**Section 360.20 Definitions**

As used in this Part, the following definitions apply:

"Accelerator" (also "particle accelerator") means any therapeutic machine capable of producing a useful beam of x-rays or charged particles with energies of 1 MeV or greater. Accelerators include cyclotrons, betatrons and linear accelerators.

"Accelerator facility" means the location at which one or more particle accelerators are installed and are operated under the same administrative control.

"Agency" means the Illinois Emergency Management Agency.

"Aluminum equivalent" means the thickness of type 1100 aluminum alloy affording the same attenuation, under specified conditions, as the material in question. The nominal chemical composition of type 1100 aluminum alloy is 99.00 percent minimum aluminum, 0.12 percent copper.

"Applicator" means a structure which determines the extent of the treatment field at a given distance from the source of the beam.

"Attenuation block" means a block or stack, having dimensions 20 centimeters by 20 centimeters by 3.8 centimeters, of aluminum equivalent. Copper may be substituted for aluminum if an appropriate thickness is used for the kVp selected, as indicated below:

|  |  |
| --- | --- |
| kVp | Millimeters of Copper Equivalent to 3.8 centimeters of aluminum |
| 99 or less | 2.0 |
| 100 to 125 | 2.5 |
| greater than 125 | 3.0 |

"Automatic exposure control" means a device that automatically controls one or more technique factors in order to obtain at a preselected location or locations a required quantity of radiation (see "Phototimer").

"Barrier" (see "Protective barrier").

"Beam" means a flow of electromagnetic or particulate radiation that passes through the opening in the beam limiting device and that is used for diagnosis or treatment.

"Beam axis" (see "Central axis of the beam").

"Beam-limiting device" means a device that provides a means to restrict the dimensions of the x-ray field (see "Collimator", "Diaphragm" and "Shutter").

"Beam monitoring system" means a system of devices that will monitor the useful beam during irradiation and will terminate irradiation when a preselected number of monitor units has been accumulated.

"Beam scattering filter" means a filter placed in an electron beam in order to scatter the beam and provide a more uniform distribution of electrons in the beam.

"Central axis of the beam" means the line passing through the source of the beam and the center of the plane formed by the edge of the first beam-limiting device.

"Charged particle beam" (see "Beam").

"Coefficient of variation" means the ratio of the standard deviation to the mean value of a population of observations.

"Collimator" means a device or mechanism by which the x-ray beam is restricted in size (see "Beam-limiting device").

"Computed tomography" or "CT" means the production of a tomogram by the acquisition and computer processing of x-ray transmission data.

"Computed tomography dose index" or "CTDI" means the integral of the dose profile along a line perpendicular to the tomographic plane divided by the product of the nominal tomographic section thickness and the number of tomograms produced in a single scan.

"Contact hour" means the number of hours an individual is in contact with an instructor. One contact hour equals 50 minutes.

"Contact therapy system" means an x-ray system used for therapy that is designed for very short treatment distances (5 centimeters or less), usually employing peak tube potentials in the range of 20 to 50 kVp.

"Control panel" means that part or parts of the x-ray system upon which are mounted the switches, knobs, pushbuttons and other hardware necessary for setting the technique factors prior to initiating an x-ray exposure.

"CT gantry" means the tube housing assemblies, beam-limiting devices, detectors and the supporting structures and frames that hold these components.

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

"Diagnostic imaging specialist" means a person who possesses the knowledge, training and experience to apply the principles of radiological physics to diagnostic x-ray applications. The diagnostic imaging specialist shall be approved and registered by the Agency pursuant to 32 Ill. Adm. Code 410.

"Diagnostic source assembly" means an x-ray tube housing assembly, designed for use in diagnostic x-ray applications, with a beam-limiting device attached.

"Diaphragm" means a device or mechanism by which the x-ray beam is restricted in size (see "Beam-limiting device").

"Direct supervision" means an individual is in the physical presence of a licensed practitioner who assists, evaluates and approves of the individual's performance of the various tasks involved in the application of ionizing radiation.

"Electronic brachytherapy" means a method of radiation therapy in which an electrically generated source of ionizing radiation is placed in or near the tumor or target tissue to deliver a therapeutic radiation dosage.

"Electronic brachytherapy device" means the system used to produce and deliver therapeutic radiation, including x-ray tube, the control mechanism, the cooling system and the power source.

"Electronic brachytherapy device operator" means a radiation therapist accredited in accordance with 32 Ill. Adm. Code 401 or a physician.

"Electronic brachytherapy source" means the x-ray tube component used in an electronic brachytherapy device.

"Field flattening filter" means a filter used to provide dose uniformity over the area of a useful beam of x-rays at a specified depth.

"Filter" means material placed in the useful beam to absorb, preferentially, radiations based on energy level or to modify the spatial distribution of the beam.

