GLOSSARY

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ABSOLUTE (ET):	Refers to measurements made without a direct reference in contrast to differential mea- surements. Absolute measurements are affected by any change in electromagnetic proper- ties; differential measurements are affected only by differences between the test area and a comparative standard.
ABSOLUTE PROBE:	A probe containing a coil that responds to all electromagnetic properties of the test part.
ABSOLUTE SIGNAL:	The value of the amplitude of a signal without consideration of its relative phase, frequency or waveform.
ABSORBED DOSE:	The energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy).
ABSORPTION COEFFI- CIENT (RT):	A fraction expressing the decrease in the intensity of a beam of radiation per unit thickness (linear absorption coefficient), or per atom (atomic absorption coefficient of the medium through which the radiation is passing).
ABSORPTION (PT):	The process of one material (liquid, solid, or gas) merging with a second material by penetration into the particles of the second material as opposed to adsorption where the material coats and is retained on the surface of the particles of the second material.
ABSORPTION (RT):	The process whereby the particles or quanta (see PHOTON) in a beam of radiation are reduced in number or energy as they are passed through some medium. The particles lose energy by interaction with either the nucleus (core) or electron (shell) of the atoms of the medium.
ADSORPTION (PT):	The process of one material (liquid, solid, or gas) merging with a second material by coating and being retained on the surface of the particles (and interstices) of the second material as opposed to absorption where the material penetrates into the particles of the second material.
AC (ALTERNATING CUR- RENT):	Electric current that reverses its direction of flow at regular intervals.
ACCELERATOR:	A device that accelerates charged atomic particles to high energies. An X-ray machine or a betatron is an accelerator.
ACCEPTANCE NUMBER:	The term used to designate the allowable number of defects in a statistical quality control sample.
ACID EMBRITTLEMENT:	A form of hydrogen embrittlement that may be induced in some metals by acid treatment.
ACOUSTIC IMPEDANCE (UT):	A material property, which determines the product of the velocity of sound in a material and the density of the material used in determining the reflection characteristics of inter- faces.
ACTIVATION:	The process by which neutrons bombard stable atoms to make them radioactive.
ACTIVITY:	A measure of how radioactive a particular radioisotope is. Activity is calculated by the number of atoms disintegrating per unit of time. Its unit of measurement is the curie. See SPECIFIC ACTIVITY.
ACUTE RADIATION SYNDROME (RT):	The immediate effects of a short-term whole-body over exposure of a person to ionizing radiation. These effects include nausea and vomiting, malaise increased temperature, and blood changes.
ADDED FILTER:	Filter added to the inherent filtration.
ADDITIVE, ABSORPTIVE (RT):	See CONTRAST AGENT.
ADHERENCE:	The extent to which a coating bonds to a substrate.

ADHERENCE INDEX:	The measure of the adherence of porcelain enamel and ceramic coatings to sheet metal (ASTMC-313).
ADHESION:	The adhering or sticking together of substances in contact with each other.
AERIAL IMAGE (RT):	The representation (in relief) of the distribution of the intensity of the radiation in the plane of the radiograph (plane of the film).
AFTERGLOW (RT):	The persistence of light emission from an intensifying screen or fluorescent screen after an exposure. It is a form of phosphorescent radiation.
AGE HARDENING:	Increasing the hardness and possible strength of an alloy by a relatively low-temperature heat treatment that causes precipitation of components or phases of the alloy from the supersaturated solid solution. Also known as precipitation hardening.
AGGLOMERATION (PT) (MT):	An indiscriminately formed mass. A cluster of disparate elements.
AGING:	A metallurgical change in a metal alloy resulting in an increase in mechanical properties. This change can occur in some instances at room temperatures. More often its effects are increased by holding for specified lengths of time at elevated temperatures. Also known as precipitation hardening.
AIR-COOLED TUBE (RT):	An X-ray tube for which the principal method of cooling is dissipation of heat into surrounding air.
AIRCRAFT QUALITY STEEL:	Steel produced in such a way as to be as nearly free of discontinuities as possible.
AIR GAP (MT):	When a magnetic circuit contains a small gap that the magnetic flux must cross, the space is referred to as an air gap. Cracks produce small air gaps on the surface of a magnetized part.
AIR HOLE:	A hole in a casting caused by air or gas trapped in the metal during solidification; also, Gas Hole.
AIR SCATTER (RT):	Ionizing radiation that, because of a scattering interaction with air, arrives at a point by way of an indirect route instead of arriving directly from the source.
ALARA:	(acronym for "as low as is reasonably achievable") means making every reasonable effort to maintain exposures to radiation as far below dose limits as is practical consistent with the purposes for which the radiation exposure is received, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utiliza- tion of radiation in the public interest.
ALCLAD ALUMINUM:	A term applied to aluminum alloy sheet and wire products to which a thin coating of high purity aluminum or aluminum alloy of different composition has been bonded for corro- sion protection.
ALLOY:	A metal composed of two or more chemical elements at least one of which is a metal.
ALLOY STEEL:	Steel that has had sufficient quantities of alloying elements added to produce desired changes in the mechanical or physical properties.
ALLOY SYSTEM:	A complete series of compositions produced by mixing in all proportions any group of two or more components, at least one of which is a metal.
ALLOYING ELEMENT:	An element added to a metal to create a desired change in its properties.
ALPHA PARTICLE (RT):	A positively charged particle emitted by certain radioactive materials. It is made up of two neutrons and two protons; hence it is identical with the nucleus of a helium atom.
ALPHA "RAY" (RT):	A stream of fast moving helium nuclei. This is a strongly ionizing radiation with very weak penetration.

ALPHA ROCKWELL HARDNESS:	The index of the resistance of a plastic to surface penetration by a specified indentor under a specified load applied with a tester. Higher values indicate higher resistance to indentation (ASTMD-785).
ALTERNATING CUR- RENT (AC):	Alternating current is current that reverses its direction of flow at regular intervals. Such current is frequently referred to as AC
ALUMINUM EQUIVA- LENT (RT, UT):	The thickness of aluminum having a specified purity, affording the same attenuation, under specified conditions, as the material in question.
AMPERAGE:	The strength of a current of electricity measured in amperes.
AMPERE:	This is the unit of electrical current. One ampere is the current that flows through a conductor having a resistance of one ohm, at a potential of one volt.
AMPERE TURNS (MT):	This term refers to the product of the number of turns in a coil and the number of amperes of current flowing through it. This is a measure of the magnetizing or demagnet- izing strength of the coil. For example: 800 amperes in a 6 turn coil = $800 \times 6 = 4800$ ampere turns.
AMPLIFIERS:	Circuit components that increase the magnitude of an electronic signal.
AMPLITUDE:	The extent of vibratory movement measured from the mean position to an extreme; the maximum departure of alternating voltage or current from the average value; indicated by vertical height on an A-scan presentation.
AMPLITUDE ECHO (UT):	The total vertical or pulse height of the received signal indicated by "A" scan presenta- tion.
AMPLITUDE RESPONSE:	That property of the test system whereby the amplitude of the detected signal is measured without regard to phase.
AMU:	Atomic mass unit.
ANGLE BEAM (UT):	A sound beam traveling at some angle other than normal to the surface of the test object. Measured from normal incidence.
ANGLE OF INCIDENCE (UT):	The angle defined by the direction of propagation of refracted wave and the normal to the interface at the point of incidence.
ANGLE OF REFLECTION (UT):	The angle defined by the direction of propagation of refracted wave and the normal to the interface at the point of incidence.
ANGLE TRANSDUCER (UT):	A transducer used in angled testing in which the sound beam is set to some predeter- mined angle to achieve a special effect, e.g., setting up shear or surface waves in the tested piece.
ANGSTROM (A):	Unit of length usually reserved for the expression of wavelength. One Angstrom equals 10^{-8} cm. Under the standard system of units, the Angstrom will be replaced by the nanometer (1.0 A = 0.10 nm). This is the standard unit for measuring wavelengths of light.
ANNEAL:	Heating metal to above its critical temperature range, then slowly cooling to remove stresses, induce softness, remove gases, alter ductility, induce toughness, or modify electrical, magnetic or other physical properties.
ANODE (TARGET) (RT):	The positive terminal of an X-ray tube. It is a high atomic number, high melting point element, and receives the electron bombardment from the cathode or negative terminal.
ANODE CORROSION:	The dissolution of a metal acting as an anode.
ANODE CURRENT (RT):	See TUBE CURRENT.
ANODE STEM (RT):	The metallic rod on which the target is mounted, and which is sealed to the envelope of the Xray tube.
ANODIZING:	Forming a coating on a metal surface by anodic oxidation; most frequently on aluminum.

ANTINODE:	Point in a standing wave where some characteristics of the wave field has a maximum amplitude.
ANTI-SCATTER GRID (RT):	An array of X-ray opaque and transparent sections of materials placed between the specimen and the film to minimize the effect of scattered radiation on the radiographic image, e.g., a Potter-Bucky diaphragm.
APPLICATION TIME (PT):	The period of time wherein parts are immersed in a bath of liquid penetrant, plus the time the liquid penetrant remains on the surface of the part, i.e., soak time and dwell time.
ARC STRIKE:	A burned area where the weld or adjacent surface is marred by the slight addition or loss of metal usually caused by inadvertent contact with the welding electrode.
AREA MONITORING (RT):	The continued measurement of ionizing radiation exposure or dose levels in an area for the purpose of radiation protection.
AREA OF INTEREST (RT):	The specific portion of the specimen image on the radiograph that is to be evaluated.
ARTIFACT (RT):	Film blemishes produced during the manufacture, packaging, handling, or processing of film which are not associated with the actual condition of the material tested. They appear as white or black crescents, fogging, staining, etc.
A-SCAN (UT):	A data presentation method by which intelligence signals from a signal object located are displayed. As generally applied to pulse echo ultrasonics, the horizontal and vertical sweeps are proportional to time or distance and amplitude or magnitude respectively. Thus the location and magnitude of acoustical interface are indicated as to depth below the transducer.
ASTM:	Abbreviation for American Society for Testing and Materials.
ASTM BLOCK:	Specific type of reference standard, cylindrically shaped and having a specified size FBH at a specified metal travel distance from the top of the block. See ASTM.
ASTM HARDNESS NUM- BER:	The depth (in thousandths of an inch) of penetration of an indentor into a rubber speci- men under loads and conditions specified in ASTMD-314. While suited for most common grades of rubber, ASTM hardness number is not applicable to extremely hard or soft rubbers.
ATOM:	The smallest particle of an element that can enter into a chemical combination. All chemical compounds are formed of atoms, the difference between compounds being attributable to the nature, number and arrangement of their constituent atoms.
ATOMIC MASS UNIT (AMU):	1.66 x 10^{-24} grams. Arbitrarily defined as 1/12th of a carbon-12 atom. An AMU is approximately the mass of a proton (1.0073 AMU) or a neutron (1.0087 AMU).
ATOMIC NUMBER:	An integer that expresses the positive charge of the nucleus in multiples of the fundamen- tal electronic charge. In present theory, it is the number of protons in the nucleus.
ATOMIC WEIGHT:	The relative weight of the atom of an element, referred to some element taken as a standard. An atomic weight of 16 for oxygen is the one usually adopted as a basis for reference.
ATTENUATION (RT):	Reduction in the intensity of a beam of ionizing radiation due to passage through matter.
ATTENUATION (UT):	Loss of energy caused by scattering of the sound beam within a material or at an interface or an electronic device in or attached to the instrument.
ATTENUATION COEFFI- CIENT (RT):	Average rate that a beam of radiation changes as it passes through a body.
ATTENUATOR:	A device that causes a known loss in energy of a beam that is passed through it. It may be calibrated in decibels.
AUGER ELECTRON (RT):	An orbital electron emitted by an atom, instead of a photon of characteristic radiation, when a vacancy in an inner electron shell is filled.
AUSTENITIC STEELS:	Steels whose constituents remain in solution with each other at room temperature and are, therefore, non-magnetic and corrosion resistant.

AUTORADIOGRAPH (RT):	The image of an object obtained on a photographic emulsion by means of radiation emitted by the object itself.
AUTORADIOGRAPHY (RT):	A test in which the object being inspected is radioactive, or made radioactive, and the inherent radiation so produced is used to produce the image on a film.
AUTOTRANSFORMER (RT):	A special type of transformer in which the output voltage can be easily varied. The autotransformer is thus employed to adjust the primary voltage applied to the step-up transformer that produces the high voltage applied to the X-ray tube.
AVERAGE GRADIENT (RT):	(of a film) The steepness of the characteristic curve of a film. Usually measured as average gradient between two levels of density; e.g., the average gradient between a density of 0.25 and a density of 2.0 is the slope of a straight line connecting these points. Most x-ray films have a gradient of 2.5 to 4.0, and any film with a gradient over 1.0 amplifies the subject contrast.
AVERAGE LIFE (MEAN LIFE) (RT):	The arithmetic mean value of the lives of the atoms of a radioactive nuclide. It is the reciprocal of the decay constant.
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BACKGROUND (PT, MT):	The surface of the test part upon which the indication is viewed. It may be the natural surface of the test part, or it may be the developer coating on the surface. This background may contain traces of unremoved penetrant, fluorescent or visible, which if present, can interfere with the visibility of the indication.
BACKGROUND FLUO- RESCENCE (PT):	Fluorescent residues observed over the general surface of the part during fluorescent penetrant inspection. It is usually due to poor emulsification or rinsing of the fluorescent penetrant, or due to excessive roughness of the surface causing entrapment of the fluorescent penetrant.
BACKGROUND NOISE (UT):	Extraneous signals caused by signal sources within the ultrasonic testing system, includ- ing the material in test.
BACKGROUND RADIA- TION (RT):	Radiation coming from sources other than the radioactive material or X-ray machines used in making an exposure. Such radiation is primarily due to cosmic radiation from outside the earth's atmosphere and leakage from nearby sources.
BACK REFLECTION (UT):	Signal from the far boundary of the test part.
BACKSCATTER (RT):	Secondary radiation that is deflected at angles greater than 90 degrees with respect to the original direction of motion. Such radiation should be filtered from the film, as they bring no information to the film and cause a reduction in contrast due to an increase in noise.
BAND PASS FILTER:	An electronic circuit which allows flow of signals of a specific frequency range but suppresses signals of both greater and smaller rates of response.
BANDED STRUCTURE:	A segregated structure of nearly parallel bands aligned in the direction of working.
BACKING RING:	A metal ring placed inside pipe for butt welding, to assure complete weld penetration and a smooth internal surface.
BANDWIDTH:	The range of a band of different frequencies; the number of hertz between the maximum frequency of the range and the minimum frequency of the range, usually measured between points of equal and stated amplitude levels.
BANKING CONCEPT (RT):	An idea or model used to facilitate the explanation of radiation exposure permitted in a lifetime.
BARIUM CLAY (RT):	A molding clay blocking material containing barium used to eliminate or reduce the amount of scattered or secondary radiation reaching the film.
BARIUM CONCRETE (RT):	Concrete containing a high portion of barium compounds, used for radiation protection purposes.
BARIUM PLASTER (RT):	Plaster containing a high proportion of barium compounds, used for radiation protection purposes.

BARIUM TITANATE TRANSDUCER (UT):	(Polycrystalline Barium Titanate $BaTiO_3$). A ceramic material composed of many individual crystals fired together, and polarized by the application of a D.C. field for use as a transducer.
BARK:	The decarburized layer just beneath the scale that results from heating steel in an oxidiz- ing atmosphere.
BARN (RT):	A very small unit of area used in measuring the cross sections of atoms, nuclei, electrons, and other particles. One barn is equal to 10 ⁻²⁴ square centimeter. The term is a measure of the probability that a given nuclear reaction will occur.
BARRIER (PROTECTIVE) (RT):	Barrier of attenuating materials used to reduce radiation exposure.
BASE DENSITY (RT):	The slight density that is due only to the film base and the blue dye in it. It is measured with the emulsion layer removed, or on a film which has been fixed without prior development.
BASE PLUS FOG (RT):	The density of a film's base material plus the darkening of its emulsion caused by fog. The base plus fog level brings no useful information to the film and merely creates a high background that reduces contrast and image visibility.
BASELINE (UT):	The horizontal trace across the A-scan CRT display for a no signal condition.
BATH (colloquial) (PT, MT):	(1) The liquid penetrant inspection materials (penetrant, emulsifier, developer) into which parts are immersed during the inspection process. (2) Penetrant materials retained in bulk in immersion tanks intended for re-use. (3) Term used to designate a suspension of ferromagnetic particles with oil or water.
BEAM:	A directed flow of energy into space or matter.
BEAM ANGLE (RT):	The smallest angle between the central axis of the radiation beam and the plane of the radiographic film.
BEAM DIVERGENCE (RT):	The solid angle of the beam of radiation as it emerges from the X-ray tube or gamma-ray exposure device.
BEAM QUALITY (RT):	An expression used to describe the penetrating power (energy spectrum) of a beam of radiation. The quality of an X-ray beam is usually expressed in terms of the half-value layer of some reference material, such as aluminum or copper.
BEAM SPREAD (UT):	Divergence of a sound beam as it travels through material.
BERNOULLI EFFECT (PT):	A law of hydrodynamics: a liquid will flow through a conduit at a constant velocity governed by the pressure. When a section of the conduit is decreased in size, the velocity of the liquid flow in the reduced section is increased. If a small opening is placed in the reduced section, a vacuum or suction will be created at the opening.
BETA PARTICLE (RT):	An electron or positron emitted from a nucleus during decay. The term "beta particle" is reserved for electrons and positrons.
BETA "RAY" (RT):	A stream of high speed electrons that is of nuclear origin. This radiation is more penetrat- ing than alpha radiation, but it ionizes less strongly.
BETATRON (RT):	A circular electron accelerator that is a source of either high energy electrons or X-rays. The electrons are injected by periodic bursts into a region of an alternating magnetic field. After acceleration, the electrons are brought out directly or directed against a target to produce X-rays.
BLACK LIGHT (PT, MT):	The term often used to describe electromagnetic radiation having wavelengths from 320- 400 nm. Typical units used in penetrant inspection provide an intensity of 100 to 150 foot-candles at 15 inches from the face of the filter and are used to excite fluorescent materials in a range visible to the eye. See also Ultraviolet A.

BLEED OUT (PT):	The action by which the penetrant exudes out of the discontinuities onto the surface of a component, due primarily to "capillary action" and to "blotting" or "soaking up" effect of the developer.
BLISTER:	A defect in metal on or near the surface, resulting from the expansion of gas in a subsurface zone. Very small blisters are called "pinheads" or "pepper blisters."
BLOCKING:	See MASKING.
BLOCKING MEDIUM (RT):	Material of appropriate radiation opacity for applying to an object, either around the edges or as a filling for holes, to reduce the effect of scattered radiation and to shield portions of the film which would otherwise be overexposed (e.g., radiographic putty).
BLOTTING (PT):	The action of the developer in soaking up the penetrant from the surface of the disconti- nuity, so as to cause maximum bleed out of the dye penetrant for increased contrast and sensitivity.
BLOWHOLE:	A hole in a casting or a weld caused by gas entrapped during solidification. See POROSI-TY.
BLUR (RT):	See UNSHARPNESS; PENUMBRA.
BODY (PT):	The term used to describe the ability of a penetrant vehicle to maintain an adequate suspension of visible or fluorescent dye material.
BODY BURDEN:	The amount of radioactive material present in the body of man or animals.
BOLTHOLE PROBE (ET):	A probe coil(s) assembly used for electromagnetically inspecting the walls of fastener holes or other small holes of limited length.
BOLTHOLE SCANNER (ET):	An eddy current device designed to provide automatic, uniform inspection of walls of fastener holes.
BOTTOM ECHO (UT):	See BACK REFLECTION.
BOUNDARY ECHO (UT):	A reflection of an ultrasonic wave from an interface.
BOUNDARY WAVE- LENGTH (QUANTUM LIMIT) (RT):	The shortest wavelength present in a continuous X-ray spectrum. It is inversely propor- tional to the peak voltage applied to the X-ray tube.
BRAZING:	Joining of metals and alloys by fusion of nonferrous alloys that have melting points above 800°F, but lower than melting points of materials being joined.
BREMSTRAHLUNG (RT):	Electromagnetic radiation emitted by charged particles when they are slowed down by electric fields in their passage through matter. Literally, "braking radiation" in German.
BRIDGE CIRCUIT (ET):	An electrical circuit designed to pass only the changes in voltage or current flow through a system while eliminating the larger steady state component. Such circuits in eddy current inspection reflect the changes in the electromagnetic variables while eliminating the larger current from the readout.
BRIGHTNESS AMPLIFIER (RT):	See IMAGE INTENSIFIER.
BRINELL HARDNESS:	A measure of the hardness of a metal, as determined by pressing a hard steel ball into the smooth surface under standard conditions. For aluminum, the steel ball is 10 millimeters in diameter and total load is 500 kilograms. Results are calculated as the ratio of applied load to total surface area of indentation and are referred to in terms of Brinell Hardness Number or BHN.
BRITTLE CRACK PROPA- GATION:	A very sudden propagation of a crack with the absorption of no energy except that stored elastically in the body. Microscopic examination may reveal some deformation even though it is not noticeable to the unaided eye.
BRITTLE FRACTURE:	Fracture with little or no plastic deformation.

