

Minnesota Rules, Chapter 4732 X-ray Revision

DRAFT INDUSTRIAL X-RAY SYSTEMS DEFINITIONS, 1.0

4732.#####. INDUSTRIAL X-RAY SYSTEMS DEFINITIONS.

Subpart 1. **Scope.** For purposes of industrial x-ray systems under parts 4732.##### to 4732.#####, the definitions in this part have the meaning given them. The definitions in this part are addition to those in part 4732.#####. When the same definition appears in both definition parts, the definition in this part applies to industrial x-ray systems.

Subp. 2. **Access control.** “Access control” means a system for allowing unescorted access to approved individuals to a restricted area and requiring that all other individuals are subject to escorted access.

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Subp. 3. **Access panel.** “Access panel” means any barrier or panel that is designed to be removed or opened for maintenance or service purposes, requires tools to open, and permits access to the interior of an enclosed fail-safe system.

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Subp. 4. **Accessible surface.** “Accessible surface” means the external or outside surface of the enclosure or housing provided by the x-ray system manufacturer. This includes the high-voltage generator, doors, access panels, latches, control knobs, and other permanently mounted hardware and including the plane across the exterior edge of any opening.

Subp. 5. **Analytical x-ray system.** “Analytical x-ray system” means an x-ray system that is used for elemental composition or microstructure of materials. Gauging systems do not determine the properties of materials; they typically measure the density, thickness, and level

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of material not the elemental properties. Analytical x-ray systems include gauging, x-ray diffraction, and x-ray fluorescence equipment.

Subp. 6. **Area survey.** "Area survey" means a survey conducted with a portable or hand-held radiation survey meter that monitors for levels of increased radiation in unshielded areas or during relocation of an industrial x-ray system.

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Subp. 7. **Beam-port.** "Beam-port" means an opening on the x-ray apparatus designed to emit a primary beam. This does not include openings on baggage units.

Subp. 8. **Cabinet x-ray system.** "Cabinet x-ray system" means non-medical radiation-generating equipment, installed in a shielded enclosure, that excludes all personnel, including extremities, from the primary beam during the generation of radiation.

Subp. 9. **Closed-beam x-ray equipment.** "Closed-beam x-ray equipment" means an x-ray system where the useful beam cannot be entered by any part of the individual's body during normal operation.

Subp. 10. **Collimator.** "Collimator" means a device or mechanism that restricts the size of the x-ray beam.

Subp. 11. **Control panel.** "Control panel" means the part of non-medical radiation-generating equipment that is used for setting the technique factors.

Subp. 12. **Dead-man switch.** "Dead-man switch" means a switch that is constructed so that circuit-closing contact can be maintained only by continuous pressure on the switch by an operator.

Subp. 13. Door. "Door" means any barrier that is designed to be movable or opened during routine operation, does not generally require tools to open, and permits access to the interior of an enclosed fail-safe system. Inflexible hardware that is affixed to the door is considered part of the door.

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Subp. 14. External surface. "External surface" means the outside surface of a cabinet x-ray system or an analytical x-ray system, including the high-voltage generator, doors, access panels, latches, control knobs, and other permanently mounted hardware and including the plane across any aperture or port.

Subp. 15. Fail-safe design. "Fail-safe design" means a design feature that prevents an individual from being exposed to the useful beam when a safety or warning device fails and a where the failure of indicators or safety components result in a condition where an individual is safe from exposure to radiation.

Subp. 16. Hands-on experience. "Hands-on experience" means experience in all of those areas considered to be directly involved in industrial radiographic operations and includes taking radiographs, calibration of survey instruments, operational and performance testing of survey instruments and devices, image development, posting of radiation areas, transportation of industrial radiography x-ray system, posting of records and radiation area surveillance.

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Subp. 17. High radiation area. "High radiation area" means any area, accessible to individuals, where radiation levels from radiation sources external to the body may result in an individual receiving a radiation dose equivalent in excess of 0.1 rem (1.0 mSv) in one hour at 30 centimeters from any source of radiation or 30 centimeters from any surface that the radiation penetrates.

