

**CLASS 378, X-RAY OR GAMMA RAY SYSTEMS OR DEVICES****SECTION I - CLASS DEFINITION**

This is the generic class for apparatus and corresponding processes involving the generation or use of electromagnetic radiation within the X-ray spectrum as defined above.

Methods, systems, and elements with specific features characteristic of X-ray applications are classified herein.

Mere use with or attachment to an X-ray device or recitation of an undefined X-ray test or analysis is insufficient to cause classification within this class.

**SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

This class is the result of a reclassification of the X-ray art which was extracted from several classes, principally Class 250, Radiant Energy. The subject matter of this class is, therefore, essentially identical in scope to the X-ray subject matter formerly found in the more comprehensive Class 250 with the addition of the X-ray source subject matter of Class 313, Electric Lamp and Discharge Devices. Selected disclosures concerning elements "for use in" but not restricted to X-ray systems were removed from the above described body of art and placed in more appropriate classes.

Significantly claimed apparatus external to this class, claimed in combination with apparatus under the class definition which is used to monitor, control or otherwise effect the operation of the external apparatus, is classified in the class appropriate to that external apparatus.

Nominally claimed apparatus external to this class, claimed in combination with apparatus under the class definition, is classified in this class unless provided for in the appropriate external class.

**SECTION III - REFERENCES TO OTHER CLASSES****SEE OR SEARCH CLASS:**

5, Beds, appropriate subclasses, particularly subclasses 600+ and 652+ for beds with body support or positioning means and subclasses 630+ for patient examination tables.

29, Metal Working, subclass 806 for film or tape cartridge manufacture.

40, Card, Picture, or Sign Exhibiting, subclasses 361+ for viewers for X-ray transparencies.

73, Measuring and Testing, subclass 23.2 for the analysis of gases; particularly subclass 23.35, for the combination of a gas chromatography test and a radiation (invisible and visible) test of the effluent from the test; subclasses 53.01+ for the examination of liquids or a liquid suspension of solids; subclasses 73+ for moisture content or absorption characteristics generally; subclass 104 for surface or cutlery edge testing generally; subclasses 151+ for bore hole and drilling study tests generally; subclasses 861+ for volume or rate of flow meters generally; subclasses 290+ for liquid level or depth gauges; and subclasses 570+ for ultrasonic testing.

99, Foods and Beverages: Apparatus, subclass 451 for apparatus for subjecting foods and beverage to wave, radiant, and electrical energy.

118, Coating Apparatus, subclasses 620+ for coating apparatus combined with means to apply radiant energy to the work.

134, Cleaning and Liquid Contact With Solids, subclass 1 for processes of cleaning or contacting of solids with liquids which include the application of radiant energy to the work.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 272.2+ and 379.6 for methods and apparatus which include applying wave energy to work.

162, Paper Making and Fiber Liberation, subclasses 49 and 192 for processes using radiant energy.

164, Metal Founding, subclass 250.1 for means to apply electrical or wave energy to work.

206, Special Receptacle or Package, subclass 455 for film receptacles.

209, Classifying, Separating, and Assorting Solids, appropriate subclasses, especially subclass 589 for radiant energy type automatic assorting.

250, Radiant Energy, subclass 214 for image intensifiers; subclasses 306+ for sample bombardment with protons or electrons which may produce X-rays; subclasses 336.1+ for radiant energy detectors; subclass 492.2 for generic irradiation of semiconductor substrates; subclasses 496.1+ for radioactive sources; and subclasses 515.1+ for radiation shielding.

252, Compositions, subclass 478 for X-ray shield compositions or contrast agents for inanimate objects.

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 405+ for direct application of electrical or wave energy to work.
- 271, Sheet Feeding or Delivering, appropriate subclasses for sheet feeding.
- 313, Electric Lamp and Discharge Devices, appropriate subclasses for electric space discharge devices, per se, including cathode-ray tubes, electric discharge lamps, liquid electrode discharge devices, gas or vapor filled discharge devices and vacuum tubes, and for the electrodes filaments, fluorescent targets and shields for electric space discharge devices.
- 314, Electric Lamp and Discharge Devices: Consumable Electrodes, subclass 22 for consumable electrode discharge devices which have means to feed a fluent material (e.g., solid particles to the discharge space.)
- 315, Electric Lamp and Discharge Devices: Systems, especially subclass 3 for systems wherein a fluent material is supplied to the discharge area between the discharge electrodes of the discharge device.
- 318, Electricity: Motive Power Systems, appropriate subclasses for motor control devices usable in rotary anode X-ray tube systems.
- 324, Electricity: Measuring and Testing, for measuring or testing of electrical properties by the use of radiant energy.
- 369, Dynamic Information Storage or Retrieval, subclass 101 for recorder-reproducers using invisible radiation.
- 372, Coherent Light Generators, subclass 5 for short wavelength lasers including X-ray lasers.
- 376, Induced Nuclear Reactions: Processes, Systems, and Elements, subclasses 156+ for X-rays generated by means of an induced nuclear reaction, e.g., wherein the internal conversion of an electron within the nucleus generates soft gamma rays.
- 382, Image Analysis, subclasses 128 through 134 for biomedical applications of image analysis.
- 396, Photography, subclasses 310+ for exposure identification means; subclasses 360+ for cameras using film magazines; and subclasses 512+ for film cassettes.
- 398, Optical Communications, various subclasses for light wave communications.
- 399, Electrophotography, subclasses 9+ for diagnostics, subclasses 38+ for controls, subclasses 130+ for image formation, subclasses 168+ for charging, subclasses 177+ for exposure, subclasses 222+ for development, subclasses 297+ for transfer, subclasses 320+ for fixing, subclasses 343+ for cleaning, and subclasses 361+ for document handling.
- 414, Material or Article Handling, subclasses 403+ for film cassette unloaders and/or reloaders.
- 424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 9.4+ for X-ray contrast compositions for use in animate objects.
- 426, Food or Edible Material: Processes, Compositions, and Products, subclass 234, 236 and 237+, particularly subclass 240 for processes involving the use of electrical, wave, or radiant energy in food treatments.
- 427, Coating Processes, subclass 65, 160 and 457+ for processes of coating using electrical or wave energy.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 5 for radiation masks; and subclasses 966+ for cross-reference art collections of disclosures relating to X-ray imagery.
- 438, Semiconductor Device Manufacturing: Process, appropriate subclass for methods of making semiconductor devices; see the search notes therein.
- 600, Surgery, subclasses 407+ for detecting nuclear, electromagnetic, or ultrasonic radiation in diagnostic testing.
- 601, Surgery: Kinesitherapy, subclasses 15+ for apparatus in direct contact which applies radiation to a human being.
- 604, Surgery, subclass 20 for the applications of light, radiation, and electrical energy to the body.
- 606, Surgery, subclass 130 for stereotactic devices.
- 702, Data Processing: Measuring, Calibrating, or Testing, appropriate subclasses for a computer data processing system for measuring, calibrating, or testing that may include X-ray subject matter.

#### SECTION IV - GLOSSARY

##### DETECTOR

A material or device whose response to X-ray energy is used to indicate the presence or amount of incident radiation.

##### GAMMA RAY

In this class the term "gamma ray" is considered to be synonymous with the term "X-ray". Gamma rays are

usually considered to be produced by some natural phenomenon such as the decay of an atomic nucleus whereas X-rays are usually considered to be produced by an electronic tube or other manufactured device.

#### INSPECTION OR EXAMINATION

A term implying a source of X-ray energy, and/or means to irradiate an object by said source and a detector responsive to X-radiation from the object to provide an indication representing some characteristic of the object.

#### OBJECT OR ANALYTE

A material subjected to X-radiation for treatment or whose response to or effect on the X-radiation is used to indicate something about the material.

#### X-RAY

Electromagnetic radiation lying in a range between "cosmic rays" and "ultraviolet rays". This range is defined as lying between 0.001 and 100 angstrom units or  $10^{-11}$  and  $10^{-6}$  centimeters in wavelength.

#### SUBCLASSES

**1**     **SPECIFIC APPLICATION:**  
This subclass is indented under the class definition. Subject matter comprising an X-ray system including means which adapts that system to a specific application.

- (1) Note. Specific methods are classified in the same subclass as the corresponding apparatus in this and each of the following subclasses.

**2**     **Radiation coding:**  
This subclass is indented under subclass 1. Subject matter including means to spatially modulate a beam of X-rays prior to its impinging upon an object or means to spatially demodulate a modulated beam.

- (1) Note. The spatial modulation may be produced by spatial filtering of an unmodulated beam or by means within the X-ray source which directly produces a modulated beam.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 145,     for X-ray zone plates which may be used as modulators or demodulators.