BRITTLENESS:	The quality of a material that leads to crack propagation without appreciable plastic deformation.
BROAD-BANDED (UT):	Having a relatively large bandwidth; used to describe instruments having an initial pulse with a relatively wide bandwidth and an amplifier with response to a relatively wide range of frequencies; opposite of narrow-banded or tuned.
BROAD BEAM (RT):	An uncollimated beam containing scattered radiation as well as the primary beam.
BROAD-BEAM ABSORP- TION (RT):	Absorption measured under conditions in which scattered radiation is not excluded from the measuring apparatus.
B-SCAN (UT):	A data presentation method generally, applied to pulse echo techniques which yields a two dimensional view of a cross-sectional plane through the test piece. The horizontal sweep is proportional to the test piece, with the vertical sweep proportional to distance, showing the front and back surfaces and discontinuities between.
BUBBLER (UT):	See WATER DELAY COLUMN.
BUILD-UP (RT):	An increase in radiation transmitted through material because of forward scatter.
BUILD-UP FACTOR (RT):	In the passage of radiation through a medium, the ratio of the total value of a specified radiation quantity at any point to the contribution to that value from radiation reaching the point without having undergone a collision.
BUNSEN-ROSCOE RECI- PROCITY LAW (RT):	States that the end result of a photochemical reaction is dependent only on the product of the radiation intensity (1) and the duration of the exposure (t), and is independent of absolute values of either quantity. This implies that the resultant density of a film would depend only on the products of the radiation intensity reaching the film and the exposure time.
BURNING:	Extreme overheating makes grains excessively large and causes the more fusible constitu- ents of steel to melt and run into the grain boundaries, or it may leave voids between the grains.
BURST:	Fissures or ruptures caused by rolling or forging improperly or at improper temperatures.
BY-PRODUCT MATERIAL (RT):	In atomic energy law, any radioactive material (except source or fissionable material) obtained in the process of producing or using source or fissionable material. Includes fission products and many other radioisotopes produced in nuclear reactors.
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CALCIUM TUNGSTATE (RT):	A fluorescent chemical compound which emits visible blue-violet light when activated by either X- or gamma radiation.
CALIBRATION:	The process of adjusting an instrument to accurately measure a dimension or other mea- surable characteristic. It is also a process by which one compares a standard with another standard of higher accuracy to ensure the former is within specified limits. Examples of measurable characteristics in NDI include thickness (dimension), conductivity, hardness and temperature.
CALIBRATION STAN- DARD:	A standard on which a calibration process is based. Calibration standards are used to adjust an instrument for measurement. The characteristic of interest in a calibration standard will derive, although often indirectly, from a NIST master standard. For critical measurements where high accuracy is required, the calibration standard should be traceable to a NIST master standard.
CANNON TUBE SHIELD (RT):	A tube shield in the form of a long cylinder generally supported in cantilever fashion. The X-ray beam emerges through an aperture in the lead-lined wall of the cylinder, at right angles to its axis.
CAPILLARY ACTION (PT):	The tendency of certain liquids to travel or climb when exposed to small openings, cracks, fissure, etc., due to factors such as surface tension, cohesion, adhesion and viscosity.

CARBON STEEL:	Steel that does not contain significant amounts of alloying elements other than carbon. Also known as straight carbon, ordinary steel or plain carbon steel contains carbon up to 2%, also termed plain carbon steel or ordinary steel.
CARBURIZE:	To produce surface hardness on low carbon steels by heating above the critical range while in contact with a suitable material containing carbon.
CARRIER FLUID (MT):	A term used colloquially to designate the liquid used to carry the magnetic substance for the wet process.
CASCADE TUBE (RT):	A high voltage X-ray tube of cylindrical form divided into sections, the potential differ- ence across each of which is a fraction of the voltage applied to the whole tube. The electron stream is accelerated to its maximum energy in stages.
CASE:	In a ferrous alloy, the outer portion that has been made harder than the inner portion, or core, by CASE HARDENING.
CASE HARDENING:	Hardening a ferrous alloy so that the outer portion, or case, is made substantially harder than the inner portion, or core. Typical processes used for case hardening are carburizing, cyaniding, carbonitriding, nitriding, induction hardening and flame hardening.
CASSETTE (RT):	A lightproof container used for holding the radiographic films in position during the radiographic exposure. These holders may or may not contain intensifying and/or filter screens.
CASTING:	(1) An object at or near finished shape obtained by solidification of a substance in a mold. (2) Pouring molten metal into a mold to produce an object of desired shape.
CASTING SHRINKAGE:	 (1) "Liquid shrinkage" - the reduction in volume of liquid metal as it cools to the liquidus. (2) "Solidification shrinkage" the reduction in volume of metal from the beginning to ending of solidification. (3) "Solid shrinkage" - the reduction in volume of metal from the solidus to room temperature. (4) "Total shrinkage" - the sum of the shrinkage in parts (1), (2) and (3).
CASTING STRAINS:	Strains in a casting caused by casting stresses that develop as the casting cools.
CASTING STRESSES:	Stressed set up in a casting because of geometry and casting shrinkage.
CAST-WELD ASSEMBLY:	An assembly formed by welding one casting to another.
CATHODE (RT):	The negatively biased electrode of an X-ray tube from which the electrons are emitted to be accelerated to the anode.
CATHODE RAY (UT, RT):	A stream of electrons emitted by a heated filament and projected in a more or less confined beam under the influence of a magnetic and/or electric field.
CATHODE RAY TUBE (UT):	A vacuum tube, containing a screen, upon which signals are displayed; basic display device for an A-scan. Abbreviation is CRT.
CENTISTOKE:	A unit of kinematic viscosity. Water has a viscosity of about one centistoke.
CENTRAL CONDUCTOR (MT):	A conductor made of copper, aluminum, steel or flexible cable that is passed into or through an opening in a cylindrically-shaped part or other shapes when applicable for the purpose of establishing a circular field on the inside diameter.
CENTRIFUGAL CASTING:	A casting made in a mold (sand, plaster, or permanent mold) which rotates while the metal solidifies under the pressure developed by centrifugal force.
CERMET (PT):	A strong alloy of a heat-resistant compound and a metal.
CERTIFIED DENSITY (RT):	See STEP-WEDGE CALIBRATION FILM.
CESIUM-137:	A radioactive isotope of the element cesium having a half-life of 80 years, plus or minus three years.
CESIUM-137 (RT):	A radioactive nuclide of the element cesium having a half-life of 30 years, and photon energy of 882 KeV (which is 0.862 MeV).

CHAIN REACTION:	A reaction that stimulates its own repetition. In a fission chain reaction, a fission nucleus absorbs a neutron and fissions, releasing more than one additional neutron. These in turn can be absorbed by other fissionable nuclei, releasing more neutrons. A fission chain reaction is self-sustaining when the number of neutrons released in a given time interval equals or exceeds the number of neutrons absorbed.
CHALK TEST:	The forerunner of modern penetrant methods. A method of locating cracks by applying oil to a part and then removing the excess from the surface, which is then coated with whiting or chalk. After a short period of time the oil seeps out of the cracks into the whiting, or chalk, causing an appreciable difference in whiteness. This method has been replaced with more advanced penetrant methods for most applications.
CHARACTERISTIC CURVE (RT):	A curve which expresses film density as a function of log relative exposure. These curves are useful in determining exposure correction factors and to define the gamma characteristics of the film.
CHARACTERISTIC RADI- ATION (RT):	X-radiation consisting of discrete wavelengths which are characteristic of the emitting material.
CHARPY:	The name of an impact-testing machine that tests a specimen by striking it with a swinging hammer. The specimen is placed against anvil supports that are 40 millimeters apart.
CHATTER:	In machining or grinding, (1) A vibration of the tool, wheel or workpiece producing a wavy surface on the work. (2) The finish produced by such vibration.
CHECKS (CHECK MARKS):	Numerous, very small cracks in metal or other material caused in processing.
CHEMICAL FOG (AERIAL FOG) (RT):	Fog caused by unwanted chemical reactions during processing of film.
CHILL:	(1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting.
CHILL: CHLORINATION:	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT):	(1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting.The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases.Cine-radiography of images produced on a fluorescent screen.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT):	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT): CIRCULAR MAGNETISM (MT):	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity. When an electric current is passed through a solid magnetic conductor, a circular magnetic field is developed not only around the conductor, but also within the conductor.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT): CIRCULAR MAGNETISM (MT): CLADDING:	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity. When an electric current is passed through a solid magnetic conductor, a circular magnetic field is developed not only around the conductor, but also within the conductor. A process wherein a metallic coating is applied to a base metal by simultaneously rolling the base metal and the cladding material.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT): CIRCULAR MAGNETISM (MT): CLADDING: CLEAN:	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity. When an electric current is passed through a solid magnetic conductor, a circular magnetic field is developed not only around the conductor, but also within the conductor. A process wherein a metallic coating is applied to a base metal by simultaneously rolling the base metal and the cladding material. Free of solid or liquid contamination from the surface or in the voids of the flaw that may interfere with the penetration of the dye penetrant into the flaws, or with the occurrence of the inspection process.
CHILL: CHLORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT):	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity. When an electric current is passed through a solid magnetic conductor, a circular magnetic field is developed not only around the conductor, but also within the conductor. A process wherein a metallic coating is applied to a base metal by simultaneously rolling the base metal and the cladding material. Free of solid or liquid contamination from the surface or in the voids of the flaw that may interfere with the penetration of the dye penetrant into the flaws, or with the occurrence of the inspection process. (1) The gap or space between two mating parts. (2) Space provided between the relief of a cutting tool and the surface cut.
CHILL: CHILORINATION: CINE-FLUOROGRAPHY (RT): CINE-RADIOGRAPHY (RT): CIRCULAR MAGNETISM (MT): CLEAN: CLEARING: CLEARING TIME (RT):	 (1) A metal insert imbedded in the surface of a sand mold or core or placed in a mold cavity to increase the cooling rate at that point. (2) White iron occurring on a gray iron casting, such as the "chill" in the wedge test. (3) (Unfused chaplets) A uniform line or band outlining the object and indicating the lack of fusion between the metal and the casting. The process of passing dry chlorine gas through molten aluminum alloys to remove trapped oxides and dissolved gases. Cine-radiography of images produced on a fluorescent screen. The production of a series of radiographs that can be viewed rapidly in sequence, thus creating an illusion of continuity. When an electric current is passed through a solid magnetic conductor, a circular magnetic field is developed not only around the conductor, but also within the conductor. A process wherein a metallic coating is applied to a base metal by simultaneously rolling the base metal and the cladding material. Free of solid or liquid contamination from the surface or in the voids of the flaw that may interfere with the penetration of the dye penetrant into the flaws, or with the occurrence of the inspection process. (1) The gap or space between two mating parts. (2) Space provided between the relief of a cutting tool and the surface cut. The time required for the first stage of fixing during which the whiteness (opaqueness) of the film disappears.

CLEAVAGE FRACTURE:	A fracture, usually of a polycrystalline metal, in which most of the grains have failed by cleavage, resulting in bright reflecting facets. It is one type of crystalline fracture. Contrast with SHEAR FRACTURE.
COALESCENSE (PT):	The merging of two or more particles of a liquid, gas, or solid into a single larger particle: The uniting by growth in one body.
COBALT-60:	A radioisotope of the element cobalt.
COBALT-60 (RT):	A radionuclide of the element cobalt, emitting gamma rays with energies of 1.33 and 1.17 MeV, with a half-life of 5.3 years.
COEFFICIENT OF THER- MAL EXPANSION:	The linear expansion or contraction per unit length per degree Fahrenheit between speci- fied lower and upper Fahrenheit temperatures. If aluminum is involved, such values are multiplied by one million for easier reading.
COERCIVE FORCE (MT):	The value of the reversing magnetizing force necessary to bring the flux density back to near zero.
COHERENT SCATTER:	The result of Compton scattering in which the electron receives none of the energy from the primary radiation. The resultant scattered radiation is of the same energy as the incident beam.
COHESION:	Molecular attraction by which the particles of a solid are held together.
COIL (ET, MT):	One or more turns of conductor wound to produce a magnetic field when current passes through the conductor.
COIL IMPEDANCE (ET):	The total opposition to current flow through a coil and is represented by the ratio of the coil voltage to the coil current. This impedance is affected by the material within the magnetic field generated by the coil and is sometimes used to measure eddy current response.
COIL SHOT (MT):	A term used colloquially to indicate a shot of magnetizing current passed through a solenoid or coil surrounding a part, for the purpose of establishing a longitudinal field.
COIL SIZE (ET, MT):	The geometry or dimension of a coil; for example, length or diameter.
COIL SPACING:	The axial distance between two encircling coils in a different system.
COLD CRACKS:	Appear as a straight line, usually continuous throughout its length and generally exist singly. These cracks start at the surface.
COLD SHORT:	A condition of brittleness existing in some metals at temperatures below the recrystalliza- tion temperature.
COLD SHUT:	(1) A discontinuity that appears on the surface of cast metal as a result of two streams of liquid meeting and failing to unite. (2) A portion of the surface of a forging that is separated, in part, from the main body of metal by oxide.
COLD WORKS:	Permanent strain produced by an external force in a metal below its recrystallization temperature.
COLD WORKING:	Deforming metal plastically at a temperature lower than the recrystallization temperature.
COLLIMATOR (RT):	A device used to limit the size, shape, and direction of the primary radiation beam.
COLLIMATOR (UT):	A lens assembly attachment designed to reduce the ultrasonic beam spread.
COLLIMATION:	The process by which a divergent beam of energy or particles is converted into a parallel beam.
COLLOIDAL (MT):	A liquid suspension of solid particles in which the particles will not settle on standing.
COLLOIDAL SUSPEN- SION (MT, PT):	An intimate mixture of two substances, one of which, called the dispersed phase (or colloidal), is uniformly distributed in a finely divided state through the second substance, called the dispersion medium (or dispersing medium); the dispersion medium or dispersed phase may be gas, liquid, or solid. Also known as colloidal dispersion; colloidal system.

COLOR-CONTRAST DYE (PT):	A dye which can be used in a penetrant to impart sufficient color intensity to give good color contrast in indications against the background of the surface being tested, when viewed under white light.
COLOR-CONTRAST PEN- ETRANT:	A penetrant incorporating a dye - usually nonfluorescent - sufficiently intense to give good visibility to flaw indications under white light.
COLUMNAR STRUC- TURE:	A coarse structure of parallel columns of grains, having the long axis perpendicular to the casting surface.
COMBINATION DIE (DIE-CASTING):	A die having two or more different cavities for different castings.
COMBINATION SCREENS (RT):	A pair of intensifying screens in which the front screen (to be placed on the tube side of the film) is usually thinner than the back screen.
COMBINED STRESSES:	Any state of stress that cannot be represented by a single component of stress; that is, one that is more complicated than simple tension, compression or shear.
COMMERCIAL SOL- VENTS:	A liquid containing no emulsifiers and having chemical properties similar to those exhib- ited by solvents conforming to Government Specifications TT-N-97 and A-A-2904.
COMPARATIVE TEST BLOCK (see REFERENCE STANDARD):	An intentionally cracked metal block having two separate but adjacent areas for the application of different penetrants so that a direct comparison of their relative effective-ness can be obtained. Can also be used to evaluate penetrant test techniques or test conditions, or both.
COMPENSATOR:	An electrical matching network to compensate for circuit impedance differences.
COMPLETE FUSION:	Fusion that has occurred over the entire base-metal surfaces exposed for welding.
COMPOSITE FILTER (RT):	A filter of two or more materials chosen so that the longer wavelengths of a beam are readily absorbed, and within this range undesirable radiation transmission is avoided. The materials are usually arranged so that the second material filters secondary radiation produced in the first material and so on. A particular example is the "Thoraeus Filter" which consists of 0.44 mm of tin, 0.25 mm of copper and I mm of aluminum in this order in the beam of radiation.
COMPOSITE PLATE:	An electrodeposit consisting of layers of at least two different compositions.
COMPOUND:	A chemical combination of elements.
COMPRESSIONAL WAVE (UT):	Waves in which the particle motion or vibration is in the same direction as the propagated wave. Same as longitudinal wave. See LONGITUDINAL WAVES.
COMPRESSIVE STRENGTH:	The maximum stress developed in a material when located in compression. For practical purposes, the compressive yield strength is considered as the maximum compressive strength, particularly in the case of wrought metals.
COMPTON ABSORPTION (COMPTON EFFECT) (RT):	The reduction of the energy of an incident photon by its interaction with an electron. Part of the photon energy is transferred to the electron (Compton electron or recoil electron) and part is redirected as a photon of reduced energy.
COMPTON EFFECT (RT):	The glancing collision of an X-ray or gamma ray with an electron resulting in a gain of energy for the electron.
COMPTON SCATTERING (RT):	A process in which a photon transfers a portion of its energy to an orbital electron in matter and a lower energy photon is scattered at an angle to the original photon path.
COMPUTED TOMOGRA- PHY (RT):	A method by which a radiograph of a predetermined interior plane of a thick material is obtained through the use of a computer. The images resulting from a series of exposures at different angles are stored and reconstructed into a single image by the computer.
CONCAVE:	Curved or rounded and hollow as the outer boundary of a spherical or circular form viewed from within; opposite of convex.
CONCENTRATE (MT):	A term used colloquially to designate the dry magnetic materials used to prepare a suspension. Also called Dry Concentrate.

CONCENTRATION TEST (MT):	The method used to determine the quantity of magnetic material in the suspension at any given time. Also known as settling test.
CONDENSER IONIZA- TION CHAMBER (RT):	An ionization chamber which, having been charged to a certain potential, can be irradiated and subsequently attached to an electrometer to measure the residual charge, whereby the exposure is determined.
CONDUCTIVITY:	This is the inverse of resistance, and refers to the ability of a conductor to carry current.
CONDUCTIVITY REFER- ENCE STANDARD (ET):	Sections of metallic materials with accurately measured electrical conductivity values in percent IACS. These standards are used to calibrate conductivity measuring eddy current instruments.
CONE (RT):	A lead diaphragm or cone placed on the tube head to limit the X-ray beam to a volume defined by a cone.
CONSTANT-POTENTIAL CIRCUIT:	A circuit, which is so, arranged to apply and maintain a substantially constant potential across an X-ray tube.
CONSTANT VOLTAGE (CONSTANT POTENTIAL) (RT):	A unidirectional voltage of essentially constant magnitude.
CONSTRAINT:	Any restriction that occurs to the transverse contraction normally associated with a longi- tudinal tension, and that hence causes a secondary tension in the transverse direction.
CONTACT HEAD (MT):	Electrode assembly used to clamp and support a part to facilitate passage of electrical current through the part for circular magnetization.
CONTACT METHOD (UT):	The inspection method in which the search unit face makes direct contact with the test part and ultrasonic energy is transmitted through a thin film of couplant.
CONTACT PADS (MT):	Replaceable metal pads, usually copper braid, placed on the contact heads to give good electrical contact, thereby reducing the possibility of damage to the part by arcing or burning.
CONTACT TESTING (UT):	Testing with transducer assembly in direct contact with material through a thin layer of couplant.
CONTACT TRANSDUCER:	A transducer that is coupled to a test surface either directly or through a thin film of couplant.
CONTAINER, GAMMA- RAY SOURCE (RT):	A device for housing radionuclides and giving a required degree of protection against radiation. (This may take the form of an exposure device or a storage container.)
CONTAMINATION (PT, MT):	Any material in the wet suspension other than the liquid vehicle and the magnetic material being used. This could be shop dust, lint, soil from improperly cleaned parts, oil, etc.
CONTAMINATION (RT):	The presence of unwanted radioactive matter, or the "Soiling" of object or materials with "Radioactive Dirt."
CONTINUOUS METHOD (MT):	The method in which the inspection medium is applied while the magnetizing current is on.
CONTINUOUS SPEC- TRUM (RT):	The characteristic radiation pattern that exhibits energies for an unbroken series of fre- quencies over a wide range.
CONTINUOUS WAVE (UT):	Steady generation of ultrasonic energy; opposite of pulsed.
CONTINUOUS WEDGE (RT):	A wedge, the thickness of which varies continuously.
CONTRACTED SWEEP (UT):	A contraction of the horizontal sweep line or time axis on the viewing screen of the ultrasonic instrument. A contraction of this sweep permits viewing defect or back reflection occurring over a greater length of time.