"Gantry" means that part of the system supporting and allowing possible movements of the radiation head.

"General purpose x-ray system" means any radiographic x-ray system that, by design, is not limited to radiographic examination of specific anatomical regions.

"Gonad shield" means a protective device for the testes or ovaries that provides a minimum of 0.5 millimeter lead equivalent protection.

"Half-value layer" or "HVL" means the thickness of a specified material that attenuates the beam of radiation to an extent such that the exposure rate is reduced to one-half of its original value.

AGENCY NOTE: The contribution of all scattered radiation, other than any that might be present initially in the beam concerned, should be minimized.

"Healing arts screening" means the examination of human beings using x-ray machines for the detection or evaluation of potential diseases when the examinations are not specifically ordered by a licensed practitioner of the healing arts legally authorized to prescribe such x-ray examinations for the purpose of diagnosis or treatment. However, healing arts screening does not include mammography on self-referred patients.

"Image intensifier" means a device, installed in a housing, that converts an x-ray pattern into a corresponding light image, usually by electronic means.

"Image receptor" means any device, such as a fluorescent screen or radiographic film, that transforms incident x-ray photons either into a visible image or into another form that can be made into a visible image by further transformations.

"Institutional review board" means a committee that has been formally designated by the registrant to approve, monitor and review biomedical and behavioral research involving humans.

"Interlock" means a device arranged or connected such that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

"Isocenter" means a fixed point in space located at the center of the smallest sphere through which the central axis of the useful beam passes at any beam orientation.

"Kilovolts peak" or "kVp" means the crest value, in kilovolts, of the electric potential applied to the x-ray tube between the cathode and anode of a pulsating electric potential generator.

"Lead equivalent" means the thickness of lead affording the same attenuation, under specified conditions, as the material in question.

"Leakage radiation" means all radiation emanating from the diagnostic source assembly except for:

The useful beam; and

The radiation produced when the exposure switch or timer is not activated.

"Leakage technique factors" means the technique factors used to measure leakage radiation from the diagnostic source assembly. They are defined as follows:

For capacitor energy storage equipment, the maximum-rated peak tube potential and the maximum-rated number of exposures in 1 hour for operation at the maximum-rated peak tube potential with the quantity of charge per exposure being 10 millicoulombs, i.e., 10 milliampere-seconds, or the minimum obtainable from the unit, whichever is larger.

For field emission equipment rated for pulsed operation, the maximum-rated peak tube potential and the maximum-rated number of x-ray pulses in 1 hour for operation at the maximum-rated peak tube potential.

For all other equipment, the maximum-rated peak tube potential and the maximum-rated continuous tube current for the maximum-rated peak tube potential.

"Light field" means that area of the intersection of the light beam from the beam-limiting device and any one of the sets of planes parallel to and including the plane of the image receptor. The edge of the light field is defined as the locus of points at which the illumination is 25 percent of that at the center of the light field.

"Medical event" means an event that meets the criteria in Section 360.120(i)(3).

"Medical radiographer" means a person other than a licensed practitioner, accredited in accordance with the provisions of 32 Ill. Adm. Code 401, or an individual exempt from the provisions of 32 Ill. Adm. Code 401, who performs medical radiation procedures and applies x-radiation, to any part of the human body, for diagnostic purposes while under the supervision of a licensed practitioner.

"Mobile equipment" (see "X-ray equipment").

"Monitor unit" means a unit response from the beam monitoring system from which the absorbed dose can be calculated.

"Moving beam therapy" means radiation therapy in which there is displacement of the useful beam relative to the patient. Moving beam therapy includes arc therapy, skip therapy and rotational beam therapy.

"Operator" means an individual who applies ionizing radiation for diagnostic or therapeutic purposes.

"Phototimer" means a method for controlling radiation exposures to image receptors by the amount of radiation that reaches a radiation monitoring devices. The radiation monitoring devices is part of an electronic circuit that controls the duration of time the tube is activated (see "Automatic exposure control").

"Portable equipment" (see "X-ray equipment").

"Portable x-ray service provider" means a registrant who, under a physician's authorization, provides x-ray procedures with hand-held or mobile radiographic equipment in a patient's place of residence.

"Position indicating device" means a device on intraoral dental x-ray equipment used to indicate the beam position and to establish a definite source-skin distance.

"Prescribed dose" means the total dose and dose per fraction as documented in the written directive. The prescribed dose is an estimation from measured data from a specified therapeutic machine using assumptions that are clinically acceptable for that treatment technique and historically consistent with the clinical calculations previously used for patients treated with the same clinical technique.

"Primary protective barrier" (see "Protective barrier").

"Protective apron" means an apron of radiation absorbing materials, at least 0.25 millimeter lead equivalent, used to reduce exposure from leakage and scatter radiation.