**3**     **Mossbauer effect:**  
This subclass is indented under subclass 1. Subject matter including systems and devices such as spectrometers employing the Mossbauer effect, i.e., the absorption or emission of gamma rays by an atomic nucleus without the nuclear recoil that usually accompanies such phenomena.

**4**     **Computerized tomography:**  
This subclass is indented under subclass 1. Subject matter employing computer processing of X-ray absorption or transmission data to produce an image of a cross section of an object.

- (1) Note. The devices found herein usually include some mechanism which allows relative movement between the source or detector of X-rays and the object being examined. The tomographic movement is typically produced by holding the object stationary and moving the X-ray source and the detector simultaneously in opposite directions about a pivot point lying in a plane through the object.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 21+,     for noncomputerized tomography.  
901,     for a cross-reference art collection of tomography programs or processors.

SEE OR SEARCH CLASS:

- 382,     Image Analysis, subclasses 128 through 134 for biomedical applications of image analysis.  
600,     Surgery, subclasses 437+ for ultrasonic computer tomography.  
708,     Electrical Computers: Arithmetic Processing and Calculating, subclasses 813+ for analog computations of convolution data.

**5**     **Energy discriminating:**  
This subclass is indented under subclass 4. Subject matter including irradiating an object with X-rays or one or more specific energy lev-

- els and determining transmission or other characteristics of the object at the one or more energy levels.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
49, for fluorescence composition analysis with spatially dispersive energy analysis.  
82+, for spatial energy dispersion analysis.  
156+, for energy selective filters.
- 6 Fluorescence or scatter mapping:**  
This subclass is indented under subclass 4. Subject matter including determining the distribution in intensity of X-rays exiting an object, the X-rays having been deviated in direction by the object or being the result of secondary emission from the object.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
44+, for nontomography fluorescence imaging.  
87, for nontomography scatter imaging.
- 7 Scatter compensating:**  
This subclass is indented under subclass 4. Subject matter including mitigating the effects of primary beam deviation or spreading from a desired direction usually upon passage through the object.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
86+, for scatter analysis.  
154+, for antiscatter grids.
- 8 Object responsive:**  
This subclass is indented under subclass 4. Subject matter including controlling the tomograph or a part thereof in response to some condition or characteristic of the object being studied.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
95, for object responsive control circuits in nontomography applications.
- 9 Plural sources:**  
This subclass is indented under subclass 4. Subject matter including more than one source of X-rays.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
92, for electronic circuits for plural sources.  
193, for supports for plural sources.
- 10 Nonrotating source or detector:**  
This subclass is indented under subclass 4. Subject matter wherein the source or detector is stationary or is moved for purposes other than scanning.
- 11 Source or detector translation within plane:**  
This subclass is indented under subclass 4. Subject matter including means which causes movement, other than rotational movement, of the source or detector within the plane of the cross section of the object being examined.
- 12 With electronic scanning:**  
This subclass is indented under subclass 11. Subject matter including means within the source of X-rays which causes movement of an electron beam across the X-ray target to cause movement of the beam of X-rays.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
113, for electronic scanning circuits for X-ray sources.  
137, for scanning X-ray tubes, per se.
- 13 Radial:**  
This subclass is indented under subclass 11. Subject matter wherein the source or detector is translated in a direction essentially parallel to the mean direction of X-ray propagation.
- 14 Fan beam translation:**  
This subclass is indented under subclass 11. Subject matter wherein the beam is in the shape of a planar fan diverging away from the source.
- 15 Continuous mechanical rotation:**  
This subclass is indented under subclass 4. Subject matter including means for electrically interfacing the source or detector in such manner that continuous unidirectional mechanical rotation can take place without interruption of the operation of the source or detector.
- (1) Note. Slip rings, energy storage within the rotating structure, and telemetering

signals from the rotating to the stationary structure are typical means used in systems of this type.

**16 Beam energy or intensity control:**

This subclass is indented under subclass 4. Subject matter including means for controlling beam energy (e.g., voltage, hardness, wavelength, frequency) or intensity (e.g., flux density).

SEE OR SEARCH THIS CLASS, SUBCLASS:

108, through 112, for regulated X-ray source power supplies.

145+, for beam control devices, per se.

**17 Tiltable or nonvertical examination plane:**

This subclass is indented under subclass 4. Subject matter including means which allows the source or detector to be positioned such that the cross section being imaged is in some other than the more usual vertical plane.

**18 With tissue equivalent material:**

This subclass is indented under subclass 4. Subject matter including use in the path of the X-rays of a material whose X-ray absorption characteristics are similar to those of the object to be examined for purposes such as path length compensation.

(1) Note. Surrounding a human being with water is one example of the subject matter found here.

(2) Note. This subclass also includes "examination phantoms" such as manikins.

SEE OR SEARCH THIS CLASS, SUBCLASS:

156, for X-ray filters.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 505.1 for examination phantoms in general.

**19 Beam detection system:**

This subclass is indented under subclass 4. Subject matter including detailed structure, technique, or control of radiation detection in computerized tomos:graphic systems.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 336.1+ for radiation detectors, per se.

**20 Object positioning or aligning:**

This subclass is indented under subclass 4. Subject matter including means for sustaining the object under examination against gravity in a selected orientation relative to the X-ray source or detector or means for indicating or monitoring the position of the object relative to the apparatus.

SEE OR SEARCH THIS CLASS, SUBCLASS:

68+, 177, 195, and 208, for object supports.  
205, for X-ray system alignment.

SEE OR SEARCH CLASS:

5, Beds, appropriate subclasses, particularly subclasses 600+ and 630+ for beds with body support or positioning means.

269, Work Holders, subclasses 322+ for patient examination tables.

607, Surgery: Light, Thermal, and Electrical Application, subclasses 1+ for apparatus in direct body contact with supports and applies radiation to a human being.

**21 Tomography:**

This subclass is indented under subclass 1. Subject matter including means which produces an image of a cross section of an object.

(1) Note. The devices found herein usually include some mechanism which allows relative movement between the source or detector of X-rays and the object being examined. In conventional tomography, the tomos:graphic movement is typically produced by holding the object stationary and moving the X-ray source and the recording medium simultaneously in opposite directions about a pivot point lying in a plane through the object.

(2) Note. Tomography is commonly referenced in the art by the equivalent terms laminography, planiography, sectional radiography.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
4+, for computerized tomography.
- 22 With nonphotographic detector:**  
This subclass is indented under subclass 21. Subject matter including fluoroscopic, electronic, electrostatic or other such detector which does not require photographic processing to develop an image.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
189+, for nonphotographic detector supports.
- 23 Dynamic tomography:**  
This subclass is indented under subclass 21. Subject matter including the production of a set of radiographs which, when superimposed in a stack for viewing with the radiographs aligned so that the images of a given point in the object all coincide, all other points or object details in the same plane will be revealed in an unobstructed view and images of all points lying in other planes, even closely adjacent planes, will be obscured or blurred out.
- (1) Note. Other specific planes may be selectively viewed by appropriate positioning of the radiographs within the stack.
- (2) Note. Dynamic tomography typically utilizes a planar tomographic movement achieved with the effective pivot point of the linkage being disposed in a plane through the object with separate images being recorded for each of multiple exposures which are made at different angles through the object, i.e., a different film or other recording medium is used for each exposure to produce the set of radiographs.
- (3) Note. Dynamic tomography is also referenced in the art as plane slipping tomography, plane slipping laminography, variable depth laminography, simultaneous multiple tomography, etc.
- 24 Transverse tomography:**  
This subclass is indented under subclass 21. Subject matter wherein the source, object, and detector of X-rays or gamma rays are arranged in such fashion that the cross section being imaged is other than the usual longitudinal cross section.
- 25 Planar tomography:**  
This subclass is indented under subclass 21. Subject matter wherein the source is moved in a plane parallel to the object plane or cross section to be imaged.
- 26 Linear tomography:**  
This subclass is indented under subclass 25. Subject matter wherein the source is moved along a straight line.
- 27 Nonplanar tomography:**  
This subclass is indented under subclass 21. Subject matter wherein the source is moved along a path which is nonplanar, e.g., spherical or is nonparallel to the object plane or cross section to be imaged.
- 28 Xeroradiography:**  
This subclass is indented under subclass 1. Subject matter including a detector upon which a latent image in the form of a pattern of electric charges is produced by action of x-radiation or gamma radiation.
- (1) Note. The detector usually includes (a) a pair of spaced imaging electrodes defining an imaging gap therebetween, (b) an image receptor sheet lying within the gap between the electrodes, (c) an imaging fluid filling the remaining space between the electrodes, and (d) an enclosing chamber. By applying a charge across the electrodes and ionizing the fluid through irradiation, charges will be removed from or deposited upon the image receptor sheet.
- SEE OR SEARCH CLASS:  
250, Radiant Energy, subclasses 324+ for apparatus for or the method of corona irradiation to charge the detector without subsequent altering of the charge.  
399, Electrophotography, subclasses 9+ for diagnostics, subclasses 38+ for