CONTRAST AGENT (RT):	Any suitable substance, solid, liquid, or gas, applied to a material being radiographed, to enhance its contrast in total or in part.
CONTRAST RATIO (PT, MT):	The relative amount of light emitted or reflected as between an indication and its back- ground.
CONTRAST RATIO (RT):	The relative amount of light emitted or reflected as between an indication and its back- ground.
CONTRAST (MT, PT, RT):	The difference in visibility between an indication and the surrounding surface.
CONTRAST, FILM (RT):	Change in density that results from a given change in incident radiation. Determined from the slope of the characteristic curve. See FILM GAMMA.
CONTRAST, RADIO- GRAPHIC (RT):	The difference in density between an image and its immediate surroundings on a radio- graph.
CONTRAST, SUBJECT (RT):	The ratio (or logarithm of the ratio) of the radiation intensities transmitted by selected portions of the specimen.
CONTROL ECHO (UT):	Reference signal from constant reflecting surface, such as the back reflection from a smooth, regular back surface.
CONTROL PANEL (RT):	A console or unit that contains the controls necessary to operate a radiation source and any ancillary equipment used for radiography.
CONTROLLED AREA (RT):	A defined area in which the occupational exposure of personnel to radiation or to radioac- tive material is under the supervision of an individual in charge of radiation protection. (This implies that a controlled area is one that requires control of access, occupancy, and working conditions for radiation protection purposes.)
CONVEX:	Curved or rounded as the exterior of a spherical or circular form viewed from without; opposite of concave.
COOLIDGE TUBE (RT):	An X-ray tube in which the source of the bombarding electrons is a heated filament in the cathode.
COOLING CRACK:	See CRACKS, COOLING.
COOLING STRESSES:	Residual stresses resulting from non-uniform distribution of temperature during cooling.
CORE (MT):	In reference to an electromagnetic inspection, it is a laminated steel conductor located within the electrical winding of a hand-held yoke or probe. Also, laminated steel conductor used in conjunction with a magnetizing coil to produce a stronger collapsing field in induced current magnetization of ring-shaped parts.
CORNER EFFECT (UT):	The strong reflection obtained when an angle beam is directed normal to the intersection of two perpendicular reflectors.
CORONA:	In spot welding, an area sometimes surrounding the nugget at the faying surfaces, contrib- uting slightly to overall and strength.
CORROSION:	The deterioration of a metal by chemical or electrochemical reaction with its environment or other material.
CORROSION EMBRIT- TLEMENT:	The severe loss of ductility of a metal, resulting from corrosive attack, usually intergranular and often not visually apparent.
CORROSION FATIGUE:	Effect of the application of repeated or fluctuating stresses in a corrosive environment characterized by shorter life than would be encountered as a result of either the repeated or fluctuating stresses alone or the corrosive environment alone.
COULOMB:	A unit of electric charge in the "practical" system of units. It contains 3×10^9 electrostatic units (see ESU) of charge.
COUPLANT (UT):	A substance (usually liquid) used between the search unit and test part to permit or improve transmission of ultrasonic energy into the test part.
COUPLING (ET):	An interaction between systems or between properties of a system.

CRACK:	A discontinuity that has a relatively large cross-section in one direction and a small or negligible crosssection when viewed in a direction perpendicular to the first.
CRACKS COLD:	A crack, which occurs in a casting after solidification, due to excessive strain generally resulting from non-uniform cooling.
CRACK CONTAMINANT:	Material which fills a crack and which may prevent penetrants from entering.
CRACKS COOLING:	In bars of alloy or tool steels, are the result of uneven cooling after rolling and usually are deep in a longitudinal direction, but are not straight.
CRACKS, FATIGUE:	Progressive cracks which develop in the surface caused by the repeated loading and unloading of the part, or by what is called reverse bending.
CRACKS, FORGING:	Cracks developed in the forging operation due to forging at too low a temperature, resulting in rupturing of the steel.
CRACKS, GRINDING:	Thermal cracks due to local over-heating of the surface being ground, generally caused by lack of coolant, improper coolant, dull wheel, too rapid a feed, or too heavy a cut.
CRACKS, HEAT TREAT- ING:	See CRACKS, QUENCHING.
CRACKS, HOT:	Same as CRACKS, COLD, but developing before the casting has completely cooled.
CRACKS, MACHINING:	A surface defect generally called machining tear and caused by too heavy a cut, a dull tool, chatter, or dragging the tool over the metal when not cutting cleanly.
CRACKS, NOT OPEN:	Indications which are difficult to discern or prove upon the use of contrast penetrant inspection techniques.
CRACKS, OPEN:	Those flaws which can be detected by contrast penetrant inspection techniques.
CRACKS, PICKLING:	Cracks caused by the release of internal stresses due to metal removal by immersion in acid or chemical solutions.
CRACKS, PLATING:	A crack developed by the plating process, usually occurring in parts having high internal stresses.
CRACKS, QUENCHING:	Ruptures produced in the tempering of metal, due to uneven cooling and contracting of one portion of a part.
CRACKS, SERVICE:	Ruptures that occur on a part after all fabrication has been completed and the part placed in service. Failure may be due to fatigue, corrosion, overstressing, or undetected process- ing discontinuities.
CRATER:	(1) In machining, a depression in a cutting tool face eroded by chip contact. (2) In arc welding, depressions at the termination of a bead or in the weld pool beneath the electrode.
CREEP:	Time-dependent strain occurring under stress. The creep strain occurring at a diminishing rate is called primary creep; that occurring at a minimum and almost constant rate, secondary creep; that occurring at an accelerating rate, tertiary creep.
CREEP STRENGTH:	(1) The constant nominal stress that will cause a specified quantity of creep in a given time at constant temperature. (2) The constant nominal stress that will cause a specified creep rate at constant temperature.
CREVICE CORROSION:	A type of concentration cell corrosion; corrosion of a metal that is caused by the concen- tration of dissolved salts, metal ions, oxygen or other gases, and such, in crevices or pockets remote from the principal fluid stream, with a resultant building up of differential cells that ultimately cause deep pitting.
CRITICAL ANGLE (UT):	The angle of the incident sound beam with respect to the normal to an interface, beyond which a given mode of refracted beam will not exist.

CRITICAL SIZE:	The established flaw size deemed to be detrimental to the serviceability of the product criteria. The acceptance/rejection levels established by design engineering required limits to meet design performance.	
CROSS TALK (UT):	The signal leakage (acoustical or electrical) across an intended barrier, such as signal leakage between the transmitting and receiving transducer elements of a dual search unit.	
CRT:	Abbreviation for cathode ray tube.	
CRYSTAL (UT):	See TRANSDUCER ELEMENT.	
CRYSTAL MOSAICS (UT):	Two or more crystals mounted in the same plane in one holder and connected so as to cause all crystals to vibrate as one unit.	
CRYSTALS (X-CUT) (UT):	Section cut so that its thickness is parallel to the X-axis of the crystal. A thickness- extensional mode of vibration occurs when excited.	
CRYSTALS (Y-CUT) (UT):	Section cut so that its thickness is parallel to the Y-axis of the crystal. A thickness- shear mode of vibration occurs when excited.	
CRYSTALS (Z-CUT) (UT):	Section cut 50 that its thickness is parallel to the Z-axis of the crystal. Piezoelectric effect is restricted to the X and Y-axis; therefore mode of vibration is width-extensional.	
C-SCAN (UT):	A data presentation method generally applied to pulse echo techniques yielding a two dimensional plan view of the scanned surfaces of the part. Through gating, only echoes arising from the interior of the test object are indicated. In the C-scan no indication is given of the echo depth.	
CUMULATIVE DOSE (RA- DIATION) (RT):	The total dose resulting from repeated exposure to radiation of the same region or of the whole body.	
CUPOLA:	A cylindrical vertical furnace for melting metal, especially gray iron, by having the charge come in contact with the hot fuel, usually metallurgical coke.	
CURIE (RT):	A unit of measure to express the rate at which a radioactive material decays. It is defined as that quantity of any radioactive material in which 3.7×10^{10} disintegrations per second are occurring. Under the new International System (SI) of Units, the curie will be replaced by disintegrations per second (1 Curie = 3.70×10^{10} disintegrations per second).	
CURIE POINT (MT):	The temperature at which ferromagnetic materials become nonmagnetic and can no longer be magnetized by outside sources. The range of temperatures is 1200°F-1600°F.	
CURRENT:	The flow of electrons through a conductor. It is measured in amperes, milliamperes or microamperes.	
CURRENT FLOW METH- OD (MT):	See CIRCULAR MAGNETIZATION.	
CURRENT INDUCTION METHOD (MT):	See INDUCED CURRENT MAGNETIZATION.	
CYANIDING:	Introducing carbon and nitrogen into a solid ferrous alloy by holding at a temperature above Acl in contact with molten cyanide of suitable composition. The cyanided alloy is usually quench hardened.	
CYCLOTRON:	A particle accelerator in which the atomic particles are whirled around in a spiral between the ends of a huge magnet gaining speed with each rotation. The cyclotron is normally used for nuclear research but the particles can be made to collide with a target to produce X-rays.	
D		
D:	Symbol for diameter.	
d:	Symbol for distance.	

d/t RATIO:	The working distance for the X-ray tube in relation to the film distance. The working distance, d, and the specimen thickness, t, are both measured with reference to the source side of the specimen.
DAC:	Abbreviation for distance amplitude correction; also used to denote electronic distance amplitude correction on some instruments.
DAMPING:	Hindering or decreasing the time of vibrations or oscillations in the motion of a body or in an electrical system subjected to influences which are capable of causing vibration or oscillation. Compare with attenuation.
DAMPING (UT):	Limiting the duration of and/or decreasing the amplitude of vibrations, as in damping of a transducer element; also designates a bond inspection method in which good bonds are verified by damping ultrasonic energy transmitted to the back surface.
DAMPING CAPACITY:	The ability of a metal to absorb vibration (cyclical stresses) by internal friction converting the mechanical energy into heat.
DAMPING MATERIAL (UT):	Material contained within a search unit in back of the transducer element and used for damping.
DARK ADAPTION:	The ability of the eye to adjust so that objects, lights, or colors can be seen in darkened areas. This is important when performing a fluorescent penetrant, fluorescent magnetic particle inspections or when interpreting radiographic film.
dB:	Abbreviation for decibel.
DC (DIRECT CURRENT):	An electrical current that flows continually in one direction through a conductor.
DEAD ZONE:	Zone in the test part directly underneath the sound entry surface where discontinuities cannot be detected; caused by the finite length of the initial pulse, ringing time of the transducer element, and/or electronic characteristics of the instrument.
DECALESCENCE:	A phenomenon, associated with the transformation of alpha iron to gamma iron on the heating (superheating) of iron or steel, revealed by the darkening of the metal surface owing to the sudden decrease in temperature caused by the fast absorption of the latent heat or transformation.
DECARBURIZATION:	The loss of carbon from the surface of a ferrous alloy as a result of heating in a medium that reacts with the carbon at the surface.
DECAY (MT):	The falling off to zero of the current in an electrical circuit. Magnetic fields can also decay in a similar manner. This is important in demagnetization.
DECAY (RT):	Spontaneous change of a nucleus with emission of a particle or a photon. For a definite quality of a nuclide, the rate of decay is usually expressed in terms of half-life.
DECAY CURVE (RT):	A graph showing radioactive strength in curies as a function of time for an isotope. Such curves are used in radiography to determine the compensation or correction for exposure time in selecting exposure conditions.
DECIBEL:	Logarithmic expression of a ratio of two amplitudes; abbreviation is dB. dB -20 log $_{10}$ (A2/Al), where Al and A2 are amplitudes.
DECONTAMINATION (RT):	The removal of radioactive contaminants from surfaces by cleaning and washing with chemicals.
DECONTAMINATION FACTOR (RT):	The ratio of the amount of radioactive contaminant initially present to the amount remain- ing after a suitable processing step has been completed. A factor referring to the reduction of the gross measurable radioactivity.
DEEP-DOSE EQUIVA- LENT:	Applies to whole-body exposure, is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm ²)
DEEP ETCHING:	Severe etching of a metallic surface for examination at a magnification of ten diameters or less to reveal gross features such as segregation, cracks, porosity or grain flow.

DEFECT:	A discontinuity that interferes with the usefulness of a part. A fault in any material or part detrimental to its serviceability. Note that all cracks, seams, laps, etc. are not necessarily defects as they may not affect serviceability of the part in which they exist.
DEFECT DETECTION SENSITIVITY (RT):	See SENSITIVITY, DEFECT.
DEFECT ORIENTATION (PT, MT):	The position of the defect in relation to the inspection surface and the magnetic or penetrant indication.
DEFECT REFLECTION (UT):	The oscilloscope presentation of the energy returned by a rejectable flaw in the material.
DEFECT RESOLUTION:	A property of a test system which enables the separation of signals due to defects in the test specimen that are located in close proximity to each other.
DEFINITION, RADIO- GRAPHIC (RT):	Measure of sharpness in outline in the radiographic image of an object. Radiographic definition is a function of the types of screens, exposure geometry, radiation energy, and the film characteristics.
DEFINITION (RT):	A general and qualitative term that refers to the degree of distinctness of image details in a radiograph, photographic reproduction, or viewing-screen image.
DEGREASING FLUID:	Solvents or cleaners employed to remove oil and grease from the surface of components before the penetrant liquid is applied.
DELAMINATION:	An area of separation between two laminae in the finished laminate.
DELAY (UT):	See SWEEP DELAY.
DELAY COLUMN (UT):	See WATER DELAY COLUMN.
DELAY LINE (UT):	Material (liquid or solid) placed in front of the search unit to cause a time delay between the initial pulse and front surface signal.
DELAYED SWEEP (UT):	An A-scan or B-scan presentation in which an initial part of the time scale is not displayed.
DELTA EFFECT:	Acoustic energy re-radiated by a discontinuity.
DEMAGNETIZATION (MT):	The reduction in the degree of residual magnetism in ferromagnetic materials to an acceptable level.
DENDRITE:	A crystal that has a tree-like branching pattern being most evident in cast metals slowly cooled through the solidification range.
DENSITOMETER:	Instrument utilizing the photoelectric principle to determine the degree of darkening of developed photographic film. Measures optical density of films.
DENSITOMETRY (RT):	The measurement of the degree of darkening of a developed photographic/radiographic film, providing one measure of the quality of the film. Measuring the optical density of films.
DENSITY COMPARISON STRIP (RT):	Alternative term for step-wedge comparison film.
DENSITY, FILM (RT):	The degree of blackening of a film is density. Film blackening or density is usually expressed in terms of the H & D curve (Hurter & Driffield) which is defined a the logarithm of the reciprocal of the transparency of the film. $D = \text{Log I}_{o}/\text{I}_{t}$ where D density, $I_{o} = \text{Light}$ incident on the film, and $I_{t} = \text{Light}$ intensity transmitted.
DENSITY GRADIENT:	The change in density of a radiographic film at a particular film density per unit change in the logarithm of the exposure received by the film. The maximum density gradient of a film is usually called gamma.
DEOXIDIZER:	A substance that can be added to molten metal to remove either free or combined oxygen.

DEOXIDIZING:	(1) The removal of oxygen from molten metals by use of suitable deoxidizers. (2) Sometimes refers to the removal of undesirable elements other than oxygen by the intro- duction of elements or compounds that readily react with them. (3) In metal finishing, the removal of oxide films from metal surfaces by chemical or electrochemical reaction.
DEPTH OF FUSION:	The depth to which the base metal melted during welding.
DEPTH OF PENETRA- TION (MT, EC):	The depth at which the magnetic field or induced eddy currents has decreased to a specified percentage of its surface value or has reached the limit of its effectiveness. The depth of penetration is an exponential function of the frequency of the signal and the conductivity and permeability of the material.
DESCALING:	Removing the thick layer of oxides formed on some metals at elevated temperatures.
DESENSITIZATION (RT):	An effect on the emulsion of a radiographic film caused by pressure of any type exerted on the emulsion prior to exposure. A desensitized area on a film is characterized by low density in the affected area.
DETAIL:	See DEFINITION, RADIOGRAPHIC.
DETAIL SENSITIVITY (RT):	The radiographic definition or sharpness of detail as indicated by the drilled holes in a penetrameter. It is expressed by a number x-yT, where x is the thickness of the penetrameter expressed as a percentage of the nominal subject thickness, and y is the diameter of the hole expressed as a multiple of the penetrameter thickness T.
DETECTOR (RT):	A device that determines the presence of ionizing radiation.
DETERGENT REMOVER (PT):	A penetrant remover that is a solution of a detergent in water.
DEUTERIUM:	The isotope of hydrogen having one proton, one neutron, one electron, and an AMU of two.
DEVELOPER DRY (PT):	A light fluffy dry absorbent powder, applied to the part being penetrant inspected after the excess surface penetrant has been removed and the part has been dried. The "Dry" developer adheres primarily to the flaw openings wetted by the penetrant liquid, to obtain increased bleed out of the penetrant and provide sharp flaw delineations.
DEVELOPER (PT):	Material, wet or dry, which will draw or absorb penetrant from a surface crack or defect to the extent the defect will be visible under natural, artificial, or UV-A, as applicable. Developers also control the background of the high contrast penetrant color system.
DEVELOPER (RT):	A chemical solution that reduces exposed silver halide crystals to metallic silver.
DEVELOPER, NONAQUE- OUS (PT):	Absorbent powdered materials suspended in a non-aqueous liquid, used to provide a white background for maximum color contrast, and to enhance the bleed out of the penetrant from the flaw cavity to obtain increased accuracy of penetrant inspection.
DEVELOPER, SOLUBLE (PT):	A developer completely soluble in its carrier, not a suspension of powder in a liquid, which dries to an absorptive coating.
DEVELOPER, SOLVENT:	A developer consisting of fine particles suspended in a volatile solvent. The volatile solvent helps dissolve the penetrant out of the discontinuity and bring it to the surface.
DEVELOPER, WET (PT):	An absorbent powder supplied in the dry form to be mixed and suspended in water for application to the part being penetrant inspected, after the excess surface penetrant has been removed. The "Wet" developer, on drying, provides an absorbent white background to the part for maximum color contrast, and enhances the bleed out of the penetrant from the flaw cavity to obtain increased inspection accuracy.
DEVELOPING AGENT (RT):	The constituent of a developer that reduces sufficiently exposed silver halide grains to metallic silver at a greater rate than unexposed or insufficiently exposed grains.
DEVELOPING TIME (PT):	The elapsed time necessary for the applied developer to bring out indications from pene- trant entrapments. Usually one-half the penetrant dwell time.