"Protective barrier" means a barrier of radiation absorbing materials used to reduce radiation dose. The types of protective barriers are as follows:

"Primary protective barrier" means the material, excluding filters, placed in the useful beam to reduce the radiation dose.

"Secondary protective barrier" means a barrier sufficient to attenuate the leakage and scatter radiation to the required degree.

"Protective glove" means a glove made of radiation absorbing materials, at least 0.25 millimeter lead equivalent, used to reduce dose from leakage and scatter radiation.

"Radiation beam" (see "Beam").

"Radiation therapy simulation system" means a radiographic/ fluoroscopic x-ray system used exclusively for localizing the volume to be exposed during radiation therapy and confirming the position and size of the therapeutic irradiation field.

"Radiologist assistant" means a person, other than a licensed practitioner, who, as a medical radiographer with advanced-level training and certification, performs a variety of activities under the supervision of a radiologist certified by the American Board of Radiology or the American Osteopathic Board of Radiology, in the areas of patient care, patient management, clinical imaging and interventional procedures. The radiologist assistant may not interpret images, make diagnoses or prescribe medications or therapies.

"Reference plane" means a plane that is displaced from and parallel to the tomographic plane.

"Scan" means the complete process of collecting x-ray transmission data for the production of a tomogram. Data can be collected simultaneously during a single scan for the production of one or more tomograms.

"Scan increment" means the amount of relative displacement of the patient support device with respect to the CT x-ray system between successive scans measured along the direction of such displacement.

"Scatter radiation" means radiation that, during passage through matter, has been deviated in direction.

"Secondary protective barrier" (see "Protective barrier").

"Shadow tray" means a device attached to the radiation head to support auxiliary beam-limiting material.

"Shutter" means an adjustable beam-limiting or attenuating device, usually made of lead, fixed to an x-ray tube housing to intercept or collimate the useful beam (see "Beam-limiting device").

"SID" means source-image receptor distance (see "Source-image receptor distance").

"Source" means the focal spot of the x-ray tube.

"Source-image receptor distance" means the distance from the source to the center of the input surface of the image receptor.

"Source to skin distance" or "SSD" means the distance measured along the central ray from the center of the front surface of the x-ray focal spot to the surface of the irradiated object.

"Special purpose x-ray system" means any radiographic x-ray system that, by design, is limited to radiographic examination of a specific anatomical region or to the extremities collectively.

"Spot film" means a radiograph that is made during a fluoroscopic examination to permanently record conditions that exist during that fluoroscopic procedure.

"Stationary beam therapy" means radiation therapy in which there is no displacement of the useful beam relative to the patient during irradiation.

"Stationary equipment" (see "X-ray equipment").

"Supervision" means responsibility for and control of quality, radiation safety and protection, and technical aspects of the application of ionizing radiation to human beings for diagnostic and/or therapeutic purposes.

"Technique factors" means the electrical potential (kilovolts), current (milliamperes), exposure time parameters (seconds or pulses) or a combination thereof, selectable at the control panel of an x-ray system (see "Control panel").

"Therapeutic radiological physicist" means an individual who has the knowledge, training and experience to measure ionizing radiation, evaluate safety techniques, advise regarding radiation protection needs and apply the principles of radiological physics to clinical radiation therapy. The therapeutic radiological physicist shall be approved and registered by the Agency pursuant to 32 Ill. Adm. Code 410.

"Tomogram" means the depiction of the x-ray attenuation properties of a section through the body.

"Tomographic plane" means that geometric plane that is identified as corresponding to the output tomogram.

"Tomographic section" means the volume of an object whose x-ray attenuation properties are imaged in a tomogram.

"Useful beam" (see "Beam").

"X-ray equipment" means an x-ray system, sub-system or component thereof. Types of x-ray equipment are as follows:

"Mobile x-ray equipment" means x-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. Mobile x-ray equipment includes x-ray equipment permanently mounted in vehicles.

"Portable x-ray equipment" means x-ray equipment designed to be hand-carried.

"Stationary x-ray equipment" means x-ray equipment that is installed in a fixed location.

"X-ray field" means, for diagnostic purposes, that area of the intersection of the useful beam and any one of the set of planes parallel to and including the plane of the image receptor. The edge of the x-ray field is defined as the locus of points at which the exposure is 25 percent of that at the center of the x-ray field.

"X-ray system" means an assemblage of components for the controlled production of x-rays. It includes minimally an x-ray high-voltage generator, an x-ray control panel, an x-ray tube housing assembly, a beam-limiting device and the necessary supporting structures. Additional components that function with the system are considered integral parts of the system. X-ray systems include diagnostic systems, therapeutic systems and accelerator systems.

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