would not need a shielding design unless some other x-ray machine was used in that area.

Beam Limitation

Some sections in Part 6 specify between stationary and portable machines. Section 6.6.2.6 is mentioned so that the facility recognizes that both beam alignment and beam collimation are required for portable systems, just as they are for stationary systems. Beam alignment, especially if using a grid, is critical to image quality. Beam collimation is always necessary to reduce the amount of radiation exposure to staff and the public, as well as improve image quality.

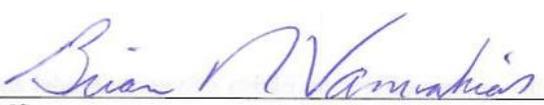
X-Ray Control

If a portable system is used routinely in a facility location, the Regulations require that for each location, a permanent control panel be located in a protected area so that the operator can remain behind the shielding during the entire exposure. The control booth requirements in Appendix 6B meet the definition of a protected area. The concept of routine use, as mentioned above, also applies to this requirement.

Radiation Safety Procedures

Each facility must have radiation safety procedures that address use of x-ray machines. Instructions for portable machines must include the restriction of Source to Skin Distance (SSD) to no less than 30 cm.

This Guidance may be revoked pending any changes to the Regulations by this Department. Any questions or comments regarding this document should be addressed to the X-Ray Certification Unit at 303-692-3427, by fax at 303-759-5355 or by sending an email to Brian.Vamvakias@state.co.us.

Authorized by:  Date: October 6, 2010
Brian Vamvakias, MS
X-ray Certification Unit, Unit Leader