DEVELOPMENT (RT):	The conversion of a latent image into a visible image by treatment of the film emulsion with a suitable chemical solution (developer).
DEVELOPMENT STAN- DARD	A development standard is an article used in the development of a new inspection procedure. It may have the characteristics of a calibration standard, a reference standard, or a reference specimen; but is often different in that it may have simulated defects of more sizes and in more locations than the final working standard.
DEZINCIFICATION:	Corrosion of some copper-zinc alloys involving loss of zinc and formation of a spongy porous copper.
DIAMAGNETIC:	A material that has less magnetic permeability than a vacuum. Although diamagnetic materials have relative magnetic permeabilities slightly less than 1, the amount of difference is insignificant in eddy current testing and diamagnetic material are classified as nonmagnetic with a relative permeability of 1.
DICHROIC FOG (RT):	Fog caused by the deposition of a very thin layer of finely divided silver on an emulsion, which when examined in white light, appears in two colors, red by transmission and green by reflection.
DIE:	Various tools used to impart shape to material primarily because of the shape of the tool itself. Examples are blanking dies, cutting dies, drawing dies, forging dies, punching dies, and threading dies.
DIE CASTING:	(1) A casting made in a die. (2) A casting process where molten metal is forced under high pressure into the cavity of a metal mold.
DIE FORGING:	A forging whose shape is determined by impressions in specially prepared dies.
DIE LINES:	Lines or markings on formed, drawn or extruded metal parts caused by imperfections in the surface of the die.
DIFFERENTIAL COILS (ET):	Two or more coils electrically connected in series opposition such that any electromagnet- ic condition which is not common to the areas of the specimen being tested or the test specimen and the standard will produce an unbalance in the system and thereby be detected.
DIFFERENTIAL MOT- TLING (RT):	Minor irregularities in the distribution of density over the whole of the radiograph.
DIFFERENTIAL SENSING:	A method of measuring eddy current response in which two coils are used to determine relative variations between two sections of material. These two sections may be two separate pieces of material (one a standard, the other the test material).
DIFFRACTION (RT):	The scattering of incident radiation from the regularly spaced atoms in crystals or com- plex molecules such that interference between the scattered waves results in a pattern of maxima and minima in the intensity of the scattered radiation.
DIFFRACTION (UT):	The deflection of a wave front when passing the edges of an obstacle.
DIFFRACTION MOTTLE (RT):	A superimposed mottle or pattern on an image due to diffraction of certain wavelengths in the incident beam, caused by tile size and orientation of the crystals of the material through which they have passed.
DIFFRACTION MOT- TLING:	A diffuse diffraction pattern on a radiograph resulting from X-raying thin sections of crystalline material.
DIFFUSE INDICATIONS (MT):	Indications of some sub-surface indications that are broad, fuzzy, feathery and are not clearly defined.
DIFFUSE REFLECTION (UT):	Rough surface or associate interface reflection of ultrasonic waves from irregularities of the same order of magnitude or greater than the wavelength.
DIFFUSION:	(1) Spreading of a constituent in a gas, liquid or solid, tending to make the composition of all parts uniform. (2) The spontaneous movement of atoms or molecules to new sites within a material.

DIGGING:	A sudden erratic increase in cutting depth or in the load of a cutting tool caused by unstable conditions in the machine setup. Usually, the machine is stalled or either the tool or the workpiece is destroyed.
DIMENSIONAL STABILI- TY:	Refers to the ability of an alloy to remain unchanged in size or shape after aging.
DIMPLING:	(1) Stretching a relatively small, shallow indentation into sheet metal. (2) In aircraft, stretching metal into a conical flange for the use of a countersunk head rivet.
DIP RINSE (PT):	A means of removing excess penetrant in which the test parts are dipped into an agitated tank of water or remover.
DIRECT CURRENT:	Electric current flowing continuously in one direction through a conductor. Such current is frequently referred to as DC.
DIRECT FILM (RT):	See NON-SCREEN FILM.
DIRECTIONAL PROPER- TIES:	Properties whose magnitude varies depending on the relation of the test axis to the specific direction within the metal. The variation results from preferred orientation or from fibering of constituents or inclusions.
DISBOND:	An area within a bonded interface between two adherends in which an adhesion failure or separation has occurred. It may occur at any time during the life of the structure and may arise from a wide variety of causes.
DISCERNABLE IMAGE:	Image capable of being recognized by sight without the aid of magnification; corrected vision excepted.
DISCONTINUITY:	An interruption in the normal physical structure or configuration of a part such as cracks, laps, seams, inclusions, porosity. A discontinuity may or may not affect the usefulness of a part. See DEFECT.
DISINTEGRATION, NU- CLEAR:	A spontaneous nuclear transformation (radioactivity) characterized by the emission of energy and/or mass from the nucleus.
DISLOCATION:	A linear defect in a crystal or lattice of a material. The two basic types are edge and screw.
DISPERSANT (PT):	A substance for promoting the formation and stabilization of dispersed particles of one substance in another.
DISPERSION, SOUND:	Scattering of rays of an ultrasonic beam as a result of reflection from a highly irregular incident surface above that normally associated with a particular transducer.
DISTANCE AMPLITUDE CORRECTION (UT):	Compensation for variance in amplitude from equal reflectors at different sound travel distances. The abbreviation is DAC. Also used to denote electronic change of amplification to provide equal amplitude from equal reflectors at different sound travel distances. Other designations for this electronic change of amplification are Swept Gain (SG), Time Corrected Gain (TCG), Time Variable Gain (TVG) and Sensitivity Time Control (STC).
DISTORTED FIELD (MT):	The direction of a magnetic field in a symmetrical object will be substantially uniform if produced by a uniformly applied magnetizing force, as in the case of a bar magnetized in a solenoid. But if the piece being magnetized is irregular in shape, the field is distorted and does not follow a straight path or have a uniform distribution.
DOSE OR RADIATION DOSE:	A generic term that means absorbed dose, dose equivalent, etc. And represents the total amount of radiation received during the applicable period of exposure.
DOSE EQUIVALENT:	The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and Sievert (Sv).
DROSS:	The scum that forms on the surface of molten metals largely because of oxidation but sometimes because of the rising of impurities to the surface.
DRY DEVELOPER (PT):	A developer powder that is applied as a dust without a liquid carrier.

DRYING OVEN (PT):	An oven used for drying rinse water from test pieces.
DRYING TIME (PT):	The time during which a washed or wet-developed part is in the hot air drying oven.
DRY METHOD (MT):	Magnetic particle inspection in which the particles are applied in a dry powder form.
DRY POWDER (MT):	Finely divided ferromagnetic particles suitably selected and prepared for magnetic particle inspection. Colors employed are usually red, gray, yellow or black.
DUAL SEARCH UNIT (UT):	A single search unit containing two transducer elements; one used as a transmitter of ultrasonic energy, the other used as a receiver of ultrasonic energy.
DUCTILE CRACK PROPA- GATION:	Slow crack propagation that is accompanied by noticeable plastic deformation and re- quires energy to be supplied from outside the body.
DUCTILITY:	The ability of a material to deform plastically without fracturing, being measured by elongation or reduction of area in a tensile test, by height of cupping in an Erichsen test or by other means.
DUPLITIZED FILM (RT):	Radiographic film that consists of a coating of photosensitivity emulsion on both sides of the tinted polyester base.
DWELL TIME (PT):	The period of time wherein the liquid penetrant remains on the surface of the part. For the immersion techniques, the period subsequent to soak and prior to wash, i.e., draining process is considered dwell time.
DYE:	The chemical component added to a penetrant vehicle to provide a characteristic color to the penetrant.
DYE PENETRANT:	Penetrant with dye added that makes it readily visible in light.
DYE STUFFS (MT, PT):	A natural or synthetic coloring matter whether soluble or insoluble that is used to color materials usually from a solution or fine dispersion and sometimes with the aid of a chemical (mordant) that serves to fix a dye in or on a substance.
DYNAMIC CREEP:	Creep that occurs under conditions of fluctuating load or fluctuating temperature.
DYNAMIC RANGE (UT):	The ratio of maximum to minimum reflective areas that can be distinguished on the cathode ray tube at a constant gain setting.
	E
ECHO:	Signal of reflected ultrasonic energy.
EDDY CURRENTS:	Currents caused to flow in an electrical conductor by the time and/or space variation of an applied magnetic field.
EDDY CURRENT INSPEC- TION OR TESTING:	A nondestructive inspection method in which eddy current flow is induced in the test object. Changes in the flow caused by the variations in the specimen are reflected into a nearby coil or coils for subsequent analysis by suitable instrumentation and techniques.
EDDY-SONIC (UT, ET):	Describes a process in which sonic or ultra-sonic energy is produced in a test part by coil on or near the surface of the test part. The coil is used to produce eddy currents in the test part. Vibrations in the test part result from the interaction of the magnetic field from the eddy currents in the test part with the magnetic field of the coil.
EDGE EFFECT (ET):	The effect on the magnetic field caused by the geometric boundaries of the test specimen. The effect is large in magnitude and similar in phase to a large crack. Also called END EFFECT.
EFFECTIVE DEPTH OF PENETRATION:	The depth within a material, under test, where the transmitted or induced energy is sufficient to detect discontinuities (determine condition of interest). EDP is approximately equal to three time's standard DOP.
EFFECTIVE FOCAL SPOT (RT):	An elongated, rectangular electron focus so angled that the focal spot size, as viewed along the X-ray beam axis, is smaller and approximately square, thereby permitting increased total area loading of the target for a given focal spot size.

ELASTIC AFTER-EFFECT:	A lagging elastic recovery, of minor proportions, following a decrease in or removal of the load.
ELASTIC CONSTANTS:	Modulus of elasticity, either in tension, compression or shear, and Poisson's ratio.
ELASTIC DEFORMATION:	Change of dimensions accompanying stress in the elastic range, original dimensions being restored upon release of stress.
ELASTIC LIMIT:	The maximum stress to which a material may be subjected without any permanent strain remaining upon complete release of stress.
ELASTICITY:	That property of a material by virtue of which it tends to recover its original size and shape after deformation.
ELECTRICAL NOISE:	Extraneous signals caused by externally radiated electrical signals or from electrical inter- ferences within the ultrasonic instrumentation.
ELECTROCHEMICAL CORROSION:	Corrosion that occurs when current flows between cathodic and anodic area on metallic surfaces.
ELECTRODE SKID:	In spot, seam or projection welding, the sliding of an electrode along the surface of the work.
ELECTROGALVANIZING:	The process of electroplating zinc on iron or steel.
ELECTROMAGNET:	A soft iron core surrounded by a coil of wire. The iron core becomes magnetic when an electric current flows through the wire.
ELECTROMAGNETIC IN- SPECTION OR TESTING (ET):	A nondestructive test method for engineering materials including magnetic materials, which use electromagnetic energy having frequencies less than those of visible light to yield information regarding the quality of test material. This term includes both eddy current testing and magnetoinductive testing.
ELECTROMAGNETIC RA- DIATION (RT):	Radiation consisting of electric and magnetic waves that travel at the speed of light. Examples: light, radio waves, gamma rays, X-rays. All can be transmitted through a vacuum.
ELECTROMAGNETIC SPECTRUM:	The wavelength range of the various forms of electromagnetic radiation.
ELECTROMOTIVE FORCE (EMF):	The work or energy that causes the flow of an electric current. Expressed as volts. It should be noted that the term "force" is a misnomer. However, the term is so well established that its use continues in spite of its being incorrect.
ELECTRON:	One of the fundamental constituents of atoms. The electron is a very small negatively charged particle with a rest mass of approximately $1/1836$ that of the hydrogen atom, or 9.107×10^{-28} gm. It has an electric charge of 4.802×10^{-10} statcoulomb (the electrostatic unit of charge). Electrons appear to be uniform in mass and charge.
ELECTRON CAPTURE (RT):	A mode of radioactive decay in which a bound electron is captured by the nucleus of the same atom, producing a vacancy in an inner emission of characteristic X-rays or auger electrons.
ELECTRON FOCUS (RT):	The surface of the intersection of the electron beam and the anode of the X-ray tube.
ELECTRON GUN (RT):	A device in which electrons (usually liberated from a hot filament) are focused and accelerated, and from which they are emitted as a narrow beam.
ELECTRON PAIR (RT):	An electron and a positron resulting from pair production.
ELECTRON RADIOGRA- PHY (RT):	The process whereby a photographic image of an object is produced by electron radiation that has penetrated through the object.
ELECTRON VOLT:	A unit of energy commonly used to express the energy of X-rays. One electron volt is the energy gained by an electron when it is accelerated by a potential difference of 1 volt (1 $eV = 1.60210 \text{ x } 10^{-19}$ joule - SI).

ELECTROPLATING:	Electrodepositing metal in an adherent method upon a metal object serving as a cathode. Examples would be nickel chromium and cadmium deposits. Thicknesses under 0.005 do not interfere with magnetic particle inspection.
ELECTROSTATIC SPRAY- ING (PT):	A technique of spraying wherein the material being sprayed is given a high electrical charge, while the test piece is grounded.
ELEMENT:	One of the 118 known chemical substances that cannot be divided into simpler substances by chemical means. Examples: hydrogen, lead, and uranium.
ELEMENTARY PARTI- CLE:	Originally a term applied to any particle that could not be further subdivided; now applied only to protons, electrons, neutrons, antiparticles, and strange particles, but not to alpha particles and deuterons.
ELONGATION:	In tensile testing, the increase in the gage length, measured after fracture of the specimen within the gage length, usually expressed as a percentage of the original gage length.
EMBRITTLEMENT:	Reduction in the normal ductility of a metal due to a physical or chemical change.
EMBRYO/FETUS:	The developing human organism, from conception until the time of birth.
EMISSIVITY:	The energy emission rate usually expressed as r/c/hr @ 1 ft or mR/mc/hr @ 1 ft.
EMULSIFICATION (PT):	The process of dispersing one liquid in a second immiscible liquid; the largest group of emulsifying agents are soaps, detergents, and other compounds, whose basic structure is a paraffin chain terminating in a polar group.
EMULSIFICATION TIME (PT):	The time allowed for the emulsifier to act on the penetrant before the part is washed, after emulsifier is applied as a separate step.
EMULSIFIER (PT):	A liquid agent that must be applied to the non-water washable penetrant after the proper dwell time has elapsed to permit water rinsing. This requires an additional step and a period of time must be allowed for the combining to occur. A suspension of one liquid phase in another.
EMULSIFIER-REMOVER (PT):	A type of solvent that can be rinsed off with water after it is applied or used as a solvent wipe remover.
EMULSIFICATION TIME (PT):	Time required for the emulsifying agent to combine with the penetrant. This is critical as insufficient time will result in failure to remove the penetrant and lead to false indica- tions, and too long a time may remove the penetrant from the flaws. Emulsification time usually ranges from 30 seconds to 5 minutes.
EMULSION (RT):	The gelatinous substance in which fine grains of silver halides are dispersed. The emul- sion is coated on a base, usually polyester, and contains the image forming substance of a radiographic film.
EMULSION FOG (RT):	The slight density in an unexposed area of the film due to a small number of silver bromide crystals developing spontaneously. Film speed and improper processing or stor- age will affect emulsion fog. Safelight, white light, or radiation fog is not considered part of emulsion fog.
ENCAPSULATION:	The process of sealing radioactive materials to prevent contamination.
ENCIRCLING COIL (MT, ET):	Coil(s) or coil assembly which surrounds the part to be tested. Coils of this type are also referred to as annular, circumferential, or feed-through coils.
END EFFECT (ET, MT):	The effect on the magnetic field caused by the geometric boundaries of the test specimen that makes it impractical to apply electromagnetic test methods to the associated regions of the test specimen; also called EDGE EFFECT.
ENDURANCE LIMIT:	A value used to measure the load-carrying ability of a metal subjected to infinitely repeated loading. It is determined from the S-N curve as the stress at which the curve becomes parallel to the N axis, i.e.; it projects to an infinite number of cycles of stress without failure.
ENDURANCE RATIO:	Same as FATIGUE RATIO.

ENERGY, RADIOGRAPH-IC (RT):	The energy of X-radiation is generally expressed in multiples of the electron volt $(1,000,000 \text{ eV} = 1,000 \text{ KeV} = 1 \text{ MeV}).$
EQUIAXED GRAIN STRUCTURE:	A structure in which the grains have approximately the same dimensions in all directions.
EQUI-OPAQUE SUB- STANCE (RT):	A material having radiation absorption similar to that of the specimen, applied along its edges or in its cavities in order to obtain homogeneous absorption and thereby avoid local overexposure of the film.
EQUIVALENT PENE- TRAMETER SENSITIVITY (RT):	The thickness of penetrameter, expressed as a percentage of the part thickness, in which the 2T hole would be visible under the same radiographic conditions.
EROSION:	Destruction of metals or other materials by the abrasive action of moving fluids usually accelerated by the presence of solid particles or matter in suspension. When corrosion occurs simultaneously, the term erosion-corrosion is often used.
ET:	Symbol for eddy current method of nondestructive testing/inspection.
ETCH CRACKS:	Shallow cracks in hardened steel, containing high residual surface stresses, produced on etching in an embrittling acid.
ETCHING:	Subjecting the surface of a metal to preferential chemical or electrolytic attack in order to reveal structural details.
EUTECTIC ALLOY:	The composition in a binary alloy system that melts at the lowest temperature. More than one eutectic composition may occur in a given alloy system consisting of more than two metals.
EUTECTIC MELTING:	Melting of localized micro areas whose composition corresponds to that of the eutectic in the system.
EVALUATION:	The process of deciding as to the severity of the condition after the indication has been interpreted. Evaluation leads to the decision as to whether the part must be rejected, salvaged or may be accepted for use.
EXFOLIATION:	A type of corrosion that progresses approximately parallel to the outer surface of the metal, causing layers of the metal to be elevated by the formation of corrosion product.
EXPANDED SWEEP (UT):	An expansion of the horizontal sweep line or time axis on the viewing screen of the ultrasonic instrument. This permits, when used in conjunction with the sweep delay, to more closely scrutinize any portion of the pattern.
EXPOSURE (RT):	The product of the X-ray intensity as measured by filament current in milliamperes and time in seconds or minutes for X-rays, or the product of source strength in curies and time in seconds or minutes for gamma rays. The exposure factor determines the degree of film blackening as long as the reciprocity law is valid. See RECIPROCITY LAW and RECIPROCITY LAW FAILURE.
EXPOSURE CHART (RT):	A graph showing the relation between material thickness, kilovoltage, and exposure. It is only adequate for determining exposure time for a uniform thickness of material.
EXPOSURE DEVICE (RT):	A shield in the form of a package designed to contain and allow the controlled use of one or more sealed sources for the purpose of making radiographic exposures.
EXPOSURE FACTOR (RT):	A quantity that combines milliamperage or source strength, time, and distance. Numeri- cally, the exposure factor is the product of milliamperage and time divided by distance squared for X-rays and the product of curies and time divided by distance squared for gamma rays.
EXPOSURE FOG (RT):	Fog caused by any unwanted exposure of a film to ionizing radiation or light, at any time between manufacture and final fixing.
EXPOSURE LATITUDE (RT):	The range of thickness of a specified material that corresponds to the range of useful film densities.

EXPOSURE METER (RT):	An instrument for measuring exposure (radiation quantity).
EXPOSURE RATE (RADI- ATION QUANTITY) (RT):	The exposure unit time. Special unit: roentgens per second.
EXPOSURE RATE METER (RT):	An instrument for measuring exposure rate (radiation quantity).
EXPOSURE TABLE (RT):	A table giving the radiographic exposures suitable for the different thicknesses of a specified material.
EXTERNAL DISCONTI- NUITIES:	Surface irregularities that cause density variations on a radiograph. These are observable with the naked eye.
EXTERNAL DOSE:	The portion of the dose equivalent received from radiation sources outside the body.
EXTREMITY:	Means hand, elbow, and arm below the elbow; foot, knee, and leg below the knee.
EXTRUSION:	Conversion of a billet into lengths of uniform cross section by forcing the plastic metal through a die orifice of the desired cross-sectional outline.
EXTRUSION DEFECT:	A defect of flow in extruded products caused by the oxidized outer surface of the billet flowing into the center of the extrusion. It normally occurs in the last 10 to 20% of the extruded bar. Also called "pipe" or "core."
EXUDED (PT):	To ooze out slowly in small drops through openings; to flow slowly out.
EYE DOSE EQUIVALENT:	Applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeters (300-mg/ cm^2) .
	F
f:	Symbol for frequency.
FALSE INDICATIONS:	See NON-RELEVANT INDICATIONS.
FALSE INDICATIONS (MT):	An indication of magnetic particles on the part held by gravity or surface roughness. It is neither caused nor held in place by leakage field.
FAMILY CONCEPT (PT):	See SYSTEM CONCEPT. The term "Family Concept" has been changed to "System Concept" to comply with DOD standardization requirements. The two terms have the same meaning.
FAMILY (PT):	A family of materials refers to the entire series of materials supplied by one manufacturer, necessary to perform a specific type or process of inspection.
FAR FIELD (UT):	Sound beam zone in which equal reflectors give signals of exponentially decreasing amplitude with increasing distance; zone beyond the near field; also known as the FRAUNHOFER ZONE.
FAST FILM:	Radiographic film that has inherent graininess characteristics of a coarse nature intended to increase the relative film speed.
FATIGUE:	The progressive fracture of a material that begins at a defect and increases under repeated cycles of stress. Fatigue fractures are progressive, beginning as minute cracks that grow under the action of the fluctuating stress.
FATIGUE CRACKS:	See CRACKS, FATIGUE.
FATIGUE LIFE:	The number of cycles of stress than can be sustained prior to failure for a stated test condition.
FATIGUE LIMIT:	The maximum stress below which a material can presumably endure an infinite number of stress cycles. If the stress is not completely reversed, the value of the mean stress, the minimum stress or the stress ratio should be stated.
FATIGUE RATIO:	The ratio of the fatigue limit for cycles of reversed flexural stress to the tensile strength.
FATIGUE STRENGTH:	Maximum stress that a metal will withstand without failure for a specified number of cycles of stress.