- controls, subclasses 130+ for image formation, subclasses 168+ for charging, subclasses 177+ for exposure, subclasses 222+ for development, subclasses 297+ for transfer, subclasses 320+ for fixing, subclasses 343+ for cleaning, and subclasses 361+ for document handling.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 966+ for cross-reference art collections of disclosures relating to X-ray imagery.
- 29 With real time display:**  
This subclass is indented under subclass 28. Subject matter including means for displaying an image of the object under examination at the time of exposure to radiation in addition to or instead of the subsequent production of a hard copy image record.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
98, for X-ray systems including circuits and means for displaying and signaling.
- 30 With focused gap field:**  
This subclass is indented under subclass 28. Subject matter wherein the electric field between the two imaging electrodes is focused such that the paths of charged particles traveling between the electrodes converge at the origin of the imaging X-rays or gamma rays.
- (1) Note. Focusing may be achieved by the use of cylindrically or spherically curved imaging electrodes.
- 31 With auxiliary electrode:**  
This subclass is indented under subclass 28. Subject matter including one or more additional electrodes within the gap between the imaging electrodes for purposes such as ion flow control.
- 32 With uniform charging of image receptor:**  
This subclass is indented under subclass 28. Subject matter including means for uniformly charging the image surface of an image receptor sheet before exposure to X-rays or gamma rays.
- SEE OR SEARCH CLASS:  
250, Radiant Energy, subclasses 324+ for xerographic charging devices.
- 33 With gap fluid handling:**  
This subclass is indented under subclass 28. Subject matter including means for supplying, removing, sealing, or recycling imaging fluid employed within the interelectrode gap of the imaging chamber.
- 34 Lithography:**  
This subclass is indented under subclass 1. Subject matter including the projection of an X-ray image upon an X-ray sensitive resist usually through a patterned mask.
- 35 Pattern mask:**  
This subclass is indented under subclass 34. Subject matter restricted to the mask itself which is made up of adjacent areas of X-ray opaque and X-ray transparent material arranged in a selected pattern (usually of an electronic circuit) and used for X-ray lithographic production of plural copies of the pattern.
- (1) Note. Although this subclass is restricted to single elements, it is placed here in the schedule as an exception to the general rule of hierarchy since the element described is used only in the system of the parent subclass.
- SEE OR SEARCH CLASS:  
216, Etching a Substrate: Processes, subclass 12 for nonetch function mask involving etching.  
430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 5 for pattern masks used in photo-lithography.
- 36 Holography or interferometry:**  
This subclass is indented under subclass 1. Subject matter including the generation, analysis, or recording of interference patterns resulting from the interaction of plural X-ray wavefronts or the making of optical holograms from conventional radiographs, e.g., stereo radiography, to permit holographic display of the information.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
41, for conventional stereo radiography.
- SEE OR SEARCH CLASS:  
359, Optics: Systems (Including Communication) and Elements, subclasses 1+ for optical holography.  
365, Static Information Storage and Retrieval, subclass 125 for memories including holograms.
- 37 Mammography:**  
This subclass is indented under subclass 1. Subject matter including means for X-ray examination of the female breast.
- 38 Dental panoramic:**  
This subclass is indented under subclass 1. Subject matter including producing an image of a curved dental structure.
- (1) Note. An example of the devices found herein is a device wherein an image of all teeth on upper and/or lower jaws is formed on a single photographic plate.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
168+, for dental film supports.  
191, for dental fluoroscopic detector supports.
- 39 Moving source and detector:**  
This subclass is indented under subclass 38. Subject matter including moving the source and the detector simultaneously about an axis generally parallel to the patient's spine.
- 40 Continuous image:**  
This subclass is indented under subclass 39. Subject matter wherein the image is formed during one continuous movement of the source and detector.
- (1) Note. The movement of the source and detector is typically both rotation about an axis and movement of the axis along a predetermined path.
- 41 Stereoscopy:**  
This subclass is indented under subclass 1. Subject matter including formation of plural related images which, when properly viewed, exhibit depth.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
98+, for television display of stereo images.  
174, for supports for plural films or plates.  
193, for supports for plural sources.
- SEE OR SEARCH CLASS:  
359, Optics: Systems (Including Communication) and Elements, subclasses 462+ for light type devices for stereoscopically viewing X-ray stereograms or a stereoscopic record or records and optical systems for producing a visual record taken from two different points of view.
- 42 Fluoroscopy:**  
This subclass is indented under subclass 41. Subject matter including a fluorescent screen upon which the images are formed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
190+, for fluoroscopes.
- 43 Telescope or microscope:**  
This subclass is indented under subclass 1. Subject matter including the collection and detection of X-rays from distant objects (e.g., the stars) or the formation of an image of an object, which image is substantially larger than the object.
- SEE OR SEARCH CLASS:  
359, Optics: Systems (Including Communication) and Elements, subclasses 368+ and 399+ for visible light telescope or microscopes.
- 44 Fluorescence:**  
This subclass is indented under subclass 1. Subject matter including the measurement or analysis of secondary X-rays resulting from the excitation by primary x-radiation or gamma radiation of analyte atoms.



- (1) Note. Although not specifically include within each of the following definitions, fluorescence systems usually include (a) a source of primary X-rays or gamma rays, (b) an analyte which emits fluorescent X-rays, (c) an analyte holder or positioning means, and (d) a detector of the fluorescent X-rays.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 3, for Mossbauer effect devices.  
6, for fluorescence or scatter mapping.  
143, for sources which produce secondary X-rays.

SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, especially subclass 589 for radiant energy type automatic assorting.  
250, Radiant Energy, subclasses 306+ for sample bombardment with protons or electrons which may produce X-rays and subclasses 253+ for geological surveying.  
376, Induced Nuclear Reactions: Processes, Systems, and Elements, subclasses 156+ for X-rays generated by means of an induced nuclear reaction, e.g., wherein the internal conversion of an electron within the nucleus generates soft gamma rays.

**45 Composition analysis:**

This subclass is indented under subclass 44. Subject matter including measurement of the chemical composition, quantity (density), or presence of a specific substance in an analyte.

- (1) Note. The measurement is typically accomplished by energy analysis of the fluorescent X-rays emitted by the object under examination. The energy of specific line emissions uniquely identifies chemical elements and the intensity of the emission characterizes its quantity.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 53, for absorption composition analysis.  
83, and 88, for diffraction, reflection, or scattering composition analysis.

SEE OR SEARCH CLASS:

- 23, Chemistry: Physical Processes, appropriate subclasses for chemical composition analysis.

**46 Plural diverse X-ray analyses:**

This subclass is indented under subclass 45. Subject matter including some type of X-ray analysis of the analyte in addition to fluorescence composition analysis.

**47 Fluid analyte:**

This subclass is indented under subclass 45. Subject matter wherein the composition to be measured is a fluid or is contained in a fluid.

**48 With standardization:**

This subclass is indented under subclass 45. Subject matter including comparison of the fluorescent spectra emitted by the analyte with reference spectra emitted by substances of known composition.

**49 With spatially dispersive energy analysis:**

This subclass is indented under subclass 45. Subject matter including specially separating fluorescent X-rays of different frequencies prior to determination of the intensity thereof.

- (1) Note. This subclass requires that the origin of the X-rays being analyzed is an analyte which is excited to fluorescence by primary X-rays, while the means for spatial energy dispersion of X-rays of subclass 82 will function regardless of the manner of production of the X-rays.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 5, for computerized tomography using energy discrimination.  
83, for composition analysis by spatial energy dispersion.  
156+, for energy selective filters.

**50 Thickness or density analysis:**

This subclass is indented under subclass 44. Subject matter including measurement of the thickness or density of an object such as a sheet or coating.

- (1) Note. This measurement is typically accomplished by comparing the attenua-

tion of fluorescent X-rays generated within the object with the attenuation in a reference object of known thickness or density.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 54+, for absorption type thickness or density analysis.
- 89+, for scattering type thickness or density analysis.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses 152.05+ for measuring density within a borehole.

### 51 **Absorption:**

This subclass is indented under subclass 1. Subject matter including the measurement or analysis of X-rays that have passed through an object under examination to determine the attenuation or other change in X-ray characteristics resulting from the passage.

- (1) Note. Although not specifically included within each of the following definitions, absorption systems usually include, (a) a source of X-rays or gamma rays, (b) an object under examination, (c) an object holder or positioning means, and (d) a detector of X-rays.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 3, for X-ray absorption involving the Mossbauer effect.

SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, especially subclass 589 for radiant energy type automatic assorting.