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Subp. 18. **Industrial radiography.** “Industrial radiography” means an examination of the structure of materials by nondestructive methods of using ionizing radiation to make images. Industrial radiography does not include a cabinet x-ray system, a gauging x-ray system, or an analytical x-ray system.

Subp. 19. **Interlock.** “Interlock” means a device or an engineered system that precludes access to an area of radiation hazard by preventing entry or by automatically removing the hazard.

Subp. 20. **Local components.** “Local components” means parts of an x-ray system and includes areas that are struck by x-rays such as the radiation source housing, port and shutter assembly, collimator, sample holder, camera, goniometer, detector, and shielding. Local components do not include the power supply, transformer, amplifier, readout device, and control panel.

Subp. 21. **Locked out and tagged.** “Locked out and tagged” means a process for equipment security and safety where non-medical radiation-generating equipment is locked to prevent operation and tagged with specific information that documents the reason the non-medical radiation-generating equipment must not be used.

Subp. 22. **Open-beam analytical system.** “Open-beam analytical system” means an analytical system configured so that any part of an individual’s body can be placed in the useful beam during normal operation.

Subp. 23. **Open-beam configuration.** “Open-beam configuration” means an analytical x-ray system where an individual may inadvertently place a part of the body in the primary beam or secondary scattered beam path during normal operation.

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Subp. 24. **Particle accelerator system.** "Particle accelerator system" means non-medical radiation-generating equipment that is designed for, or capable of, accelerating electrically charged particles.

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Subp. 25. **Permanent radiographic installation.** "Permanent radiographic installation" means a radiographic system enclosed in a shielded room, a cell, or a vault and is not located at a temporary job site.

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Subp. 26. **Personal supervision.** "Personal supervision" means guidance and instruction by an industrial radiographer who is physically present at a temporary job site, is in personal contact with an industrial radiographer's assistant, and is able to give immediate assistance.

Subp. 27. **Port.** "Port" means any opening in the outside surface of a cabinet x-ray system or analytical x-ray system that is designed to remain open during generation of radiation to convey material to be irradiated into and out of the enclosure, or for partial insertion for irradiation of an object whose dimensions do not permit complete insertion into the enclosure.

Subp. 28. **Practical examination.** "Practical examination" means a demonstration through application of the safety rules and principles in industrial radiography including use of all procedures and equipment to be used by industrial radiography personnel.

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Subp. 29. **Qualified personnel.** "Qualified personnel" means an individual, designated by a registrant, who has obtained training through the x-ray system manufacturer that provides the individual with the knowledge and experience to perform duties related to a specific task or required function.

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Subp. 30. Radiation source (or x-ray tube) housing. “Radiation source (or x-ray tube) housing” means the portion of an x-ray system that contains the x-ray tube or secondary target.

Subp. 31. Radiographic operations. “Radiographic operations” means all activities associated with the presence of an industrial x-ray system. Activities include using, or storing at a temporary job site, performing surveys to confirm the adequacy of boundaries, setting up equipment, and any activity inside restricted area boundaries.

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Subp. 32. Safety device. “Safety device” means a device, interlock, or system that prevents the entry of any portion of an individual’s body into the useful x-ray beam, or that causes the useful beam to shut off upon entry into its path.

Subp. 33. Shutter. “Shutter” means a device that is affixed to any radiation source housing to intercept the useful beam.

Subp. 34. Storage area. “Storage area” means a location, facility, or vehicle that is locked or has a physical barrier to prevent accidental exposure to, tampering with, or unauthorized removal of the x-ray system.

Subp. 35. Temporary job site. “Temporary job site” means a location where radiographic operations are performed and where industrial radiography x-ray system may be stored in the facility storage area.

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Subp. 36. Useful beam. “Useful beam” means radiation that passes through the collimator in the radiation source housing by a direct path from the radiation source.

Subp. 37. Warning device. “Warning device” means a visible or audible signal that warns an individual of a potential radiation hazard.

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05/30/2018

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