FATIGUE STRENGTH RE-DUCTION FACTOR (Kf): The ratio of the fatigue strength of a member or specimen with no stress concentration to the fatigue strength with stress concentration. Kf has no meaning unless the geometry, size and material of the member or specimen and stress range are stated.

FAYING SURFACE: The surface of a piece of metal (or a member) in contact with another to which it is or is to be joined.

FBH: Abbreviation for flat bottom hole.

FERRITE BANDING: Parallel bands of free ferrite aligned in the direction of working. Sometimes referred to as ferrite streaks.

FERROMAGNETIC MATE-RIAL: Materials that are strongly attracted by a magnetic field. Iron, steel, nickel, and cobalt are included in this category. Permeability is much greater than one, and is effected by the applied magnetic field. Such materials exhibit hysteresis behavior.

FERROUS METALS: Containing iron, such as steel, stainless steel and cast iron.

FFD (RT): Film focal distance; distance between film and tube target.

FIBER (FIBRE): (1) The characteristic of wrought metal that indicates Directional Properties and is revealed by the etching of a longitudinal section or is manifested by the fibrous or woody appearance of a fracture. It is caused chiefly by the extension of the constituents of the metal, both metallic and nonmetallic, in the direction of working. (2) The pattern of preferred orientation of metal crystals after a given deformation process, usually wiredrawing.

FIBROUS FRACTURE: A fracture where the surface is characterized by a dull gray or silky appearance. Contrast with crystalline fracture.

FIBROUS STRUCTURE: (1) In forgings, a structure revealed as laminations, not necessarily detrimental, on an etched section or as a ropy appearance on a fracture. It is not to be confused with the "silky" or "ductile" fracture of a clean metal. (2) In wrought iron, a structure consisting of slag fibers embedded in ferrite. (3) In rolled steel plate stock, a uniform, fine-grained structure on a fractured surface, free of laminations or shale-type discontinuities. As contrasted with part (1) above, it is virtually synonymous with "silky" or "ductile" fracture.

FIELD, BIPOLAR (MT): A longitudinal field within a part having two poles.

FIELD, CIRCULAR (MT): The magnetic field surrounding any magnetic conductor or part resulting from the current being passed through a central conductor or the part.

FIELD COIL (ET): The coil generating the magnetic field that produces eddy currents in the part being tested.

FIELD INDICATOR (MT): A device for indicating the amount of magnetism in a part.

FIELD, LEAKAGE (MT): The field that leaves or enters the surface of a part at a discontinuity or change in section configuration.

FIELD, LONGITUDINAL A field created by a coil shot or cable wrap and in which the flux lines traverse the part (MT): essentially parallel with its longitudinal axis. A localized field, on the surface of a part, traversing from one leg of a yoke or probe to the other.

FIELD, MAGNETIC (MT): The space within and surrounding a magnetized part or a conductor carrying current in which magnetic lines of force exists.

FIELD, RESIDUAL (MT): The magnetism that remains in a piece of magnetizable material after the magnetizing force has been removed.

FIELD, RESULTANTThe magnetic field resulting when two or more magnetizing forces, operating in different
directions, are applied to ferromagnetic materials.

FILAMENT (RT): The source of electrons in a hot-cathode tube. It is usually a heated wire.

FILAMENT TRANSFORM- ER (RT):	A transformer supplying power to heat the filament of a hot-cathode. The primary and secondary windings must be sufficiently insulated to withstand the peak potential difference between the cathode and earth.
FILLED CRACK:	A crack-like discontinuity, open to the surface, but filled with some foreign material - oxide, grease, etc which tends to prevent penetrants from entering.
FILLET:	Radius imparted to the inside of two meeting surfaces.
FILL FACTOR (MT):	The square of the ratio of the diameter of a part to the diameter of one encircling coil(s). The square of the ratio of the internal coil diameter to the bore diameter for internal probes. The fill factor is a measure of coupling between the encircling or internal coil and the test object.
FILM BADGE (RT):	A piece of masked radiographic film worn in the form of a badge that is used to measure exposure. The amount of exposure is determined from the degree of film blackening.
FILM BASE (RT):	A flexible, transparent, or translucent material that is coated with a photosensitive emul- sion.
FILM CLEARING TIME (RT):	See CLEARING TIME.
FILM CONTRAST (RT):	See CONTRAST, FILM.
FILM DENSITY (RT):	See DENSITY, FILM.
FILM GAMMA (RT):	Term used to describe the amplification factor of a radiographic film, equal to the absolute slope of the characteristic curve.
FILM GRAININESS (DI- RECT X-RAY EXPO- SURES) (RT):	The visual impression of irregularity of density, in areas where exposure is macroscopi- cally uniform, due to the random spatial distribution of X-ray quanta absorbed in the film. In general, fast films exhibit greater graininess than slow films.
FILM HOLDER (RT):	A light-tight carrier for films and screens.
FILM ILLUMINATOR (RT):	A device incorporating a suitable source of illumination for viewing radiographs or other transparencies.
FILM LATITUDE (RT):	Latitude refers to the exposure range within which a satisfactory radiograph is produced. Films which have the widest latitude are those which have the lowest film gradient and therefore the lowest film contrast.
FILM PROCESSING (RT):	See PROCESSING, FILM.
FILM, RADIOGRAPHIC (RT):	A photographic film that is usually coated on both sides with an emulsion designed for use with X-rays and gamma rays.
FILM SPEED (RT):	A measure of the rate at which a film responds to a given amount of radiation. Slower films require a longer period of time to reach the same film density than a fast film under the same exposure conditions.
FILM UNSHARPNESS (RT):	See UNSHARPNESS.
FILM VIEWER (RT):	See FILM ILLUMINATOR.
FILTER (RT):	A layer of absorptive material which is placed in the beam of radiation for the purpose of absorbing rays of long wavelengths to control the quality of the radiograph.
FILTERS (UT, ET):	Filters are electrical circuits designed to eliminate various frequencies from a circuit output or input. Filter may be low pass (high frequencies suppressed), high pass (low frequencies suppressed) or band pass (frequencies outside a specified range suppressed).
FILTRATION:	See INHERENT FILTRATION.
FILTRATION (RT):	The use of a filter to alter the characteristics of a radiation beam.

FINE CRACK:	A discontinuity in a solid material with a very fine opening to the surface, but possessing length and depth greater than the width of this opening; usually depth is many times the width.
FINISH:	(1) Surface condition, quality or appearance of a metal. (2) Stock on a forging to be removed when finish machined.
FIRE SCALE:	Oxide subscale formed just under the surface of certain alloys when they are annealed in air.
FISH EYES:	Areas on a fractured steel surface having a characteristic white crystalline appearance.
FISSION:	The splitting of a heavy nucleus into two roughly equal parts (which are nuclei of lighter elements) accompanied by the release of a relatively large amount of energy and frequently one or more neutrons. Fission can occur spontaneously, but usually it is caused by the absorption of gamma rays, neutrons, or other particles.
FISSION PRODUCTS:	Nuclei formed by the fission of heavy elements. They are of medium atomic weight, and almost all are radioactive. Examples: strontium-90, cesium-137.
FISSIONABLE MATERI- AL:	Any material readily fissioned by slow neutrons, for example, uranium-235 and plutoni- um-239.
FIT:	The amount of clearance or interference between mating parts.
FIXER (RT):	A chemical solution that removes unexposed silver halide crystals from film emulsion.
FIXING (RT):	The procedure used in film processing that removes all of the undeveloped silver salts of the emulsion from the surface of the film, thus leaving only the developed latent image.
FLAME HARDENING:	A method of hardening where the surface layer is heated by a high temperature torch and then quenched.
FLAKES:	Short discontinuous internal fissures in ferrous metals attributed to stresses produced by localized transformation and decreased solubility of hydrogen during cooling after hot working. In a fractured surface, flakes appear as bright silvery areas; on an etched surface they appear as short, discontinuous cracks. Also called "shatter cracks and snowflakes."
FLANGE:	The projecting annular rim around a cylinder that is used for strengthening, fastening, or positioning.
FLANGE RADIUS:	The radius formed at the junction of a flange and the wall of a casting.
FLASH:	(1) In forging, the excess metal forced between the upper and lower dies. (2) In die casting, the fin of metal that results from leakage between the mating die surfaces. (3) In resistance butt welding, a fin formed perpendicular to the direction of applied pressure.
FLASH LINE:	The line of location of flash formed around a forging.
FLASH MAGNETIZATION (MT):	Magnetization by a current flow of very brief duration.
FLASH POINT:	The lowest temperature at which a substance will decompose to a flammable gaseous mixture. The temperature at which the vapor air mixture first ignites is the flash point. This temperature can be determined by raising the temperature of the liquid in accordance with the pre-determined schedule, and periodically introducing a flame or other ignition means immediately above the surface.
FLASH TUBE (RT):	An X-ray tube designed for use in flash radiography.
FLASH X-RAY:	Term used to describe the technique in which a tube capable of producing very short (10 to 100 nanoseconds) high intensity pulses of radiation are used for special radiographic inspections.
FLAT BOTTOM HOLE (UT):	A type of reflector commonly used in reference standards. Abbreviation is FBH.

FLAW:	An imperfection in an item or material that may or may not be harmful. See DISCONTI- NUITY.
FLAW SENSITIVITY (RT):	See SENSITIVITY, DEFECT.
FLOW LINES:	A fiber pattern frequently observed in wrought metals, which indicates the manner in which the metal flows during deformation. The pattern is made more visible by acid etching.
FLOW STRESS:	The uniaxial true stress required to cause plastic deformation at a particular value of strain.
FLUORESCENT (RT):	The emission of electromagnetic radiation by a substance as the result of the absorption of electromagnetic or corpuscular radiation having greater unit energy than that of the fluorescent radiation. Fluorescence is characterized by the fact that it occurs only so long as the stimulus responsible for it is maintained. The characteristic X-radiation emitted, as a result of absorption of X-rays of higher frequency is a typical example of fluorescence. Property of emitting visible light as the result of and only during, the absorption of radiant energy from some other source (i.e., UV-A).
FLUORESCENT DYE PEN- ETRANT (PT):	A highly penetrating liquid which fluoresces when subjected to ultra-violet or black light, used to produce luminous indications of surface flaws or discontinuities.
FLUORESCENT MAGNET- IC PARTICLE INSPEC- TION (MT):	The inspection process employing magnetic materials which have been coated with a material that fluoresces when activated by light of suitable wavelength.
FLUORESCENT SCREEN (Salt Screen) (RT):	Intensifying screens composed of fluorescent all, such as calcium tungstate, which emit a visible blue-violet electromagnetic radiation when activated by the absorption of the primary rays, thereby reducing the exposure time.
FLUORESCENT SCREENS (RT):	Intensifying screens composed of fluorescent salts which emit a visible blue-violet elec- tromagnetic radiation when activated by the absorption of the primary rays, thereby reducing the exposure time.
FLUOROGRAPHY (RT):	The use of photography to record fluoroscopic images on film.
FLUOROMETALLIC SCREEN (RT):	A screen consisting of a metal foil (usually lead) coated with a material that fluoresces when exposed to ionizing radiation. It combines the properties of the fluorescent and metal screen.
FLUOROSCOPY (RT):	The visual observation on a fluorescent screen of the image of an object that has been exposed to penetrating, ionizing radiation.
FLUX:	A fusible salt mixture or gas used to purify molten metal by removing suspended oxides or dissolved gas.
FLUX (NEUTRON):	The intensity of neutron radiation. It is expressed as the number of neutrons passing through 1 square centimeter in 1 second.
FLUX DENSITY (MT):	The number of magnetic flux lines per unit of area taken at right angles to the direction of magnetic field flow. This is a measure of field strength.
FLUX LINES (MT):	Also called lines of force, magnetism or induction. Imaginary lines used as means of explaining the distribution and potential of magnetic fields.
FLUX, MAGNETIC LEAK-AGE:	See FIELD, LEAKAGE.
FLUX PENETRATION (MT):	The depth to which magnetic flux is effective in a part.
FOCAL-FILM DISTANCE (FFD) (RT):	The distance in inches between the focal spot of the X-ray tube, or gamma source, and the film.

FOCAL SPOT (RT):	The area on the target that receives the bombardment of electrons and emits the primary radiation necessary to produce an image of the object on a radiographic film. The spot at which the sound beam from a focused search unit converges to maximum intensity.
FOCUSED BEAM (UT):	Sound beam that converges to a focal spot.
FOCUSED TRANSDUCER (UT):	A transducer with a concave face which converges the acoustic beam to a focal point or line at a definite distance from the face. Also known as a focused search unit.
FOCUSING:	Concentration or convergence of energy into a small beam.
FOCUSING (RT):	Concentration or convergence of energy into a narrow beam.
FOD (RT):	Film object distance; distance from film to object being radiographed.
FOG (RT):	A general term used to denote any increase in the optical density of a processed film caused by anything other than the direct action of image-forming radiation.
FOG DENSITY (RT):	See FOG.
FOG THRESHOLD (RT):	The minimum uniform density inherent in a processed emulsion without prior exposure.
FOIL:	Metal in sheet from less than 0.006 inches in thickness.
FOLD:	See LAP.
FOREIGN MATERIALS:	They may appear as isolated, irregular, or elongated variations of film density not corre- sponding to variations in thickness of material or to cavities. May be sand, slag, oxide or dross, or metal of different density, included in the material being examined.
FORGING:	Working metal into a desired shape by hammer, upsetting, or pressing, either hot or cold, or by a combination of these processes.
FORGING CRACKS:	See CRACKS, FORGING.
FORGING RANGE:	Temperature range in which a metal can be forged successfully.
FORGING STRAIN:	Internal strains in the metal set up by the forging operation.
FORGE WELD:	Uniting metal by heat and pressure during forging.
FORMABILITY:	The relative ease with which a metal can be shaped through plastic deformation.
FORMING:	Making a change, with the exception of shearing or blanking, in the shape or contour of a metal part without intentionally altering the thickness.
FORWARD SCATTER:	Radiation scattered in approximately the same direction of the primary beam.
FOUNDRY:	A commercial establishment or building where metal castings are produced.
FRACTOGRAPHY:	Descriptive treatment of fracture, especially in metals, with specific reference to photo- graphs of the fracture surface. Macrofractography involves photographs at low magnifica- tion; microfractography, at high magnification.
FRACTURE:	A break, rupture, or crack large enough to cause a full or partial partition of a casting.
FRACTURE STRESS:	(1) The maximum principal true stress at fracture. Usually refers to unnotched tensile specimens. (2) The (hypothetical) true stress which will cause fracture without further deformation at any given strain.
FRACTURE TEST:	Breaking a specimen and examining the fractured surface with the unaided eye or with a lowpower microscope to determine such things as composition, grain size, case depth, soundness, or presence of defects.
FRAGMENTATION:	The subdivision of a grain into small discrete crystallites outlined by a heavily deformed network or intersecting slip as a result of cold working. These small crystals or fragments differ from one another in orientation and tend to rotate to a stable orientation determined by the slip systems.
FRAUNHOFER ZONE (UT):	See FAR FIELD.

FREE CARBON:	The part of the total carbon in steel or cast iron that is present in the elemental form as graphite or temper carbon.
FREQUENCY:	Frequency in uniform circular motion or in any periodic motion is the number of revolu- tions or cycles completed in unit time. The International Systems of Units expresses frequency in Hertz (1 Hz = 1 cycle per second).
FREQUENCY (FUNDA- MENTAL) (UT):	In resonance testing, the frequency at which the wavelength is twice the thickness of the examined material.
FREQUENCY (INSPEC- TION) (UT):	Effective peak ultra-sonic wave frequency used to inspect the test part.
FREQUENCY (PULSE REPETITION) (UT):	The number of pulses per second.
FRESNEL ZONE (UT):	Pronounced "fray-NEL." See NEAR FIELD.
FRETTING (FRETTING CORROSION):	Action that results in surface damage, especially in a corrosive environment, when there is relative motion between solid surfaces in contact under pressure.
FRILLING (RT):	See SLOUGHING.
FULL-WAVE RECTIFIED SINGLE-PHASE AC:	This is rectified alternating current for which the rectifier is so connected that the reverse half of the cycle is "turned around," and fed into the circuit flowing in the same direction as the first half of the cycle. This produces pulsating D.C., but with no interval between the pulses. Such current is also referred to as single-phase full-wave D.C. It is also known as unidirectional current, single phase.
FULL-WAVE RECTIFIED THREE-PHASE AC:	When three-phase alternating current is rectified the full-wave rectification system is used. The result is D.C. with very little pulsation -in fact only a ripple of varying voltage distinguishes it from straight D.C. It is also known as unidirectional current, three phase.
FUNCTIONAL CHECK	The process of checking that an instrument is functioning correctly. An example would be the inspector performing ultrasonic system checks using an IIW block or ASTM flat- bottom hole standards.
FURRING (MT):	Buildup or bristling of magnetic particles due to excessive magnetization of the compo- nent under examination resulting in a furry appearance.
FUSION:	The process by which two light nuclei combine to form a heavier nucleus.
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GADOLINIUM-153: GAIN:	A radioisotope of the element gadolinium. See SENSITIVITY.
GALVANIC CORROSION:	Corrosion consisting of two dissimilar conductors in an electrolyte, or two similar con- ductors in dissimilar electrolytes.
GAMMA, FILM (RT):	See GRADIENT.
GAMMA INFINITY (RT):	The maximum gamma that can be achieved by prolonged development of a photographic film.
GAMMA RADIOGRAPHY (RT):	The process whereby a photographic image of an object is produced by gamma radiation that has penetrated through the object.
GAMMA RADIOGRAPHY SYSTEM (RT):	All components necessary to make radiographic exposures with gamma radiation, includ- ing the exposure device, source assembly, control, and other components associated with positioning the source such as source guide tubes, exposure head, and collimators, if used.
GAMMA-RAY SOURCE (RT):	A quantity of a radionuclide that emits gamma radiation suitable for radiography.
GAMMA-RAY SOURCE CONTAINER (RT):	See CONTAINER, GAMMA-RAY SOURCE.

GAMMA RAYS:	The electromagnetic radiation of high frequency or short wavelength emitted by the nucleus of an atom during a nuclear reaction. Gamma rays are undeflected by electric or magnetic fields. They are identified in nature and properties to X-rays of the same wavelength, and differ only in their manner of production.
GAS HOLES:	Blow holes, channels, or porosity produced by gas evolution, usually during solidification.
GAS HOLES (RT) (ON RA- DIOGRAPH):	Appear as round or elongated, smooth-edged dark spots, occurring individually, in clus- ters, or distributed throughout the casting.
GAS POROSITY:	Refers to porous sections in metal that appear as round or elongated dark spots corre- sponding to minute voids usually distributed through the entire casting.
GAS POROSITY (RT) (ON RADIOGRAPH):	Represented by round or elongated dark spots corresponding to minute voids usually distributed through the entire casting.
GATE (UT):	Electronic device to monitor signals in a selected segment of the distance trace on an A-scan display.
GAUSS:	This is the unit of flux density or induction. The strength of field induced in a ferromag- netic body is described as being so many Gausses. It is usually designated by the letter "B." Numerically, one Gauss is one line of flux per square centimeter of area.
GEIGER COUNTER:	A radiation detection and measuring instrument. It contains a gas-filled tube that dis- charges electrically when ionizing radiation passes through it. Discharges are counted to measure the radiation's intensity.
GENETIC EFFECTS OF RADIATION:	Effects that produce changes in those cells of organisms which give rise to egg or sperm cells and therefore affect offspring of the exposed individuals.
GEOMETRIC FACTORS (RT):	General term used to describe the factors in radiographic exposures that account for distortion and/or enlargement. Some of the more common geometric factors include focal spot size, specimen thickness, and source-to-film distance.
GEOMETRIC UNSHARP- NESS (RT):	See UNSHARPNESS.
GHOST (UT):	An indication that has no direct relation to reflected pulses from discontinuities in the materials being tested.
GRADIENT (RT):	The slope of a characteristic curve at a specified density. Symbol: G. Note: The term "gamma" is used for the slope of the approximately straight portion of the curve.
GRAININESS (RT):	A film characteristic which consists of the grouping or clumping together of the countless small silver grains into relative large masses visible to the naked eye or with slight magnification.
GRAIN BOUNDARY:	An interface separating two grains when the orientation of the lattices changes from that of one grain to that of another. When the orientation change is very small, the boundary is sometimes referred to as subboundary.
GRAIN FLOW:	See FLOW LINES.
GRAINS:	Individual alloy crystals that form the structure of the metal.
GRAIN SIZE:	Size of the crystals in metal when compared with a standard. Usually referred to as being fine, medium or coarse.
GRAIN SIZE (RT):	The average size of the silver halide particles in a photographic emulsion.
GRAPHITIZATION:	Formation of graphite in iron or steel. Where graphite is formed during solidification, the phenomenon is called "primary graphitization"; where formed later by heat treatment, "secondary graphitization."
GRAY (Gy):	The SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 Joule/kilogram (or 100 rads).