### 52 **Fluid level measuring:**

This subclass is indented under subclass 51. Subject matter which includes a body of fluent material, an X-ray or gamma ray source, and a detector responsive to the source arranged so that the body of fluent material is located in the radiation path between the source and detector or the body of fluent material supports either the source or detector, wherein the detector produces an output representative of the height

or depth of the body of fluent material and methods corresponding to the apparatus.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses 290+ for liquid level or depth gauges not using invisible light.
- 116, Signals and Indicators, subclasses 109+ and 227+ for mechanical liquid level indicators.
- 137, Fluid Handling, subclasses 386+ for liquid level responsive or maintaining system.
- 250, Radiant Energy, subclasses 306+ for contained fluent material level signaling where charged particles are used to sense the level of the material.
- 340, Communications: Electrical, subclasses 612+ for fluent or pulverized material level signalling not using invisible light.

### 53 **Composition analysis:**

This subclass is indented under subclass 51. Subject matter including measurement of the chemical composition, quantity (density), or presence of a specific substance in an analyte.

- (1) Note. The measurement is typically accomplished by energy analysis of the X-ray spectra as absorbed by the analyte and comparing the absorbed spectra with reference a spectra from substances of known composition. The energy of specific line absorptions uniquely identifies chemical elements and the degree of the absorption characterizes its quantity.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 45, for fluorescence composition analysis.
- 83, and 88, for diffraction, reflection, or scatter composition analysis.

### 54 **Thickness or density analysis:**

This subclass is indented under subclass 51. Subject matter including measurement of the thickness or density of an object such as a sheet or coating.

- (1) Note. This measurement is typically accomplished by analyzing the attenua-

tion of X-rays as a result of their passage through the object under examination.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, for fluorescence thickness or density analysis.  
89+, for scatter type thickness or density analysis.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 152.05+ for measuring density within a borehole.

**55 With movable source or detector:**  
This subclass is indented under subclass 54. Subject matter including means to allow movement of the source or detector to X-rays relative to the object being examined.

**56 With standardization:**  
This subclass is indented under subclass 54. Subject matter including comparison of the attenuation of X-rays passing through the object under examination with the attenuation produced by a reference object of known thickness or density.

**57 Inspection of closed container:**  
This subclass is indented under subclass 51. Subject matter including examining the contents of a closed container such as luggage without opening that container.

**58 Flaw analysis:**  
This subclass is indented under subclass 51. Subject matter including detection and location of a structural defect in an object under examination by analyzing the pattern of absorption of X-rays passing through the object in comparison with pattern of absorption of X-rays passing through a reference object of known integrity.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for scatter type flaw analysis.

**59 Pipe testing:**  
This subclass is indented under subclass 58. Subject matter wherein the object under examination is a pipe.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 220 for magnetic pipe testing.

**60 Pipe crawler:**  
This subclass is indented under subclass 59. Subject matter including self propelled means of transporting an X-ray or gamma ray source or detector along the interior of a pipe to be examined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

198, for mobile X-ray source supports.

**61 Tire testing:**  
This subclass is indented under subclass 58. Subject matter wherein the object under examination is a tire.

**62 Imaging:**  
This subclass is indented under subclass 51. Subject matter including forming a visible or latent image of a field of X-rays that has been modulated by absorption during passage through an object.

(1) Note. The image may be photos:graphic or electronic in nature.

SEE OR SEARCH THIS CLASS, SUBCLASS:

44, for fluorescence imaging.  
87, for scatter imaging.  
163, for size, distance, or location determination within an examined object relative to reference indices.

SEE OR SEARCH CLASS:

252, Compositions, subclass 478 for X-ray shield compositions or contrast agents for inanimate objects.  
424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 9.4+ for X-ray contrast compositions for use in animate objects.  
430, Radiation, Imagery Chemistry: Process, Composition, or Product Thereof, subclass 5 for radiation masks; and subclasses 966+ for cross-reference art collections of disclosures relating to X-ray imagery.

**63 Combined with non-X-ray imaging:**

This subclass is indented under subclass 62. Subject matter including forming an image using visible light, mechanical impression or other such technique in addition to the image formed by using X-rays.

**64 Irradiating:**

This subclass is indented under subclass 51. Subject matter wherein the object to which X-radiation is being applied is the sole primary receiver of the radiation.

- (1) Note. A secondary receiver or detector of radiation may be included in a system of this subclass for purposes such as control.

## SEE OR SEARCH CLASS:

- 99, Food and Beverages: Apparatus, subclass 451 for apparatus for subjecting foods and beverages to wave, radiant, and electrical energy.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 272.2+ and 379.6 for methods and apparatus which include applying wave energy to work.
- 250, Radiant Energy, subclasses 492.1+ for non-X-ray irradiating.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 405+ for direct application of electrical or wave energy to work.
- 426, Food or Edible Material: Processes, Compositions, and Products, subclass 234, 236 and 237+, particularly subclass 240 for processes involving the use of electrical, wave or radiant energy in food treatments.

**65 Therapy:**

This subclass is indented under subclass 64. Subject matter wherein the purpose of applying the radiation is treatment or cure of a disease or other disability.

## SEE OR SEARCH CLASS:

- 604, Surgery, subclass 20 for the applications of light, radiation, and electrical energy to the body.

- 607, Surgery: Light, Thermal, and Electrical Application, subclasses 1+ for apparatus in direct body contact which applies radiation to a human being.

**66 Of fluid:**

This subclass is indented under subclass 64. Subject matter wherein the object of irradiation is a fluid or is contained in a fluid.

**67 With tortuous flow:**

This subclass is indented under subclass 66. Subject matter wherein the fluids travels in a circuitous path during irradiation that bends, twists, or curves.

**68 Including object support or positioning:**

This subclass is indented under subclass 64. Subject matter including means for sustaining the object of irradiation against gravity in a selected orientation during irradiation.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 20, and the subclasses noted thereunder, for object support, positioning, or aligning devices.

**69 With object moving:**

This subclass is indented under subclass 68. Subject matter including means which causes movement of the supported object.

**70 Diffraction, reflection, or scattering analysis:**

This subclass is indented under subclass 1. Subject matter including the measurement or sensing of X-rays, the direction of which have been modified by interaction with an object under examination.

- (1) Note. Although not specifically included within each of the following definitions, diffraction, reflection, or scattering systems usually include, (a) source of X-rays or gamma rays, (b) a diffracting, reflecting, or scattering object, (c) an object holder or positioning means, and (d) a detector of diffracted, reflected, or scattered X-rays.

## SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, appropriate subclasses, especially subclass 589 for radiant energy type automatic assorting.

**71 Diffractometry:**

This subclass is indented under subclass 70. Subject matter providing for the generation and examination or determination of at least part of the characteristic X-ray diffraction pattern of an analyte.

- (1) Note. Devices under subclass 82 employ diffraction elements such as crystals and gratings which spatially disperse X-rays according to their energy. These elements are not objects or examination as in this subclass but rather are tools for examining something else since their diffraction patterns are known.

**72 Stress analysis:**

This subclass is indented under subclass 71. Subject matter including detecting the presence or measuring the extent of stress within an analyte by analyzing the manner in which its X-ray diffraction pattern is modified when the X-rays are incident on a stressed area.

**73 Crystallography:**

This subclass is indented under subclass 71. Subject matter wherein the analyte is a crystal.

**74 Topography:**

This subclass is indented under subclass 73. Subject matter including measuring surface features of a crystal by analyzing the manner in which X-rays are differentially diffracted by different areas of the surface of the crystal.

**75 Powder technique:**

This subclass is indented under subclass 73. Subject matter wherein the crystal is in pulverized form and is analyzed by processes such as the Debye-Scherrer method.

**76 Back reflection:**

This subclass is indented under subclass 73. Subject matter in which the crystal is analyzed by the back reflection technique.

- (1) Note. For a more detailed treatment of the back reflection technique, see Applied X-rays, by George L. Clark, McGraw Hill Book Co., 1955.

**77 Precession:**

This subclass is indented under subclass 73. Subject matter in which the crystal is analyzed by the precession technique.

- (1) Note. For a more detailed treatment of the precession technique, see Applied X-rays, by George L. Clark, McGraw Hill Book Co., 1955.

**78 Piezoelectric crystal:**

This subclass is indented under subclass 73. Subject matter in which the crystal being analyzed is piezoelectric, i.e., becomes electrically polarized when mechanically strained or mechanically strained when electrically polarized.

**79 Analyte support:**

This subclass is indented under subclass 71. Subject matter including detailed structure of the analyte holder or positioning means.

**80 With environmental control:**

This subclass is indented under subclass 79. Subject matter including means to alter the pressure, temperature, or composition of the atmosphere surrounding the analyte.

**81 Goniometer:**

This subclass is indented under subclass 79. Subject matter including means for translating, rotating, or oscillating the analyte.