GRID (RT):	An assembly of strips of metal, opaque to X-rays, assembled edgewise and interleaved with material of low absorption, to be placed between the object and the screen or film, in order to reduce the effects of scattered radiation from the object.
GRID RATIO (RT):	The ratio of the depth of the opaque strips of a grid, measured in the direction of the primary beam, to the spacing between them.
GRINDING CRACKS:	See CRACKS, GRINDING.
GRINDING STRESS:	Residual stress, generated by grinding, in the surface layer of work. It may be tensile, compressive, or both.
GRIT BLAST:	See SANDBLAST.
GROSS POROSITY:	In weld metal or in a casting, pores, gas holes or globular voids that are larger and in greater number than obtained in good practice.
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H AND D CURVE (RT):	See CHARACTERISTIC CURVE.
HAIRLINE SEAM:	See SEAM.
HALATION (RT):	The fogging of a film emulsion due to reflection and dispersion of the radiation within the emulsion. This is generally apparent at locations of heavy exposure.
HALF-LIFE (RT):	The time in which half the atoms in a radioactive substance disintegrate. Half-lives vary from millionths of a second to billions of years.
HALF-LIFE (BIOLOGI- CAL):	The time required for a biological system, such as a man or an animal, to eliminate, by natural processes, half the amount of a substance that has entered it.
HALF-VALUE LAYER (RT):	The thickness of a material that transmits 50 percent of the radiation incident upon it. In exponential attenuation, the half-value layer is related to the linear attenuation coefficient and the mean free path.
HALF-VALUE PERIOD (RT):	See HALF-LIFE.
HALF-WAVE RECTIFIED AC (MT):	Alternating current which passes through a rectifier in such a manner that the reversing half of the cycle (negative) is blocked out completely. It is pulsating unidirectional current. It differs from full-wave.
HALL DEVICE (MT):	An element composed generally of a semiconductor material which exhibits a relatively large output voltage across the edges of the element in a directional mutually perpendicu- lar to current flowing through the material and a magnetic field at right angles to the current flow.
HALL EFFECT (MT):	The phenomenon wherein a voltage is generated across the opposite edges of an electrical conductor carrying current and placed in a magnetic field. The generated voltage differential is mutually perpendicular to the direction of current flow and the applied magnetic field.
HAMMER FORGING:	Forging in which the work is deformed by repeated blows. Compare with press forging.
HARDENABILITY:	In a ferrous alloy, the property that determines the depth and distribution of hardness induced by quenching.
HARDENER (RT):	An agent incorporated into the fixer solution to harden the emulsion during the fixing process. The acid hardener prevents the swelling of the emulsion and facilitates the drying process.
HARDENING:	Heating metal to within its critical range as in annealing, followed by rapid cooling as in quenching.
HARD FACING:	Depositing filler metal on a surface by welding, spraying or braze welding, for the purpose of resisting abrasion, erosion, wear, galling and impact.

HARDNESS:	Resistance of metal to plastic deformation, usually by indentation. However, the term may also refer to stiffness or temper or to resistance to scratching, abrasion or cutting.
HARDNESS TESTING:	By means of instruments such as Brinnel, Rockwell, Scleroscope, Vickers, etc.
HARD RADIATION (RT):	A term used to describe qualitatively the more penetrating types of radiation.
HARDWARE FINISH:	Refers to an especially smooth, as cast, surface which requires a minimum of preparation for plating.
"HARD" X-RAYS:	A term used to express the quality or penetrating power of X radiation. Hard X-rays are very penetrating.
HARMONICS (UT):	Those vibrations that are integral multiples of the fundamental frequency; used in resonance testing.
HASH:	Numerous, small indications appearing on the viewing screen of the ultrasonic instrument indicative of many small inhomogeneities in the material and/or background noise; also known as grass.
HEADING:	Upsetting wire, rod or bar stock in dies to form parts having some of the cross-sectional area larger than the original. Examples are bolts, rivets, and screws.
HEADS:	The clamping contacts on a stationary magnetizing unit.
H & D CURVE (HURTER AND DRIFFIELD) (RT):	See CHARACTERISTIC CURVE.
HEADSHOT (MT):	A term used colloquially to designate the magnetizing current passing through a part or a central conductor while clamped between the head contacts of a stationary magnetizing unit for the purpose of circular magnetization.
HEALTH PHYSICS:	A term in common use for that branch of radiological science dealing with the protection of personnel from harmful effects of ionizing radiation.
HEAT (MELT) OF MET- AL:	A quantity of metal manufactured from one melt.
HEAT-AFFECTED ZONE:	That portion of the base metal which was not melted during brazing, cutting or welding, but whose microstructure and physical properties were altered by the heat.
HEAT CHECK:	A pattern of parallel surface cracks that are formed by alternate rapid heating and cooling of the extreme surface metal, sometimes found on forging dies and piercing punches. There may be two sets of parallel cracks, one set perpendicular to the other.
HEAT CHECKING:	The crazing of a die surface, especially when the die is subjected to alternate heating and cooling by molten metal; the resulting fine cracks produce corresponding veins on castings.
HEAT TINTING:	Coloration of a metal surface through oxidation by heating to reveal details of the micro- structure.
HEAT TREAT:	Heating and cooling of a metal or alloy in the solid state for the purpose of obtaining certain desirable conditions or properties.
HEAT TREAT CRACKS:	See CRACKS, QUENCHING.
HEAT TREATMENT:	Exposure of a metal to predetermined temperatures beyond the range of normal atmospheric conditions for a specific time to obtain a specific range of mechanical properties.
HERTZ:	One cycle per second; a unit for frequency. Abbreviation is Hz.
HETEROGENEOUS RADI- ATION (RT):	Radiation consisting of particles or photons that have a broad spectrum of energies.
HIGH-CONDUCTIVITY COPPER:	Copper that, in the annealed condition, has a minimum electrical conductivity of 100% IACS as determined in accordance with ASTM methods of test.

HIGH RADIATION AREA:	Means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.
HOMOGENIZING:	Holding at high temperature to eliminate or decrease chemical segregation by diffusion.
HOMOGENIZING TREAT- MENT:	A heat treatment of an alloy intended to make it uniform in composition by eliminating coring and concentration gradients.
HOODED ANODE (RT):	A type of anode, in medium or high voltage X-ray tubes, in which the target is recessed in a metal hood that intercepts electrons. The hood may also incorporate a filter to absorb unwanted radiation.
HORIZONTAL LINEARI- TY (UT):	Constant relationship between the incremental horizontal displacement of vertical indica- tions on an A-scan presentation and the incremental time required for reflected waves to pass through a known length in a uniform transmission medium.
HORSESHOE MAGNET:	A bar magnet, bent into the shape of a horseshoe so that the two poles are adjacent. Usually the term applies to a permanent magnet.
HOT-CATHODE TUBE (RT):	An X-ray tube in which the cathode is electrically heated to provide electrons.
HOT CELL:	A heavily shielded enclosure in which radioactive materials can be handled remotely through the use of manipulators and viewed through shielded windows so that there is no danger to personnel.
HOT CRACKS:	See CRACKS, HOT.
HOT FORMING:	Working operations, such as bending, drawing, forging, piercing, pressing and heading performed above the recrystallization temperature of the metal.
HOT SHORTNESS:	Brittleness in metal in the hot forming range.
HOT SPOT:	The point of retarded solidification caused by an increased mass of metal at the juncture of two sections. It frequently results in shrinkage and inferior mechanical properties at this location.
HOT TEAR:	A fracture formed in a metal during solidification because of hindered contraction. Usually on the surface of the part.
HOT WORKING:	Deforming metal plastically at such a temperature and rate that strain hardening does not occur. The low limit of temperature is the recrystallization temperature.
HYDROGEN EMBRITTLE- MENT:	A condition of low ductility in metals resulting from the absorption of hydrogen.
HYDROMETER:	An instrument used to determine specific gravity and hence the strength. It consists of a sealed, graduated tube, weighted at one end, that sinks in a fluid to a depth used as a measure of the fluid's specific gravity.
HYDROPHILIC (PT):	Having an affinity for, attracting, adsorbing, or absorbing water. A substance soluble in water.
HYDROPHILIC REMOVER (PT):	A water compatible remover used with standard penetrants. Provides for improved control of the emulsification step process. It requires different processing steps than the standard Lipophilic emulsifiers.
HYSTERESIS (MT):	A retardation or lagging of the magnetic effect when the magnetizing forces acting upon a ferromagnetic body are changed.
Hz:	Abbreviation for hertz.
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IACS (ET):	International Annealed Copper Standard is an international standard of electrical conductiv- ity. It is based on a high purity grade of copper designated as 100 percent.
ICICLES (BURN THROUGH):	A coalescence of metal beyond the root of the weld.
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IIW:	Abbreviation for International Institute of Welding.
IIW BLOCK:	Specific type of reference standard used for angle beam, straight beam, and surface wave methods. See IIW.
IMAGE AMPLIFIER (RT):	A device that enhances a radiographic image for the purpose of decreasing interpretation time or increasing image detail.
IMAGE CONTRAST (RT):	See CONTRAST, FILM.
IMAGE DEFINITION (RT):	See DEFINITION, RADIOGRAPHIC.
IMAGE INTENSIFIER (RT):	A device used in fluoroscopy to produce an image brighter than that, which would be produced by the unaided action of the X-ray beam on a fluorescent screen.
IMAGE QUALITY INDI- CATOR (IQI) (PENE- TRAMETER) (RT):	A device used to determine from the appearance of its image in a radiograph, the overall quality of that radiograph. It is not intended for use in judging size nor establishing acceptance limits for discontinuities.
IMAGE QUALITY LEVEL (RT):	See RADIOGRAPHIC QUALITY LEVEL.
IMMERSION METHOD (UT):	The inspection method in which the search unit and the test part are submerged in a fluid, usually water, which acts as the coupling medium.
IMMISCIBLE (PT):	Pertaining to liquids that will not mix with each other.
IMPACT ENERGY (IM- PACT VALUE):	The amount of energy required to fracture a material, usually measured by means of an Izod or Charpy test.
IMPACT STRENGTH:	The ability to resist shock, as measured by an impact testing machine.
IMPACT TEST:	A test to determine the behavior of materials when subjected to high rates of loading, usually in bending, tension or torsion. The quantity measured in the energy absorbed in breaking the specimen by a single blow, as in the Charpy or Izod tests.
IMPEDANCE:	This term is used to refer to the total opposition to the flow of current represented by the combined effect of resistance, inductance and capacitance of a circuit.
IMPEDANCE (ACOUS- TIC):	Resistance to flow of ultrasonic energy in a medium. Impedance is a product of particle velocity and material density.
IMPEDANCE PLANE DIA- GRAM:	A graphical representation of the locus of points indicating the variations in the impe- dance of a test coil as a function of basic test parameters such as electrical conductivity, magnetic permeability, test frequency, thickness and magnetic coupling.
IMPEDANCE TESTING:	A term generally applied to eddy current testing which measures the overall change in impedance caused by variations in electromagnetic properties as differentiated from phase analysis testing which measures changes in phase.
IMPURITIES:	Elements or compounds whose presence in a material is undesired.
INCLUSION:	Particles of impurities, usually oxides, sulphides, silicates, and such, which are retained in the metal during solidification or which are formed by subsequent reaction of the solid metal.
INCOMPLETE FUSION:	Fusion that is less than complete. Failure of weld metal to fuse completely with the base metal or proceeding bead.
INCOMPLETE JOINT PEN- ETRATION (LACK OF FU- SION):	Appears as elongated darkened lines of varying length and width that may occur in any part of the welding groove.
INCOMPLETE PENETRA- TION:	Root penetration that is less than complete or failure of a root pass and a backing pass to fuse with each other.

INDENTATION:	In a spot, seam or projection weld, the depression on the exterior surface of the base metal.
INDENTATION HARD- NESS:	The resistance of a material to indentation. This is the usual type of hardness test, in which a pointed or rounded indenter is pressed into a surface under a substantially static load.
INDICATION:	In nondestructive inspection, a response or evidence of a response, that requires interpre- tation to determine its significance.
INDICATION (MT):	This term refers to any magnetically held magnetic particle pattern on the surface of a part being tested.
INDICATION (PT):	The visible evidence of penetrant which has come out of a discontinuity, indicating to the inspector that some sort of surface opening is present.
INDICATION (UT):	The signal displayed on the ultrasonic equipment.
INDIVIDUAL MONITOR- ING DEVICES:	Devices designed to be worn by a single individual for assessment of dose equivalents. Although they may include film badges, thermoluminescent dosimeters (TLDs), pocket ionization chambers and personal air sampling devices, their use within the Army is usually limited to TLDs.
INDUCED CURRENT MAGNETIZATION (MT):	A special technique used to establish a circular field for the detection of circumferential discontinuities in ring-shaped parts without making direct contact with the surface of the part. Sometimes referenced as Induced Field.
INDUCED RADIOACTIVI- TY:	Radioactivity that is created by bombarding a substance with neutrons in a reactor or with charged particles produced by particle accelerators.
INDUCED RADIOACTIVI- TY (RT):	Radioactivity resulting from irradiation of matter.
INDUCTANCE:	A property of a circuit that opposes any change in the existing current. Inductance is present only when the current is changing. A coil is a source of inductance.
INDUCTION:	Magnetic induction is the magnetism induced in a ferromagnetic body by some outside magnetizing force.
INDUCTION HARDEN- ING:	Quench hardening in which the heat is generated by electrical induction.
INDUCTIVE REAC- TANCE:	This is the opposition, independent of resistance, of a coil to the flow of an alternating current.
INDUSTRIAL RADIOLO- GY (RT):	That branch of radiology covering industrial applications of ionizing radiation.
INGATE:	Same as GATE.
INGOT:	A casting suitable for working or remelting.
INHERENT DEFECTS:	Defects introduced into steel at the time it originally solidifies from the molten state.
INHERENT FILTRATION (RT):	The filtration exhibited by the walls and other materials of a radiation source through which the radiation must pass before it is utilized. Inherent filtration affects the spectral distribution of the radiation, and thus, the quality of the final radiograph.
INHERENT UNSHARP- NESS (RT):	See UNSHARPNESS.
INHIBITOR:	A substance that retards some specific chemical reaction such as rusting.
INITIAL PULSE (UT):	Electrical pulse generated by the ultrasonic instrument; used to excite a search unit in order to produce ultrasonic energy. Sometimes called the main bang.
IN-MOTION RADIOGRA- PHY:	A method in which either the object being radiographed or the source of radiation is in motion during the exposure.

IRRELEVANT INDICA- TION:	See GHOST.
INSPECTION:	Process of examining for possible defects or for deviation from established standards.
INSPECTION (MT):	Visually observing, or looking at the surface of a part after it has been magnetized and magnetic particles applied to assure that the part is free of discontinuities.
INTENSIFYING SCREEN (RT):	A layer of material that, when placed in contact with a photographic film, improves the efficiency of the photographic action of ionizing radiation on the film emulsion. The increased rate of absorption of radiation energy by the emulsion enables reduction of exposure time.
INTENSITY, RADIATION (RT):	The amount of energy passing per unit time per unit area at a point in a beam of radiation, the area being perpendicular to the direction of propagation.
INTERACTION (RT):	Any process in which all or part of the energy of incident radiation is transferred to the electrons or nuclei of the atoms that constitute matter, or in which only the direction of the incident particle is altered.
INTERFACE:	The physical boundary between two adjacent surfaces.
INTERGRANULAR COR- ROSION:	Corrosion occurring preferentially at grain boundaries.
INTERLOCK (RT):	A device for precluding access to an area of radiation hazard either by preventing entry or by automatically removing the hazard.
INTERMEDIATE LAYER METHOD (ET):	A method of liftoff compensation where the same eddy current indication is obtained from bare metal and at a predetermined distance from the bare metal using a nonconduc- tive shim (intermediate layer).
INTERNAL COIL (ET):	A coil wound upon a bobbin and having a cross-sectional configuration close to that of the internal bore or passage of the test object.
INTERNAL CONVERSION (RT):	The transfer of nuclear energy directly to a bound electron in the same atom, which causes the electron to be ejected from the atom. Subsequent filling of the vacancy thus created results in the emission of characteristic X-rays or auger electrons.
INTERNAL STRESSES:	Unseen forces existing within a part. These are forces that exist without the part being subjected to a working load.
INTERPRETATION (Evalu- ation):	The determination of the cause of an indication or the evaluation of the significance of discontinuities from the standpoint of whether they are detrimental defects or superficial blemishes.
INTERPRETATION (MT):	The determination of what condition in the part has caused the magnetic particle pattern.
INTERSTITIAL SOLID SO- LUTION:	An alloy in which small atoms of alloying elements including carbon, nitrogen or hydro- gen assume positions between the lattice sites normally occupied by the base metal.
INVERSE SQUARE LAW (RT):	At constant kilovoltage or source strength, the intensity of the radiation reaching the object is governed by the distance between the focal spot or radioactive source and the object, varying inversely with the square of the distance.
INVERSE VOLTAGE (RT):	A voltage that may appear across an X-ray tube or rectifier during one half-cycle of an alternating current and that reverses the polarity of the electrodes relative to the previous half-cycle.
INVESTMENT CASTING:	(1) Casting metal into a mold produced by surrounding (investing) in expendable pattern with a refractory slurry that sets at room temperature after which the wax, plastic or frozen mercury pattern is removed through the use of heat. Also called precision casting or lost-wax process. (2) A casting made by the process.
ION (RT):	An ion is an atom or group of atoms that is not electrically neutral but instead carries a positive or negative electric charge. Positive ions are formed when neutral atoms or molecules lose valance electrons; negative ions are those which have gained electrons.

ION PAIR (RT):	A positive ion and a negative ion or electron having charges of the same magnitude, and formed simultaneously from a neutral atom or molecule with energy supplied by radiation or any other suitable source.
ION PAIRS:	A positive ion and a negative ion or electron having charges of the same magnitude, and formed from a neutral atom or molecule by the action of radiation or by any other agency that supplies energy.
ION SOURCE (ION GUN) (RT):	A device by which gaseous ions are produced, focused, and accelerated, and are emitted as a narrow beam.
IONIC (RT, PT):	Relating to, existing in the form of, or characterized by ions.
IONIZATION:	The process of adding electrons to, or knocking electrons from, atoms or molecules, thereby creating ions. High temperatures, electrical discharges, and nuclear radiation can cause ionization.
IONIZATION CHAMBER:	An instrument that detects and measures ionizing radiation by observing the electrical current created when radiation ionizes gas in the chamber, making it a conductor of electricity.
IONIZING RADIATION:	Any radiation that directly or indirectly displaces electrons from the outer domains of atoms. Examples: alpha, beta, and gamma radiation.
IQI SENSITIVITY (RT):	The sensitivity (quality level) of a radiographic process, as determined by the use of an image quality indicator (IQI). Properly called radiographic sensitivity.
IRIDIUM-192:	A radioactive isotope of the element Iridium that has a half life of 75 days. It is used extensively as a source of gamma radiation.
IRRADIATION:	Exposure to radiation, as in a nuclear reactor.
ISOMER:	One or two or more nuclides having the same atomic number, but existing for measurable time intervals in different quantum states, with different energies and radioactive properties.
ISOMER (RT):	One of two or more nuclides that are both isotopes (same atomic number) and isobars (same mass number) of each other, but which have some measurably different physical property, such as half life.
ISOMERIC TRANSITION (RT):	The transition of an isomer to a lower energy state. It is accompanied by the emission of gamma radiation that may be internally converted.
ISOTOPE (RT):	One of several nuclides having the same number of protons in their nuclei, and hence belonging to the same element, but differing in the number of neutrons, and therefore in mass number. Small quantitative differences in chemical properties exist between ele- ments and isotopes. Isotopes may or may not be unstable. Unstable isotopes undergo transitions to other isotopes or elements with a loss of energy. Such energy is usually given off in the form of electromagnetic or particle radiation. Isotopes are used as source of radiation for radiography.
ISOTROPY:	Quality of having identical properties in all directions.
ITEMS:	An item is one of the compounds necessary to make up a family of penetrant materials. For example: penetrant, emulsifier, remover, or developer.
IZOD TEST:	A pendulum-type of single-blow impact test in which the specimen, usually notched is fixed at one end and broken by a falling pendulum. The energy absorbed, as measured by the subsequent rise of the pendulum, is a measure of impact strength or notch toughness.
	J
JIG:	A fixture or template employed to ensure exact location of one part in relation to another.
JOINT EFFICIENCY:	The strength of a welded joint expressed as a percentage of the strength of the unwelded base metal.
JOINT PENETRATION:	The distance weld metal and fusion extend into a joint.

K-ELECTRON CAPTURE:	Electron captured by a nucleus of an electron from the "K" or innermost shell of electrons surrounding it. Also loosely used to designate any orbital electron captured.
KEY SWITCH (RT):	A device that requires a Key for making and breaking electrical connections.
KHz:	Abbreviation for kilohertz.
KILLED STEEL:	Steel deoxidized with a strong deoxidizing agent such as silicon or aluminum in order to reduce the oxygen content to such a level that no reaction occurs between carbon and oxygen during solidification.
KILOHERTZ:	Unit of frequency equal to 1,000 Hz. Abbreviation is kHz.
KILOVOLT:	Unit of electromotive force or potential equal to 1,000 volts.
KILOVOLT PEAK:	The crest value of electromotive force or potential, in kilovolts, of a pulsating source of electric potential.
	L
L _o :	Symbol for near field length.
LACK OF FUSION:	Two-dimensional defect due to lack of union between weld metal and parent metalA casting made in a mold (sand, plaster, or permanent mold) which rotates while the metal solidifies under the pressure developed by centrifugal force.
LAMB WAVE (UT):	A complex type of ultrasonic wave propagated in metal sheets up to a few wavelengths thick. Their propagation characteristics are dependent upon the properties of the material and its thickness, along with the frequency of the incident wave. These vibrations occur throughout the thickness of the material and consist of two basic types, symmetrical and asymmetrical. Each of these types may have an infinite number of modes, which are determined, by the wave's incident angle. They can be very effective for detecting laminar discontinuities, but, because of their complexity, practical application can be difficult.
LAMBDA (λ):	Symbol for wavelength; the eleventh letter of the Greek alphabet.
LAMINATE:	(1) A composite metal, usually in the form of sheet or bar, composed of two or more metal layers so bonded that the composite metal forms a structural member. (2) To form a metallic product of two or more bonded layers.
LAMINATIONS:	Discontinuities in plate, sheet or strip caused by pipe, inclusions, or blowholes in the original ingot; after rolling they are usually flat and parallel to the outside surface.
LAMINOGRAPHY:	A special form of tomography which is used for limiting an inspection to a single plane in the material; images of the condition along the plane of interest are brought into sharp focus while other images are smeared or blurred.
LAP:	A surface defect, appearing as a seam, caused by folding over hot metal, fins or sharp corners and then rolling or forging them into the surface, but not welding them.
LATENT IMAGE (RT):	The metallic silver image of the material radiographed brought out by the developing process.
LATITUDE (RT):	Latitude, most closely aligned with contrast, is the range of thickness that can be trans- ferred or recorded on a radiograph within the useful reading range of film density. A high contrast has little latitude whereas a low contrast film will have great latitude.
LATTICE:	The repetitive three-dimensional arrangement of atoms in a solid.
LAW:	Liquid Active Waste.
LAW OF RECIPROCITY,	PHOTOGRAPHIC (RT): See RECIPROCITY LAW.
LD (RT):	See MEDIAN LETHAL DOSE.
LEAD EQUIVALENT (RT):	The thickness of lead affording the same attenuation of radiation under specified condi- tions, as the material in question.

LEAD GLASS (RT):	Glass containing a high proportion of lead compounds, used as a transparent shielding material.
LEAD RUBBER (RT):	Rubber containing a high proportion of lead compounds. It is used as a flexible shielding material.
LEAD-RUBBER GLOVES (PROTECTIVE GLOVES) (RT):	Gloves incorporating lead rubber as a shielding material.
LEAD SCREENS:	See SCREENS, LEAD.
LEAK:	A hole or void in the wall of an enclosure, capable of passing liquid or gas from one side to the other under action of a pressure or concentration difference existing across the wall.
LEAKAGE (RT):	The undesired release of radioactive material from a sealed source.
LEAKAGE FIELD:	See FIELD, LEAKAGE.
LEAKAGE RADIATION (RT):	Radiation other than the useful beam emitted from an X-ray tube assembly or source housing.
LEAKAGE RATE:	The quantity of gas per unit time at a given temperature and pressure, that flows through a leak or leaks; normally expressed in standard cubic centimeters per second (STD. $cm3/s$).
LEAK TEST (RT):	A method capable of detecting the leakage of radioactive material from a sealed source.
LEAK TESTING (PT):	Method of applying penetrant to one surface and developer to the opposite side of a structure to detect flaws that extend entirely through the structure.
LEAKER-PENETRANT:	The type of penetrant especially designed for leak detection.
LENGTH/DIAMETER RA- TIO (MT):	A ratio of the length and diameter of a part for the purpose of calculating the amperes required for longitudinal magnetization.
LICENSED MATERIAL:	Source material, special nuclear material, or by-product material received, possessed, used, or transferred under a general or special license issued by the Atomic Energy Commission.
LICENSED MATERIAL (RT):	Source material, special nuclear material, or byproduct material received, possessed, used, or transferred under a general or special license issued by the Nuclear Regulatory Commission or an Agreement State.
LIFT-OFF (ET):	A measure of the gap between the face of a surface probe and the surface being inspect- ed. It is a measure of the coupling between the probe and the material being inspected.
LIFT-OFF COMPENSA- TION (LIFT-OFF ADJUST- MENT) (ET):	Procedures for instrument adjustments whereby impedance variations caused by a variable gap between an eddy current surface and the test part are suppressed. This adjustment is designed to provide a better signal-to-noise ratio for eddy current inspection.
LIFT-OFF EFFECT (ET):	The effect observed in the test system output due to a change in magnetic coupling between a test specimen and a probe coil whenever the distance of separation between them is varied.
LIGHT METAL:	One of the low-density metals such as aluminum, magnesium, titanium, beryllium or their alloys.
LIGHT METER (MT, PT):	A device used to measure the light intensity of a UV-A lamp in foot candles or micro- watts per square centimeter, whichever is appropriate.
LIMIT FREQUENCY:	A mathematically derived frequency value used to establish impedance diagrams.
LINDEMANN GLASS (RT):	Glass of low X-ray absorption containing lithium, boron and beryllium.
LINEAR ABSORPTION COEFFICIENT:	See ABSORPTION COEFFICIENT, LINEAR.

LINEAR ACCELERATOR:	An apparatus used to accelerate electrons to high velocities by means of a high frequency electrical wave traveling along a tube in the linear direction of the electron beam.
LINEAR DISCONTINUI- TIES:	Ragged lines of variable width. May appear as a single jagged line or exist in groups. They may or may not have a definite line of continuity.
LINEAR ENERGY TRANS- FER (LET) (RT):	The energy lost by a charged particle per unit distance of material traversed. It can be expressed as electron volts per meter, or some convenient multiple or submultiple, such as KeV per millimeter.
LINEAR INDICATIONS:	An indication having length three or more times its width.
LINEARITY:	See VERTICAL LINEARITY and HORIZONTAL LINEARITY.
LINE FOCUS (RT):	See EFFECTIVE FOCAL SPOT.
LINE FOCUS PRINCIPLE (RT):	The process of making the angle between the anode face and the central ray such that the effective focal spot is small in relation to the actual spot size.
LINE-FOCUS TUBE (RT):	An X-ray tube in which the electron focus is approximately a rectangle and the foal spot size is approximately a square.
LINES OF FORCE (MT):	Imaginary lines used to visualize the magnetic field.
LIMITS (dose limits):	The permissible upper bounds of radiation doses.
LIPOPHILIC (PT):	An oil based liquid used in penetrant inspection to make penetrant oil water-washable.
LIQUID VEHICLE (MT):	The liquid in which the magnetic particles are suspended to facilitate their application.
LOCALIZING CONE (COLLIMATING CONE) (RT):	A cone that limits the divergence of a beam of radiation.
LONGITUDINAL MAG- NETIZATION (MT):	Magnetization of a material in such a way that the magnetic lines of force are essentially parallel to the test parts longitudinal axis.
LONGITUDINAL WAVE (UT):	A type of wave in which the particle motion of the material is essentially in the same direction as the wave propagation.
LOSS OF BACK REFLEC- TION (UT):	Absence of an indication of the far surface of the article being inspected.
LUDERS' LINES:	Lines that are produced on the surface of low carbon steel by deforming the metal just past the yield point.
LUMEN (PT, MT):	A measure of the brightness of light. A unit of luminous flux equal to the light emitted in a unit solid angle by uniform point source of one candle.
LUMINESCENCE (RT):	A phenomenon in which the absorption of radiation by a substance gives rise to the emission of light characteristic of the substance.
	Μ
MACHINEABILITY:	Refers to the ease and speed with which a metal may be cut (with free chip removal) to produce a reasonably smooth surface.
MACHINED SURFACE:	The metal surface left by the cutting tool.
MACHINING:	Removing material, in the form of chips, from work, usually through the use of a machine.
MACHINING STRESS:	Residual stress caused by machining.
MACRO-ETCH:	Etching of a metal surface for accentuation of gross structural details and defects for observation by the unaided eye or at magnifications not exceeding ten diameters.
MACROGRAPH:	A graphic reproduction of the surface of a prepared specimen at a magnification not exceeding ten diameters. When photographed, the reproduction is known as a photomacrograph.

MACRO INSPECTION:	Utilizes deep etch and examination under low magnification up to 10 diameters. It reveals flow lines, etc.
MACROPOROSITY (PT):	Voids or gas pockets in metals that are large enough to be seen at magnification of less than 10 diameters.
MACROSCOPIC:	Visible at magnifications from one to ten diameters.
MACROSCOPIC STRESS- ES:	Residual stresses which vary from tension to compression in a distance (presumably many times the grain size) which is comparable to the gage length in ordinary strain measurements, hence, detectable by X-ray or dissection methods.
MACROSTRUCTURES:	The structure of metals, as revealed by the eye or at a magnification of less than 10 diameters.
MAGNET:	Materials that show the power to attract iron and other substances to themselves, and that exhibit polarity, are called magnets.
MAGNET, PERMANENT:	A highly retentive metal that has been strongly magnetized; for example, the alloy Alnico.
MAGNETIC COUPLING (MT):	A term designating the interaction of a magnetic field with an adjoining test part.
MAGNETIC DISCONTI- NUITY (MT):	This refers to a break in the magnetic uniformity of the part - a sudden change in permeability. A magnetic discontinuity may not be related to any actual physical break in the metal, but it may produce a magnetic particle indication.
MAGNETIC FIELD (MT):	The space around a source of magnetic flux in which the effects of magnetism can be determined.
MAGNETIC FIELD STRENGTH (MT):	The intensity of the magnetic field surrounding the magnetized part measured in GAUSS.
MAGNETIC FLUX:	The total number of magnetic lines existing in a magnetic circuit is called "magnetic flux."
MAGNETIC FORCE:	In magnetic particle inspection the magnetizing force is considered to be the total force tending to set up a flux in a magnetic circuit. It is usually designated by letter "H."
MAGNETIC HYSTERESIS:	See HYSTERESIS.
MAGNETIC LOOP:	If a conductor carrying an electric current is bent in a loop, the magnetic lines of force enter on one side of the loop and leave at the other, and the space within the loop is found to contain a magnetic field which has very definite directional properties. Polarity is created within the coil with one end being a north pole and the opposite end a south pole. The space enclosed by the loop is longitudinally magnetized.
MAGNETIC MATERIALS:	Materials are affected by magnets in two general ways. Some of them are attracted by a magnetic force, while others exert a repellent force. The first is called "paramagnetic" and the latter "diamagnetic." In magnetic particle inspection we are not ordinarily concerned with either of the two classes, but with what may be termed a subdivision of the first class called "ferromagnetic materials."
MAGNETIC PARTICLE INSPECTION (MT):	A method for detecting discontinuities on or near the surface in suitably magnetized materials, which employ finely divided magnetic particles that tend to congregate in regions of the magnetic non-uniformity, i.e., along cracks, over inclusions, voids, etc.
MAGNETIC PERMEABILI- TY (MT):	A term indicating the ease with which a magnetic field can be established in a material. It is determined by the ratio of the strength of the resultant magnetic force to the applied magnetic force.
MAGNETIC POLES:	The ability of a magnet to attract or repel is not uniform over its surface, but is concen- trated at local areas called "poles." Each magnet has at least two poles, one of which is attracted by the earth's North Pole and is called the north pole of the magnet, and the other which is attracted by the earth's South Pole and is called the south pole of the magnet. Magnetic leakage occurs at poles.

MAGNETICALLY HARD ALLOY:	A ferromagnetic alloy capable of being magnetized permanently because of its ability to retain induced magnetization and magnetic poles after removal of externally applied fields; an alloy with high coercive force. The name is based on the fact that the quality of the early permanent magnets was related to their hardness.
MAGNETICALLY SOFT ALLOY:	A ferromagnetic alloy that becomes magnetized readily upon application of a field and that returns to practically a nonmagnetic condition when the field is removed; an alloy with the properties of high magnetic permeability, low coercive force and low magnetic hysteresis loss.
MAGNETIC RUBBER IN- SPECTION (MT):	An inspection process involving the use of a formulation of magnetic particles dispersed in a room temperature curing rubber. An extension of the magnetic particle method used for detection of flaws in problem areas such as bolt holes, tubes, etc.
MAGNETIC SATURATION (MT):	The degree of magnetization when increasing the magnetizing force upon a part no longer increases the magnetic flux density (permeability) in the part.
MAGNETIC WRITING (MT):	A form of nonrelevant indications, sometimes caused when the surface of a magnetized part comes into contact with another piece of ferromagnetic material.
MAGNETISM (MT):	The ability of matter to attract other matter to itself and exhibit polarity.
MAGNETIZING CURRENT (MT):	The flow of either alternating, rectified AC or direct current used to induce magnetism into the part.
MAGNETIZING FORCE:	For the purpose of this discussion, magnetizing force is considered to be the total force tending to set up a magnetic flux in a magnetic circuit. It is usually designated by the letter "H" and the unit is the "Oersted."
MAGNETOGRAPH:	A magnetograph is a picture of a magnetic field made by the use of iron powder under conditions that allow it to arrange itself into the pattern of the field.
MAGNETROSTRICTIVE (MT):	The property of changing dimension with changing magnetic field.
MAIN BANG (UT):	See INITIAL PULSE.
MAINTENANCE INSPEC- TION:	Inspecting any tooling, machines, or equipment periodically, or during rebuilding to pre- vent future in-service failure.
MALLEABILITY:	That property which allows a material to be permanently deformed, by compression, without rupture.
MALLEABLE CAST IRON:	A cast iron made by a prolonged anneal of white cast iron in which decarburization or graphitization, or both, take place to eliminate some or all of the cementite. The graphite is in the form of temper carbon.
MANIPULATOR (UT):	A device used for orientation of the transducer assembly. As generally applied to immer- sion techniques provides either angular or normal sound wave path.
MAP:	Locating the boundaries of a discontinuity.
MARKERS:	A series of square waves, or other beam deflections displayed on the cathode-ray tube screen of the ultrasonic equipment used to determine the distance from the test surface of the article being inspected to a subsequent discontinuity or boundary.
MAS:	Milliampere seconds, utilized to standardize radiographic exposures. Example: 5 MA X 60 seconds = 300 MAS.
MASKING (RT):	Surrounding specimens or covering thin sections with absorptive material to eliminate scatter and halation on the film image.
MASS ABSORPTION CO- EFFICIENT (RT):	A numerical expression of the absorption characteristics of a given material. The mass absorption coefficient is different for different materials, and is dependent on kilovoltage. It is equal to the Linear Absorption Coefficient divided by the mass density.
MASS ATTENUATION COEFFICIENT (RT):	The fraction of uncharged ionizing particles that experience interactions in traversing a unit distance in a material of density.

MASS NUMBER:	The sum of the neutrons and protons in a nucleus. The mass number of uranium-235 is 235. It is the nearest whole number to the atom's actual atomic weight.
MATERIAL NOISE:	Extraneous signals caused by the structure of the material being tested.
MAXIMUM PERMISSIBLE DOSE (MPD):	That dose of ionizing radiation which competent authorities have established as the maxi- mum that can be absorbed without undue risk to human health.
MEAN FREE PATH:	Average distance a particle travels between collisions.
MEAN LIFE:	The average time during which an atom or other system exists in a particular form.
MEAN STRESS:	(1) In fatigue testing, the algebraic mean of the maximum and minimum stress in one cycle. Also called the steady stress component. (2) In any multiaxial stress system, the algebraic mean of three Principal Stresses; more correctly called mean normal stress.
MECHANICAL PROPER- TIES:	The properties of a material that reveal its elastic and in-elastic behavior where force is applied, thereby indicating its suitability for mechanical applications; for example, modulus of elasticity, tensile strength, elongation, hardness, and fatigue limit.
MEDIAN LETHAL DOSE (RT):	The whole-body dose, resulting from a single short exposure (minutes or hours), that will cause the death, within a specified period of time, of 50 percent of the individuals irradiated. The dose sufficient to cause death to 50 percent of the individuals within 30 days is indicated as LD and is on the order of 300 rads.
MEGACYCLE:	One million cycles; often used to express one million cycles per second. Abbreviation is mc.
MEGAHERTZ:	Unit of frequency equal to one million Hertz. Abbreviation is MHz.
METAL SCREEN (RT):	A screen consisting of a foil of dense metal (usually lead) that emits secondary electrons when exposed to X- or gamma radiation. It also reduces the undesirable effects of scattered radiation.
METALLOGRAPH:	An optical instrument designed for both visual observation and photomicrography of prepared surfaces of opaque materials at magnifications ranging from about 25 to about 1500 diameters.
METALLOGRAPHY:	The science dealing with the constitution and structure of metals and alloys as revealed by the unaided eye or by such tools as low-powered magnification, optical microscope, electron microscope and diffraction or X-ray techniques.
METALLURGY:	The science and technology of metals.
MeV:	One million electron volts.
MHz:	Abbreviation for megahertz.
MICRO:	A prefix that divides a basic unit by one million.
MICROFISSURE:	A crack of microscopic proportions.
MICROGRAPH:	A graphic reproduction of the surface of a prepared specimen, usually etched, at a magnification greater than ten diameters. If produced by photographic means it is called a photomicrograph (not a microphotograph).
MICROHARDNESS:	The hardness of microscopic areas or of the individual microconstituents in a metal, as measured by such means as Tukon, Knoop or scratch methods.
MICRO-INSPECTION:	Utilizes a mild etch and high magnification (up to 1000 diameters) for examination of specifically prepared polished samples.
MICRO-SHRINKAGE:	Irregular feathery cavities occurring in the grain boundaries. (Occurs predominantly in magnesium alloys.)
MICROPOROSITY:	Porosity visible only with the aid of a microscope.