**82 Spatial energy dispersion:**

This subclass is indented under subclass 70. Subject matter including means for physically spreading out an X-ray beam into its various energy components by diffraction, e.g., spectrometers and monochromators.

- (1) Note. This subclass includes means for spatial energy separation of X-rays, which means function regardless of the origin or manner of production of the X-rays.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 5, for computerized tomography using energy discrimination.  
 49, for spatially dispersive energy analysis of the X-ray fluorescence of an analyte.  
 156+, for energy selective filters.
- 83 Composition analysis:**  
 This subclass is indented under subclass 82. Subject matter including measurement of the chemical composition, quantity (density), or presence of a specific substance in an analyte.
- (1) Note. This subclass includes means for energy analyzing X-rays that have interacted with or have been produced by an analyte such as by scattering or radioactive decay for the purpose of determining analyte composition.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 45, or fluorescence composition analysis.  
 53, for absorption composition analysis.  
 88, for scatter type composition analysis.
- 84 Monochromator of focusing device:**  
 This subclass is indented under subclass 82. Subject matter including a specific element of its support means for limiting the energy spectrum of a beam of X-rays to a narrow band of energies or for converging a beam of X-rays.
- (1) Note. The elements of this subclass comprise crystals and gratings which, by diffraction, spatially disperse X-rays according to their energy. These elements are not the objects of examination as in subclass 71 above but rather are tools for examining something else since their diffraction patterns are known.
- 85 With plural dispersing elements:**  
 This subclass is indented under subclass 84. Subject matter comprising plural elements for focusing or energy analyzing X-rays by diffraction.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 157, for plural filters.
- 86 Scatter analysis:**  
 This subclass is indented under subclass 70. Subject matter including the measurement or analysis of X-rays that have been modulated in direction by an object under examination.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 7, for scatter compensation in computerized tomography.
- 87 Imaging:**  
 This subclass is indented under subclass 86. Subject matter including forming a visible or latent image of X-rays that have been modulated in direction by interaction with an object.
- (1) Note. The image may be photographic or electronic in nature.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 6, for computerized tomography fluorescence or scatter mapping.  
 44+, for fluorescence imaging.  
 62, for absorption imaging.
- 88 Composition analysis:**  
 This subclass is indented under subclass 86. Subject matter including measurement of the chemical composition, quantity (density), or presence of a specific substance in an analyte.
- (1) Note. The measurement is typically accomplished by deflection analysis of the X-rays modified in direction by the analyte and comparing the deflection with reference data from substances of known composition.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 45, for fluorescence composition analysis.  
 53, for absorption composition analysis.  
 83, for spatial energy dispersion composition analysis.
- SEE OR SEARCH CLASS:  
 250, Radiant Energy, subclass 253 for geological surveying.

**89 Thickness or density analysis:**

This subclass is indented under subclass 86. Subject matter including measurement of the thickness or density of an object such as a sheet or coating.

- (1) Note. This measurement is typically accomplished by comparing the modification in direction of X-rays as a result of their interaction with an object under examination with the modification in direction produced by a reference object of known thickness or density.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 50, for fluorescence thickness or density analysis.  
54+, for absorption thickness or density analysis.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, subclasses  
152.05+ for measuring density within a borehole.

**90 Plural diverse X-ray analyses:**

This subclass is indented under subclass 89. Subject matter including some type of X-ray analysis of the analyte in addition to scatter type thickness or density analysis.

**91 ELECTRONIC CIRCUIT:**

This subclass is indented under the class definition. Subject matter comprising a combination of electrically connected devices for powering or controlling and connected to an X-ray source or detector or displaying an image or other information developed from the source or detector.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 119, for X-ray sources, per se.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, subclasses 336.1+  
for radiant energy detectors, per se.  
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear active device circuits.

- 340, Communications: Electrical, appropriate subclasses for indicating and display systems in general.

**92 For plural X-ray sources:**

This subclass is indented under subclass 91. Subject matter in which there are two or more X-ray or gamma ray sources with circuit portions being provided for one or more of the sources.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 9, for computerized tomography using plural sources.  
193, for supports for plural sources.

**93 For electrode movement:**

This subclass is indented under subclass 91. Subject matter wherein the source is an X-ray tube having a movable target or electrode and at least one part of the circuit is connected thereto to control or monitor its movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 125, and 135, for X-ray tubes with movable targets or electrodes.

SEE OR SEARCH CLASS:

- 318, Electricity: Motive Power Systems, for motor control circuits.

**94 With movement sensing:**

This subclass is indented under subclass 93. Subject matter including detection of electrode motion, usually to prevent energization of the tube until proper speed of the electrode is attained.

**95 Object responsive control:**

This subclass is indented under subclass 91. Subject matter wherein the circuit controls the source in response to a sensed condition of the object.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 8, for object responsive control circuits used in computerized tomography.  
97, and 108, for dose responsive control circuits.

- 96 Exposure timer:**  
This subclass is indented under subclass 91. Subject matter wherein the circuit includes means to determine the length of time that the object is exposed to radiation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
117, for means for termination of exposure to prevent damage to the system.
- SEE OR SEARCH CLASS:  
368, Horology: Time Measuring Systems or Devices, subclasses 89+ for interval timers, per se.
- 97 Dose responsive:**  
This subclass is indented under subclass 96. Subject matter wherein the means to determine the duration of exposure is responsive to the amount of radiation being applied to the object or received by the detector.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
108, for dose controlled X-ray source power supplies.
- 98 With display or signaling:**  
This subclass is indented under subclass 91. Subject matter wherein an image of the object is displayed electronically or some condition of the object or of the X-ray system is indicated.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 500+ for condition responsive indicating systems.  
345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 1.1 through 3.4 for visual display systems with selective electrical control.
- 98.11 With image subtraction:**  
This subclass is indented under subclass 98.9. Subject matter wherein the television system includes means for subtracting one image from another and then displaying the resultant image so as to, for example, enhance the display of a particular body part such as a blood vessel.
- SEE OR SEARCH CLASS:  
382, Image Analysis, appropriate subclasses for image analysis.  
708, Electrical Computers: Arithmetic Processing and Calculating, appropriate subclasses for generic arithmetic processing and calculating.
- 98.12 With image subtraction or addition:**  
This subclass is indented under subclass 98.2. Subject matter wherein the television system includes means for subtracting or adding one image from another and then displaying the resultant image so as to, for example, enhance the display of a particular body part such as a blood vessel.
- SEE OR SEARCH CLASS:  
382, Image Analysis, appropriate subclasses for image analysis.  
708, Electrical Computers: Arithmetic Processing and Calculating, appropriate subclasses for generic arithmetic processing and calculating.
- 98.2 Television:**  
This subclass is indented under subclass 98.1. Subject matter wherein the display is in the form of a television image.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
41, for stereoscopic radiography that employs television.
- SEE OR SEARCH CLASS:  
250, Radiant Energy, subclass 214 for image intensifier tubes.  
348, Television, appropriate subclasses for non-X-ray television.
- 98.3 With visible light optics:**  
This subclass is indented under subclass 98.2. Subject matter wherein the X-ray television system includes visible light optical elements between the means for converting the X-ray image to a visible light image and the means for converting the visible light image to an electronic video signal.
- (1) Note. These elements may comprise optical cubes, lenses, mirrors, prisms,



optical fibers, filters, diaphragms, or shutters.

SEE OR SEARCH CLASS:

359, Optics: Systems (Including Communication) and Elements, for optical elements.

**98.4 With electronic X-ray scatter compensating:**  
This subclass is indented under subclass 98.2. Subject matter wherein the X-ray television system includes electronic circuit means for modifying the video signal representative of the X-ray image in accordance with an electronic signal representative of the X-rays that are scattered by the imaged object or by its surroundings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, and 154, for compensating for z-ray scatter in computer tomograph and for mechanical devices for eliminating scattered X-rays.

**98.5 With auxiliary data video display:**  
This subclass is indented under subclass 98.2. Subject matter wherein the X-ray television system includes means for displaying on a television monitor information in addition to the actual X-ray image.

(1) Note. Such information may comprise positional data of the examined object or the X-ray equipment, exposure parameters such as X-ray tube voltage and current, the outline of a body organ or contrast agent bolus, an EKG waveform or a visible light image of the examined object or different colors which may represent a time lapse, composition, or regions of interest.

SEE OR SEARCH THIS CLASS, SUBCLASS:

162, for nontelevisory acquisition or recording of auxiliary data.

**98.6 With electronically scanned X-ray source:**  
This subclass is indented under subclass 98.2. Subject matter wherein the television system includes a source of X-rays that comprises an electron tube with means to emit a small diam-

eter X-ray beam that is electronically scanned over the object to be examined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

113, and 137, for X-ray tube scanning circuits and for scanning X-ray tubes.

**98.7 With automatic image brightness control:**  
This subclass is indented under subclass 98.2. Subject matter wherein the X-ray television system includes means for automatically adjust or maintain constant the image brightness of the video display.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97, and 108, for control of X-ray dosage.

**98.8 With solid-state image detector:**  
This subclass is indented under subclass 98.2. Subject matter wherein the X-ray television system includes a solid-state detector that generates the video image in response to the X-ray or visible light image.

SEE OR SEARCH CLASS:

250, Radiant Energy, appropriate subclasses for solid detectors.

**98.9 With plural X-ray energies:**  
This subclass is indented under subclass 98.2. Subject matter wherein the television system includes means for acquiring X-ray images at more than one X-ray energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

156, for energy filtering of X-rays.

**101 X-ray source power supply:**  
This subclass is indented under subclass 91. Subject matter wherein the circuit includes specific devices such as voltage regulators, current convertors, and rectifiers which are used to develop the required voltages and currents for proper operation of the X-ray or gamma ray source.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 11+ and 43+ for plural load power supplies and circuits.

- 323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for general purpose power supplies.
- 363, Electric Power Conversion Systems, appropriate subclasses for power conversion systems.
- 102 Mobile or portable:**  
This subclass is indented under subclass 101. Subject matter including means to supply energy to the X-ray or gamma ray source during irradiation by other than connection to power mains.
- (1) Note. The devices herein are frequently for supplying power to movable parts of stationary systems.
- 103 Energy storage:**  
This subclass is indented under subclass 101. Subject matter including means such as capacitors and inductors used for energy storage.
- 104 With specific rectifier:**  
This subclass is indented under subclass 101. Subject matter including a detailed embodiment of means to convert alternating current to direct current.
- 105 High frequency:**  
This subclass is indented under subclass 101. Subject matter including means to supply alternating current at a frequency higher than standard 60 hertz alternating current.
- 106 With pulse output:**  
This subclass is indented under subclass 101. Subject matter including means to supply current in single short bursts or interrupted at a regular rate.
- 107 With AC output:**  
This subclass is indented under subclass 101. Subject matter including supplying power to a self-rectifying source in the form of alternating high potential current.
- 108 Dose regulated:**  
This subclass is indented under subclass 101. Subject matter including means to control the power supply in response to the amount of radiation being applied to or transmitted by an object.
- (1) Note. These circuits require means for measuring the amount of radiation that is actually incident on the object or detector.
- 109 Current regulated:**  
This subclass is indented under subclass 101. Subject matter including controlling the amount of current being supplied to the source.
- 110 Automatic:**  
This subclass is indented under subclass 109. Subject matter including maintaining constant current or adjusting current according to a pre-determined program without manual control.
- 111 Voltage regulated:**  
This subclass is indented under subclass 101. Subject matter including controlling the level of the voltage being supplied to the source.
- 112 Automatic:**  
This subclass is indented under subclass 111. Subject matter including maintaining constant voltage or adjusting voltage according to a pre-determined program without manual control.
- 113 Electron beam control:**  
This subclass is indented under subclass 101. Subject matter including supplying appropriate voltages and current to a source to control the focus or intensity or to cause scanning or deflection of the X-ray producing electron beam therein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
12, for tomography systems which include electronic scanning.  
137, for X-ray tubes, per se, which include electron scanning or deflecting means.  
138, for X-ray tubes, per se, which include electron focusing or intensity control means.  
146, and 193, for mechanical X-ray scanning.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, subclasses 364+ for non-X-ray cathode-ray tube deflection circuits.

**114 With switching means:**

This subclass is indented under subclass 91. Subject matter wherein the circuit includes a detailed embodiment of a switching circuit for controlling the operation of an X-ray system or its components.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
96, for exposure time switching.

**115 For selecting:**

This subclass is indented under subclass 114. Subject matter wherein the switching means is operative to select between different portions of the circuit, different devices connected to the circuit or different modes of operation.

**116 Technique or detector:**

This subclass is indented under subclass 115. Subject matter wherein the switching means selects between different modes of operation of the system or between several detectors.

**117 For safety or protection:**

This subclass is indented under subclass 114. Subject matter wherein the switching means causes discontinuation of operation of a portion or all of the system upon the occurrence of an undesired condition.

SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 1+ for safety and protection of systems and devices in general.

**118 Tube overload:**

This subclass is indented under subclass 117. Subject matter wherein the undesired condition is overload of the X-ray tube.

**119 SOURCE:**

This subclass is indented under the class definition. Subject matter including methods and means for generating X or gamma rays not provided for elsewhere.

SEE OR SEARCH CLASS:  
372, Coherent Light Generators, subclass 5 for short wavelength lasers including X-ray lasers.

376, Induced Nuclear Reactions: Processes, Systems, and Elements, subclass 156 for X-rays generated by means of an induced nuclear reaction, e.g., wherein the internal conversion of an electron within the nucleus generates soft gamma rays.

**120 Nuclear excited:**

This subclass is indented under subclass 119. Subject matter wherein the source is caused to emit X-rays through excitation of a target upon bombardment of the target with subatomic particles generated by the nuclear decay of a radioactive substance.

**121 Electron tube:**

This subclass is indented under subclass 119. Subject matter wherein the source is an electronic discharge device.

(1) Note. A typical X-ray tube includes an envelope within which are positioned a filament used to heat a cathode which emits a beam of electrons which strikes a target which target then emits X-rays.

SEE OR SEARCH CLASS:  
313, Electric Lamp and Discharge Devices, appropriate subclasses for non-X-ray electron tubes.

**122 Field emission or cold cathode:**

This subclass is indented under subclass 121. Subject matter wherein electrons are ejected by a cathode upon the application of an intense potential gradient between the cathode and anode.

SEE OR SEARCH CLASS:  
313, Electric Lamp and Discharge Devices, subclass 309 or discharge devices having a multipointed or serrated edge electrode and subclass 336 for point source cathodes.

**123 Vacuum control:**

This subclass is indented under subclass 121. wherein the tube includes means such as getters, regulators, and pumps to permit variation of the vacuum within the tube or which act continuously to maintain the vacuum, e.g., by scavenging.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

125+, and 135, for X-ray tubes with movable electrodes which may include vacuum seals for the electrode moving means.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, subclass 547 for related subject matter used in discharge devices generally.

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 38+ and 73 for related subject matter used in the manufacture and repair of discharge devices.

**124 With plural targets or anodes:**

This subclass is indented under subclass 121. Subject matter including more than one target for the beam of electrons or more than one anode within the tube.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

134, for tubes with plural electrodes other than targets or anodes.

**125 With movable target:**

This subclass is indented under subclass 121. Subject matter wherein the target within the tube is movable.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

135, for tubes with movable electrodes other than the target.

**126 Translation or nutation:**

This subclass is indented under subclass 125. Subject matter wherein the movement is in a straight line or a compound movement other than simple rotation.

**127 Temperature modification:**

This subclass is indented under subclass 125. Subject matter wherein means are provided to modify one or more temperatures within the tube, e.g., to decrease the operating temperature of the rotor bearings to prevent them from seizing.

(1) Note. Also included is subject matter having means comprising evaporable metal for transferring heat away from the focal spot to lower the maximum instantaneous local temperature on the target itself.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

141+, for X-ray tubes other than the movable target type with cooling means.

199+, for cooling means external to the X-ray tube.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, subclasses 11+ for temperature modification in discharge devices generally.

**128 With thermal impedance:**

This subclass is indented under subclass 127. Subject matter wherein a temperature (usually the bearing temperature) is modified through the use of means to diminish the rate of heat transfer in a specific direction.

SEE OR SEARCH CLASS:

165, Heat Exchange, subclass 133 for diminishing thermal radiation by surface polishing.

**129 With increased emissivity:**

This subclass is indented under subclass 127. Subject matter wherein a surface is conditioned to enhance the radiation of heat.

(1) Note. Typical conditioned surfaces are target surfaces or motor rotor surfaces.

SEE OR SEARCH CLASS:

165, Heat Exchange, subclass 133 for increasing thermal radiation by the coating or roughening of surfaces.

**130 With cooling fluid:**

This subclass is indented under subclass 127. Subject matter wherein a fluid is used to remove heat from some region of the tube.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 141+, for X-ray tubes other than the movable target type with cooling means.  
 199+, for cooling means external to the X-ray tube.
- 131 With specific motor means:**  
 This subclass is indented under subclass 125. Subject matter including detailed means to produce target movement.
- SEE OR SEARCH CLASS:  
 310, Electrical Generator or Motor Structure, appropriate subclasses for electrical motor structure, per se.
- 132 With specific bearing means:**  
 This subclass is indented under subclass 125. Subject matter including detailed structure for supporting while allowing movement of the target.
- SEE OR SEARCH CLASS:  
 384, Bearings, appropriate subclasses for bearings, per se.
- 133 With lubrication:**  
 This subclass is indented under subclass 132. Subject matter including means for maintaining the bearing in a proper state of lubrication.
- 134 With plural cathodes or heaters:**  
 This subclass is indented under subclass 121. Subject matter including more than one cathode or heater within the tube.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 124, for tubes with plural targets or anodes.
- 135 With movable electrode:**  
 This subclass is indented under subclass 121. Subject matter wherein an electrode within the tube other than the target is movable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 125+, for tubes with movable targets.
- 136 With specific cathode:**  
 This subclass is indented under subclass 121. Subject matter including a specific embodiment of a cathode defining particular material or structure.
- 137 With electron scanning or deflecting means:**  
 This subclass is indented under subclass 121. Subject matter including means to electrostatically or magnetically move the beam of electrons from one position to another on the target.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 12, for computerized tomography systems which include electronic scanning.  
 113, for power supplies for electron scanning X-ray tubes.
- SEE OR SEARCH CLASS:  
 313, Electric Lamp and Discharge Devices, subclass 364 for cathode-ray tube structure not specific to X-ray tubes.  
 315, Electric Lamp and Discharge Devices: Systems, subclass 364 for cathode-ray tube scanning circuits not specific to X-ray tubes.
- 138 With electron focusing or intensity control means:**  
 This subclass is indented under subclass 121. Subject matter including means to converge the beam of electrons into a spot at the target or to control the electron density of the beam.
- SEE OR SEARCH CLASS:  
 313, Electric Lamp and Discharge Devices, subclasses 452+ for cathode-ray tubes provided with focusing means for the electron beam.
- 139 With potential stress distribution:**  
 This subclass is indented under subclass 121. Subject matter including means for decreasing local potential gradients such as would result in puncturing of the envelope, e.g., the means is typically a coating on the surface of the envelope, the resistivity of the coating being just low enough to drain off electrical charges which would otherwise accumulate during the operation of the tube.

**140 With X-ray window or secondary radiation screen:**

This subclass is indented under subclass 121. Subject matter provided with means for absorbing secondary electrons and/or unwanted photons, and X-ray tubes having a window in the envelope of the tube which passes a broader spectrum of X-ray radiation than is passed by the remainder of the envelope.

- (1) Note. Included in this subclass, for example, are X-ray tubes having an envelope made of a glass which transmits only "hard" X-rays and which has a window made of a material that will transmit "soft" X-rays.
- (2) Note. A typical secondary screen is a hood surrounding the target with an entrance aperture for primary electrons and an exit aperture for desired X-rays.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
161, for windows, per se.

**141 With cooling means:**

This subclass is indented under subclass 121. Subject matter wherein means is provided to remove heat from some region of the tube.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
127+, for temperature modification means in movable target tubes.  
199+, for cooling means external to the X-ray tube.

**142 With solid heat conductor or shield:**

This subclass is indented under subclass 141. Subject matter wherein the cooling means is in the form of a solid and acts to remove heat by conduction from or blocks the passage of heat to some region of the tube.

**143 Target:**

This subclass is indented under subclass 119. Subject matter including a specific embodiment of an element which is designed to generate X-rays when bombarded by electrons or other radiation.

- (1) Note. This subclass contains patents for targets (which are sources of X-rays) when the target is not claimed in combination with a tube.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
121+, for targets claimed in combination with an X-ray tube.

**144 Rotary:**

This subclass is indented under subclass 143. Subject matter including targets specifically designed to be rotated.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
125+, for X-ray tubes with movable targets.

**145 BEAM CONTROL:**

This subclass is indented under the class definition. Subject matter comprising adjusting X-ray beam characteristics subsequent to generation of the X-ray beam to provide desired beam size, shape, energy, intensity, propagation direction, or other such features.

- (1) Note. The means for adjusting the beam characteristics may be included within the X-ray source.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
16, for beam energy or intensity control in computerized tomography.

SEE OR SEARCH CLASS:  
250, Radiant Energy, subclass 505.1 for radiation controlling means in general.

**146 Scanner:**

This subclass is indented under subclass 145. Subject matter including means to cause the beam of X-rays to sweep over a selected area by sequentially passing small portions of a large beam while blocking all other portions, e.g., an X-ray opaque Nipkow disk.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
12, 113 and 137, for systems including scanning an electron beam across a

target to thus cause scanning of the emitted X-rays.

**147 Collimator:**

This subclass is indented under subclass 145. Subject matter comprising control of X-ray beam shape, size, axial direction, or focal length.

- (1) Note. This subclass includes X-ray opaque aperture plates, source mounted masking devices, etc.
- (2) Note. Beam masking devices positioned on or adjacent an irradiated object so as to protect the object are considered radiation shields and are classified in Class 250, Radiant Energy, subclass 515.1.

**148 Plural selectable:**

This subclass is indented under subclass 147. Subject matter including means to select one of a plurality of collimators.

**149 Multiaperture:**

This subclass is indented under subclass 147. Subject matter wherein the collimator is formed of a large number of small apertures, e.g., arranged in the form of a honeycomb, which apertures are employed simultaneously.

**150 Variable:**

This subclass is indented under subclass 147. Subject matter wherein the shape, size, axial direction, or focal length of the beam is variable.

- (1) Note. Variable collimators are referred to in the art by numerous alternative terms such as diaphragms, shutters, screens, masks, or cones.

**151 Automatic:**

This subclass is indented under subclass 150. Subject matter wherein the collimator is caused to vary in response to the sensing of some condition of the X-ray device or the object.

**152 With linear leaf motion:**

This subclass is indented under subclass 150. Subject matter wherein the aperture in the collimator is bounded by movable leaves of X-ray opaque material and these leaves are each movable along straight lines.

**153 With pivotal leaf motion:**

This subclass is indented under subclass 150. Subject matter wherein the aperture in the collimator is bounded by movable leaves of X-ray opaque material and these leaves are each movable about pivot points.

**154 Antiscatter grid:**

This subclass is indented under subclass 145. Subject matter including a plurality of X-ray opaque elements arranged in the form of a grid and used to prevent the passage therethrough of X-rays coming from other than a desired direction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 140, for secondary radiation screens combined with X-ray sources.
- 149, for structure wherein X-ray opaque elements define a large number of small apertures.

**155 With grid moving means:**

This subclass is indented under subclass 154. Subject matter including means to move the grid, such that a shadow of the grid does not appear in the final X-ray image.

**156 Filter:**

This subclass is indented under subclass 145. Subject matter including means which allows the passage therethrough of X-rays of selected energy or intensity.

- (1) Note. A single filter may allow the passage of photons having different energies at different portions thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 5, for computerized tomography using energy discrimination.
- 49, for spatially dispersive energy analysis of the X-ray fluorescence of an analyte.
- 82+, for spatial energy dispersion analysis.

**157 Plural:**

This subclass is indented under subclass 156. Subject matter including a plurality of separate filter units.

**158 Single filter with plural elements:**  
This subclass is indented under subclass 156. Subject matter including a plurality of filter elements joined to form a single filter unit.

**159 Contoured:**  
This subclass is indented under subclass 156. Subject matter wherein the filter is of nonuniform thickness.

**160 Shutter or chopper:**  
This subclass is indented under subclass 145. Subject matter including means which may be rapidly opened or closed to completely block or pass an X-ray beam.

**161 Window:**  
This subclass is indented under subclass 145. Subject matter including an aperture in an X-ray opaque material which is closed by an X-ray transmissive material.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
140, for windows combined with X-ray sources.

**162 AUXILIARY DATA ACQUISITION OR RECORDING:**  
This subclass is indented under the class definition. Subject matter including the acquisition or recording of information concerning the object or the exposure other than the image of the object.

(1) Note. The recording usually takes the form of a marking or coding on a photographic plate upon which the image of the object is formed.

SEE OR SEARCH CLASS:  
346, Recorders, for recording devices, per se.  
606, Surgery, subclass 130 for stereotactic devices, i.e., holders comprising X-ray opaque marking for supporting surgical instruments relative to a patient.

**163 Distance or dimension marker:**  
This subclass is indented under subclass 162. Subject matter including means of known dimensions which are at least partly opaque to

X-rays placed on or near the object at known distances from each other such that they appear in the final image of the object and whose images may be used to calculated distance or dimensions within the object.

**164 Coordinate grid:**  
This subclass is indented under subclass 163. Subject matter wherein the means comprises a coordinate grid which is at least partly opaque to X-rays.

**165 Patient or exposure data:**  
This subclass is indented under subclass 162. Subject matter wherein the data concerns patient related information or the image number, duration, intensity, or other characteristic of the exposure.

SEE OR SEARCH CLASS:  
396, Photography, subclasses 310+ for exposure identification.

**166 With light projection:**  
This subclass is indented under subclass 165. Subject matter wherein the data is recorded by projecting light modulated with the data onto the X-ray detector.

(1) Note. The light may be infrared, visible or ultraviolet.

**167 PHOTOGRAPHIC DETECTOR SUPPORT:**  
This subclass is indented under the class definition. Subject matter including means to support, contain, or position an X-ray detector of the photographic type.

SEE OR SEARCH CLASS:  
396, Photography, appropriate subclasses for photographic film support, positioning, aligning, and moving means, in general.

**168 Dental:**  
This subclass is indented under subclass 167. Subject matter wherein the object under examination includes the teeth or jaw of a patient.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
38+, for dental panoramics.



- 191, for dental fluoroscopic detector supports.
- 169 Cassette:**  
This subclass is indented under subclass 168. Subject matter including a container for the detector.
- SEE OR SEARCH CLASS:  
206, Special Receptacle or Package, subclass 455 for film receptacles.  
396, Photography, subclasses 512+ for photographic film cassettes.
- 170 With aligning:**  
This subclass is indented under subclass 168. Subject matter including means to position the detector in a selected alignment with the source and object.
- 171 For roll or strip film:**  
This subclass is indented under subclass 167. Subject matter wherein the film is in the form of a roll or strip.
- 172 Serial plate of cassette changer:**  
This subclass is indented under subclass 167. Subject matter providing for the sequential supply of unexposed X-ray plates or cassettes to an X-ray exposure station and for the subsequent removal therefrom of exposed plates or cassettes.
- 173 Serial film or film pack changer:**  
This subclass is indented under subclass 167. Subject matter providing for the sequential supply of unexposed X-ray films or film packs to an X-ray exposure station and for the subsequent removal therefrom of exposed films or film packs.
- 174 For plural films or plates:**  
This subclass is indented under subclass 167. Subject matter including plural photographic detector units.
- 175 For plural exposures on single film or plate:**  
This subclass is indented under subclass 167. Subject matter including means to position a film or plate in such manner that plural exposures may be made on that single film or plate.
- 176 With real time imaging:**  
This subclass is indented under subclass 175. Subject matter including means such as a fluorescent screen or a television system which provides a visual presentation of the X-ray image being recorded photographically.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
29, for real time display combined with xeroradiography.  
98, for X-ray systems including circuits and means for displaying and signaling.  
190, for fluoroscopes.
- 177 With object support or positioning:**  
This subclass is indented under subclass 167. Subject matter including means combined with the detector support which supports or positions the object.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
20, and the subclasses noted thereunder, for object support, positioning or aligning devices.
- 178 For seated object:**  
This subclass is indented under subclass 177. Subject matter including means to support an animate object in a seated position.
- 179 Pivoted object support:**  
This subclass is indented under subclass 177. Subject matter including means for pivoting the object during X-ray examination.
- 180 With object retaining:**  
This subclass is indented under subclass 177. Subject matter including means to prevent movement of the object relative to the detector once it has been positioned.
- 181 For movable film or plate:**  
This subclass is indented under subclass 167. Subject matter wherein the photographic detector is in the form of a film or plate and means is provided to move the detector support.

- 182 Sheet film cassette:**  
This subclass is indented under subclass 167. Subject matter wherein the detector is in the form of sheet film and is enclosed in a container therefor.
- 183 Self-developing:**  
This subclass is indented under subclass 182. Subject matter including means within the cassette to develop the film after exposure.
- SEE OR SEARCH CLASS:  
396, Photography, subclasses 30+ for developing cameras.
- 184 Flexible:**  
This subclass is indented under subclass 182. Subject matter wherein the cassette is not rigid.
- 185 With radiation modifying:**  
This subclass is indented under subclass 182. Subject matter wherein the cassette includes some means to modify the radiation entering the cassette such as antiscatter means, filters, or intensifier screens.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
145+, for beam control means, per se.
- 186 With antiscatter means:**  
This subclass is indented under subclass 185. Subject matter including means to admit X-rays from a desired direction only.
- 187 With film clamping:**  
This subclass is indented under subclass 185. Subject matter including means for holding the film in intimate contact with a support surface such as foam pads, pressure plates, or cassette evacuation means.
- 188 With hinged cover:**  
This subclass is indented under subclass 182. Subject matter wherein the cassette includes a cover hinged to the body thereof.
- 189 NONPHOTOGRAPHIC DETECTOR SUPPORT:**  
This subclass is indented under the class definition. Subject matter including means to support, contain, or position an X-ray detector of a nonphotographic type.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
22, for nonphotographic detectors used in tomography.
- 190 Fluoroscope:**  
This subclass is indented under subclass 189. Subject matter wherein the detector exhibits an image of the object by means of a material which fluoresces in response to the X-radiation being transmitted through the object.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
42, for stereofluoroscopy.
- 191 Dental:**  
This subclass is indented under subclass 190. Subject matter wherein the object under examination includes the teeth or jaw of a patient.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
38+, for dental panoramics.  
168+, for dental film supports.
- 192 Foot or shoe examination:**  
This subclass is indented under subclass 190. Subject matter wherein the object under examination includes the foot or shoe of a patient or customer.
- 193 SOURCE SUPPORT:**  
This subclass is indented under the class definition. Subject matter including means to support, contain, or position an X-ray source.
- SEE OR SEARCH CLASS:  
250, Radiant Energy, subclasses 496.1+ for containment and shielding of radioactive sources and subclass 522.1 for source supports.
- 194 Including cable handling:**  
This subclass is indented under subclass 193. Subject matter including means to house, support, or manipulate the cables which supply the X-ray source.
- (1) Note. The source cables may serve for the transfer of electrical energy or hydraulic, pneumatic or cooling fluid.

- 195 Including object support or positioning:**  
This subclass is indented under subclass 193. Subject matter including means combined with the source support which supports or positions the object.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
20, and the subclasses noted thereunder, for object support, positioning, or aligning devices.
- 196 With movable source:**  
This subclass is indented under subclass 195. Subject matter wherein means is provided to move the source with respect to the object.
- 197 Including movable source:**  
This subclass is indented under subclass 193. Subject matter wherein means is provided to move the source.
- 198 With mobile support:**  
This subclass is indented under subclass 197. Subject matter wherein the support which allows movement of the source is itself movable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
60, for pipe crawlers.
- 199 Source cooling:**  
This subclass is indented under subclass 193. Subject matter wherein the source support includes means to cool external surfaces of the source.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
127+, and 141, for means for cooling the interior of an X-ray tube.
- 200 Liquid coolant:**  
This subclass is indented under subclass 199. Subject matter wherein the means to cool the source includes a liquid which acts to remove heat from the source.
- 201 Shock proofing:**  
This subclass is indented under subclass 193. Subject matter including means to prevent contact with voltage carrying elements which supply power to or are a part of the source.
- 202 Fluid immersion:**  
This subclass is indented under subclass 201. Subject matter wherein the shock proofing includes immersion of the source in a nonconductive fluid.
- 203 Shielding:**  
This subclass is indented under subclass 193. Subject matter wherein the source support includes means to shield the X-ray source to eliminate unwanted radiation.
- 204 ACCESSORY:**  
This subclass is indented under the class definition. Subject matter which are not X-ray devices in and of themselves but which are specifically and uniquely designed for use in or with X-ray devices.
- 205 Alignment:**  
This subclass is indented under subclass 204. Subject matter including means designed to aid in the alignment of source, object, or detector relative to one another.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
20, for alignment devices used in computerized tomography.
- 206 With light projection:**  
This subclass is indented under subclass 205. Subject matter including the projection of a beam of light in a direction such that by monitoring the position where the light strikes the object, alignment may be achieved.
- (1) Note. The light may be infrared, visible, or ultraviolet.
- 207 Testing or calibration:**  
This subclass is indented under subclass 204. Subject matter including means designed to test an X-ray device for proper operation or to aid in the adjustment of the device for operation within desired characteristics.

## SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 252.1 for calibration or standardization methods used in radiant energy systems.

**208 Object holder or support:**

This subclass is indented under subclass 204. Subject matter including means to maintain the object in a selected position or orientation.

## SEE OR SEARCH THIS CLASS, SUB-CLASS:

20, and the subclasses noted thereunder, for object support, positioning, or aligning devices.

**209 Table or couch:**

This subclass is indented under subclass 208. Subject matter wherein the support is in the form of a table or couch.

## SEE OR SEARCH CLASS:

5, Beds, subclasses 630+ for surgical supports.

**210 MISCELLANEOUS:**

This subclass is indented under the class definition. Subject matter not provided for under any of the previous subclasses.

## CROSS-REFERENCE ART COLLECTIONS

**901 COMPUTER TOMOGRAPHY PROGRAM OR PROCESSOR:**

Art collection of disclosures including computer devices or programs relating to X-ray tomography.

END