MICROSCOPIC STRESS- ES:	Residual stresses which vary from tension to compression in a distance (presumably approximating the grain size) which is small compared to the gage length in ordinary strain measurements. Hence not detectable by dissection methods, they can sometimes be measured by X-ray line shift.
MICROSECOND:	Unit of the time equivalent to 10 ⁻⁶ second or 0.000001 second.
MICRORADIOGRAPHY:	A technique used to examine very small objects or minute detail through the use of low voltage X-rays and an ultrafine grain film emulsion which is examined with the aid of optical enlargement.
MICROSHRINKAGE (ON RADIOGRAPH):	Cracks that appear as dark feathery streaks, or irregular patches that indicate cavities in the grain boundaries.
MICROSTRUCTURE:	The structure of polished and etched metals as revealed by a microscope at a magnifica- tion greater than ten diameters.
MILLI:	A prefix that divides a basic unit by one thousand.
MILLIAMPERAGE (RT):	Milliamperage is a measure of the current flowing between the cathode and the anode in an X-ray tube, and is a measure of the intensity of the emitted radiation.
MILLIAMPERE (RT):	A unit of electrical current equal to one thousandth of an ampere.
MILLIAMPERE-SECONDS (RT):	A term used to quantify radiographic exposures made with X-rays. It is the product of tube current in milliamperes and exposure time in seconds. Abbreviation: mAs.
MILLICURIE-HOUR (RT):	A term used to quantify radiographic exposures made with a gamma-ray source. It is the product of the activity of the source in millicuries and the exposure time in hours.
MILLIROENTGEN (mR):	One-thousandth of a roentgen.
MINIATURE ANGLE BEAM BLOCK (UT):	Specific type of reference standard primarily used for the angle beam method, but also used for the straight beam and surface wave methods.
MINIATURE-FILM RADI- OGRAPHY (MASS MINIA- TURE RADIOGRAPHY) (RT):	Fluorography using miniature photographic film.
MISCIBLE (PT):	The tendency of capacity of two or more liquids to form a uniform blend, that is, to dissolve in each other; degrees are total miscibility, partial miscibility, and immiscibility.
MISRUN:	A casting not fully formed, resulting from the metal solidifying before the mold is filled.
MISRUNS (RADIOGRAPH-IC):	Appears as prominent darkened areas of variable dimensions with a definite smooth outlines.
MOBILITY (MT):	The ease with which magnetic particles move over the surface of a magnetized part and accumulate at a discontinuity exhibiting polarity.
MODE:	The manner in which acoustic energy is propagated through a material as characterized by the particle motion of the wave.
MODE CONVERSION (UT):	Changing from one mode of vibration to another; caused by retraction at an interface.
MODE OF VIBRATION (UT):	Type of wave motion; e.g., longitudinal, transverse, etc. Three common modes of vibra- tion used in ultrasonic inspection are longitudinal, transverse, and surface wave modes.
MODULATION ANALY- SIS (ET):	An instrumentation method used in eddy current testing which separates responses based on their frequency or rate of response. For instance, slow responses from gradual dimen- sion changes can be separated from rapid responses from a crack.
MODULUS OF ELASTICI- TY:	The ratio of stress to the corresponding strain within the limit of elasticity.
MODULUS OF RUPTURE:	Nominal stress at fracture in a bend test or torsion test.

MOLD:	A form or cavity into which molten metal is poured to produce a desired shape. Molds may be made of sand, plaster or metal and frequently require the use of cores and inserts for special applications.
MOLECULE:	The smallest unit quantity of matter that can exist by itself and retain all the properties of the original substance. Molecules are formed by the chemical combination of atoms.
MONITORING (RT):	Periodic or continuous determination of the amount of ionizing radiation or radioactive contamination present in an occupied region.
MONOCHROMATIC:	(Homogeneous) of the same wavelength.
MOTTLING (RT):	Large graininess effect on a radiograph that may be due to diffraction by large grain structures in materials, or can be caused by the use of fluorescent screens. Mottling is readily distinguishable from film graininess because of its coarse appearance and lack of definition.
MOVEMENT UNSHARP- NESS (RT):	See UNSHARPNESS.
MT:	Symbol for the magnetic particle method of nondestructive testing/inspection.
MULTIAXIAL STRESSES:	Any stress state in which two or three principal stresses are not zero.
MULTIDIRECTIONAL MAGNETIZATION:	Two separate fields, having different directions, cannot exist in a part at the same time. But two or more fields in different directions can be imposed upon a part sequentially in rapid succession. When this is done magnetic particle indications are formed when dis- continuities are located favorably with respect to the directions of each of the fields, and will persist as long as the rapid alternations of field direction continue. This, in effect, does constitute two or more fields in different directions at the same time, and enables the detection of defect oriented in any direction in one operation.
MULTIPLE REFLECTIONS (UT):	Successive echoes of ultrasonic energy between two surfaces.
	Ν
NANOMETER (PT):	A unit of length equal to one billionth of a meter, or 10^{-9} meter. The Nanometer has replaced the angstrom unit as a measurement of short wave length, electromagnetic radiation where 1 nm = 10 angstroms.
NANOSECOND:	(10 ⁻⁹) one billionth of a second.
NARROW-BANDED (UT):	Having a relatively narrow bandwidth; opposite of broad-banded; see TUNED.
NEAR FIELD (UT):	The region of the ultrasonic beam adjacent to the search unit, having complex beam profiles; also known as the Fresnel zone. The length of the near field extends from the face of the search unit to the point at which the far field begins and is given by the equation: $L_{o} = D^{2}f / 4v$ where:
	$L_o = near field length - inches.$ D = the major dimensions of the search unit element - inches. For circles, $D = the diameter$. For rectangles or squares, D = diagonal. $f = ultrasonic frequency - hertzv = ultrasonic velocity - inches per second.$
NEIGHBORHOOD EFFECT (RT):	The name given to various effects arising from the diffusion of developer which has become locally exhausted or loaded with oxidation products by its action on a heavily exposed region of an emulsion. Typical examples are developer streaks and abnormal density variations near the edges of regions of high density.
NET DENSITY (RT):	Total film density less the base plus fog density.
NETWORK STRUCTURE:	A structure in which one constituent occurs primarily at the grain boundaries, thus partially or completely enveloping the grains of the other constituents.

NEUTRON:	An uncharged elementary particle with a mass nearly equal to that of the proton. The isolated neutron is unstable and decays with a half-life of about 13 minutes into an electron, proton, and neutrino. Neutrons sustain the fission chain reaction in a nuclear reactor. Neutron radiograph is a technique in which neutrons are used as a penetrating radiation to produce a radiograph.
NEUTRON RADIOGRA- PHY (RT):	The process whereby a photographic image of an object is produced by neutron radiation that has penetrated through the object.
NITRIDING:	Introducing nitrogen into a solid ferrous alloy by holding at a suitable temperature (below Acl for ferritic steels) in contact with a nitrogenous material, usually ammonia or molten cyanide of appropriate composition. Quenching is not required to produce a hard case.
NOBLE METAL:	A metal whose potential is highly positive relative to hydrogen electrode. A metal with a marked resistance to chemical reaction.
NODE:	A point in a standing wave where some characteristic of the wave field has essentially zero amplitude.
NODULAR CAST IRON:	A cast iron that has been treated while molten with a master alloy containing an element such as magnesium or cerium to give primary graphite in the spherultic form.
NOISE (UT, ET):	Any undesired signal that tends to interfere with normal reception or processing of the desired signal. Origin may be electrical or from small reflectors in a material.
NONAQUEOUS DEVEL- OPER:	See SOLVENT DEVELOPER.
NONDESTRUCTIVE IN- SPECTION (NDI):	A method used to check the soundness of a material or a part without impairing or destroying the serviceability of the part.
NONFERROMAGNETIC MATERIAL (NONMAG- NETIC):	A material that is not magnetizable and hence, essentially not affected by magnetic fields. This would include paramagnetic materials having a magnetic permeability slightly greater than that of a vacuum and approximately independent of the magnetizing force and diamagnetic materials having permeability less than a vacuum. Some metals free from iron are zinc, tin, aluminum, brass, copper and pot metal.
NON-METALLIC INCLU- SION:	Inclusions (or stringers) are impurities in the metal as a mechanical mixture. They may be stretched out and broken up during rolling or forging and are at various depths from the surface.
NON-RELEVANT INDICA- TIONS:	An indication due to misapplied or improper inspection. Also, an indication caused by an actual discontinuity in the material that does not affect the usefulness of the part (such as a change of section).
NONRELEVANT INDICA- TION (MAGNETIC PARTI- CLE INSPECTION):	A magnetic particle indication due to a weak leakage field caused by some condition other than a discontinuity but does not affect the usefulness of the part; such as a keyway, dissimilar parts, etc.
NON-SCREEN FILM (RT):	X-ray film designed for use with or without metal screens, but not intended for use with salt screens. It may be of relatively high speed and coarse grain (ordinary non-screen film) or of lower speed and finer grain (fine grain non-screen film).
NON-STOCHASTIC EF- FECT:	Means health effects, the severity of which varies with the dose and for which a threshold is believed to exist (below which there are no effects). Radiation-induced cataract forma- tion is an example of a non-stochastic effect.
NORMALIZE:	Heating steel to above its critical range, as in annealing, and then cooling it in still air at ordinary room temperature.
NOTCH BRITTLENESS:	Susceptibility of a material to brittle fracture at points of stress concentration.
NOTCH SENSITIVITY:	A measure of the reduction in strength of a metal caused by the presence of stress concentration. Values can be obtained from static, impact or fatigue tests.

NOZZLE:	The outlet end of a gooseneck, or the fitting that joins the gooseneck to the sprue hole of the die.
NUCLEAR REACTION:	A reaction involving an atom's nucleus, such as fission, neutron capture, radioactive decay, or fusion, as distinct from a chemical reaction, which is limited to changes in the electron structure surrounding the nucleus.
NUCLEAR REACTOR:	A device by means of which a fission chain reaction can be initiated, maintained, and controlled. Its essential component is a core with fissionable fuel. It usually has a moderator, a reflector, shielding, and control mechanisms.
NUCLEAR TRANSITION (RT):	A change in the energy state or level of an atomic nucleus which may, or may not, result in the emission of radiation.
NUCLEUS:	The heavy central part of an atom in which most of the mass and the total positive electric charge is concentrated. With the exception of the nucleus of hydrogen, nuclei are composed of protons and neutrons. The charge of the nucleus, an integral multiple of the charge of the electron, is the essential factor that distinguishes one element from another chemically.
NUCLIDE:	Any species of atom that exists for a measurable length of time. A nuclide can be distinguished by its atomic weight, atomic number, and energy state. The term is used synonymously with isotope. A radionuclide is a radioactive nuclide.
NUCLIDE (RT):	A species of atom characterized by its mass number, atomic number, and nuclear energy state, and that has a measurable mean life.
	Ο
OBJECT-TO-FILM DIS- TANCE (RT):	The distance from the tube or source side of the irradiated specimen to the film surface, i.e., inclusive of specimen thickness. Abbreviation: ofd.
OCCUPANCY FACTOR (RT):	The factor by which the workload should be multiplied to correct for the degree or type of occupancy of the area in question. Symbol: T.
OCCUPATIONAL DOSE:	The dose received by an individual in a restricted area or in the course of employment in which the individual's assigned duties involve exposure to radiation. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or a member of the general public.
OERSTED (MT):	A unit of field strength that produces magnetic induction designated by the letter "H." The Oersted is numerically equal in air or in a vacuum. Oersted (H) refers to the magnetizing force tending to magnetize an unmagnetized body, and Gauss refers to the field (B) so induced in the body.
OHM:	The ohm is the unit of electrical resistance. It is the value of a resistance that will pass one ampere of current at a potential of one volt.
OIL-COOLED TUBE (RT):	An X-ray tube in which the heat produced is dissipated, directly or indirectly, by means of oil.
OIL-IMMERSED TUBE (RT):	An X-ray tube designed for operation in oil.
OPERATING STRESS:	The stress to which a structural unit is subjected in service.
OPTICAL DENSITY (RT):	See DENSITY.
OPTICAL PYROMETER:	A temperature measuring optical device used to compare the incandescence of a heated object with that of an electrically heated filament whose brightness can be regulated.
OPTIMUM FREQUENCY (ET, UT):	That frequency, which provides the highest signal-to-noise ratio obtainable for the detec- tion of an individual property such as conductivity, crack, or inclusion of the test speci- men. Each type of defect in a given material may have its own optimum frequency.

ORANGE-PEEL EFFECT:	A surface roughening in the form of a grain pattern where a metal of unusually coarse grain is stressed beyond its elastic limit. Also called pebbles and alligator skin.
ORBITAL ELECTRON (SHELL ELECTRON) (RT):	An electron in the extra-nuclear structure of an atom.
ORIENTATION:	Position of a discontinuity or part or surface in relation to the test surface of the article or ultrasonic beam.
ORIENTATION (CRYS- TAL):	Arrangement in space of the axes of a crystal with respect to a chosen reference or coordinate system.
OSCILLATOR (ET):	A component of an electrical circuit that provides a source of current that varies in magnitude and direction with time. In eddy current testing, the oscillator provides a source of alternating current to establish a varying magnetic field.
OSCILLOGRAM (UT):	Common term for photograph of data displayed on CRT.
OVER-DEVELOPMENT (RT):	Development that is greater than that required to produce the optimum results in a particular radiograph. It may arise from development for too long a time, or at too high a temperature, and may give rise to excessive graininess and lack of contrast.
OVERHEATED:	Steel subjected to such high temperatures that coarse grains are produced without destroy- ing the stock as in burning. This may be corrected by suitable heat treat.
OVERLAP:	Protrusion of weld metal beyond the bond at the toe of the weld.
OVERLOAD INTERLOCK, X-RAY UNIT (RT):	An X-ray machine in which the presetting of voltage, current, and time are interlinked in such a way that if their product (i.e., the energy to be applied) exceeds the permissible loading of the X-ray tube, the latter cannot be energized.
OVERSTRESSING:	In fatigue testing, cycling at a stress level higher than that used at the end of the test.
OXIDATION:	The reaction of an element to oxygen or an oxygen containing compound.
OXIDATION FOG (RT):	Fog caused by exposure of a film to air during development.
	Р
PAIR PRODUCTION (RT):	The conversion of very high-energy photons, when absorbed in matter, by a process wherein the photon is converted in the electrical field of a nucleus into an electron (negative charge) and a positron (equal but opposite positive charge).
PARALLEL MAGNETIZA- TION:	A magnetic field induced in a piece of magnetizable material that is placed parallel to a conductor carrying an electric current.
PARAMAGNETIC (MT):	Materials in which the magnetic permeability is slightly greater than one. These materials are classified as nonmagnetic with a permeability of one for purposes of eddy current inspection. A material which can be slightly magnetized, but not sufficiently to permit magnetic particle inspection.
PART:	A term used to refer to a manufactured article that is being inspected.
PARTICLE:	A minute constituent of matter with a measurable mass, such as a neutron, proton, or meson.
PARTICLE MOTION (UT):	Movement of particles in an article brought about by the action of a transducer.
PARTICLE (RT):	A minute constituent of matter with a measurable mass, such as an electron, neutron, proton, or meson.
PARTICULATE RADIA- TION (RT):	Radiation consisting of charged or uncharged atomic particles.
PARTING LINE:	The line along which a pattern is divided for molding or along which the sections of a mold separate.
PASTE (MAGNETIC):	Finely divided, ferromagnetic particles in paste form used in preparing wet suspensions magnetic particle inspection.
PEAK VOLTAGE (RT):	The maximum value achieved by a varying voltage.

PENETRABILITY (PT):	The property of a penetrant that causes it to find its way into very fine openings, such as cracks.
PENETRAMETER (RT):	A device employed to obtain evidence on a radiograph that the technique used was satisfactory. It is not intended for use in judging the size of discontinuities nor for establishing acceptance limits for materials or products.
PENETRAMETER SENSI- TIVITY (RT):	See SENSITIVITY, RADIOGRAPHIC.
PENETRANT (PT):	A liquid of high surface tension and high capillary action which is a vehicle for a colored or a fluorescent dye, used to penetrate into the defect and detect surface discontinuities.
PENETRANT INDICA- TION:	Readings that mark or denote the presence of material defects.
PENETRANT, POST EMULSIFIABLE (PT):	A penetrant that requires the application of a separate emulsifier to render the surface penetrant water-washable.
PENETRANT REMOVER (PT):	A penetrant remover is a solvent-type liquid used to clean penetrants from the surface of a material.
PENETRANT SENSITIVI- TY (PT):	Penetrant sensitivity is the ability of the penetrant, processing technique, and developer to detect surface-connected discontinuities and provide an indication visible to the unaided eye.
PENETRANT, VISIBLE (PT):	A penetrant that is characterized by an intense visible color, usually red, that allows it to give contrasting indications on a white developer background.
PENETRANT, WATER- WASHABLE (IT):	See WATER-WASHABLE.
PENETRATION:	The maximum depth from which indications can be measured in a material.
PENETRATION (RT):	A qualitative term used to describe the degree to which radiation is capable of penetrating a given object. Penetration is usually a function of the applied tube voltage in X-rays or equivalent voltage in isotope radiography.
PENETRATION TIME (PT):	The time allowed for the penetrant to enter into surface discontinuities, i.e., the length of time elapsing between the application of the penetrant to the part and removal of penetrant.
PENUMBRA (RT):	The shadow cast when the incident radiation is partly, but not wholly, cut off by an intervening body; the space of partial illumination between the umbra, or perfect shadow, on all sides and the full light. A marginal region of borderland of partial obscurity.
PERSONNEL MONITOR- ING EQUIPMENT (RT):	Devices designed to be worn or carried by an individual for the purpose of measuring the dose received (e.g., film badges, pocket chambers, pocket dosimeters, film rings, etc.)
PERIODIC TABLE:	A tabular arrangement of elements according to their properties.
PERMEABILITY (MT):	The ease with which a material can become magnetized. It is the relationship between field strength and the magnetizing force.
PERMEABILITY (MT):	The ease with which a magnetic field or flux can be set up in a magnetic circuit. It is not a constant value for a given material, but is a ratio. At any given value of magnetizing force, permeability is B/H the ratio of flux density, B, to magnetizing force H.
PERMANENT MAGNETS:	A body that possesses the ability to retain or hold a large amount of the applied magnet field after the active power of the field is removed.
PERMANENT MOLD:	A metal mold (other than an ingot mold) of two or more parts that is used repeatedly for the production of many castings of the same form. Liquid metal is poured in by gravity.
PERMANENT SET:	Plastic deformation that remains upon releasing the stress that produces the deformation.

PHASE:	In periodic changes of any magnitude varying according to a simple harmonic law (as ultrasonic vibrations, alternating electric currents, etc.), the point or stage in the period to which the variation has advanced, considered in its relation to a standard position; can be expressed in degrees.
PHASE ANALYSIS:	An instrumentation technique which discriminates between variables in the test part by the different phase angle changes which these conditions produce in the test signal.
PHASE ANGLE:	The angular equivalent of the time displacement between corresponding points on two sine waves of the same frequency.
PHASE SHIFT:	A change in the phase relationship between two alternating quantities of the same fre- quency.
ΡΗΙ (φ):	Symbol for the sound beam angle as measured from the normal to a sound entry or sound reflecting surface; the Greek letter Phi.
PHOTOELECTRIC AB- SORPTION (RT):	A process by which electromagnetic radiation imparts energy to matter.
PHOTOGRAPHIC EMUL- SION (RT):	See EMULSION.
PHOTOGRAPHIC FOG (RT):	Fog caused solely by the properties of an emulsion and the processing conditions, i.e., the total effect of inherent fog and chemical fog.
PHOTOGRAPHIC INTEN- SIFICATION (RT):	Chemical treatment of a processed emulsion, usually with an oxidizing agent, to lessen the density. There may be a change of contrast, depending on the process used.
PHOTOGRAPHIC TRANS- MISSION DENSITY (RT):	See DENSITY.
PHOTON (RT):	An electromagnetic packet of radiation. It has a dual character, acting sometimes like a particle and at other times like a wave. Photons all have equal velocity (the speed of light), have no electric charge, and have no mass.
PHOTO-SENSITIVITY (RT):	A property of a photographic emulsion by virtue of which electromagnetic or particulate radiation may produce chemical or physical changes in the emulsion.
PHOTOTHERMO- GRAPHIC FILM (RT):	A blue/green sensitive "dry silver" film used in conjunction with special fluorescent screens in vacuum cassettes which can serve as an alternative to X-ray film for noncritical applications. The principle advantage of this film is that it is processed thermally, eliminating the need for wet chemicals.
PHYSICAL PROPERTIES:	The properties, other than mechanical properties, that pertain to the physics of a material; for example, density, electrical conductivity, heat conductivity, thermal expansion.
PHYSICAL TESTING:	Determination of Physical Properties.
PICKLE:	Using acid or other chemicals with suitable inhibitors to remove scale or smeared metal without affecting the sound metal.
PICKLE PATCH:	A tightly adhering oxide or scale coating not properly removed during the pickling process.
PICKLE STAIN:	Discoloration of metal due to chemical cleaning without adequate washing and drying.
PICKLING CRACKS:	Cracks caused by internal stresses being released as the pickling acid eats away the surface of the material.
PIEZOELECTRIC (UT):	That ability of a material to convert electrical energy into mechanical energy and vice versa.
PIG:	A cast slab of primary metal that must be remelted before use.
PINHOLES:	Very small holes; sometimes found as a type of porosity in a casting because of microshrinkage or of gas evolution during solidification.
PINHOLE (RT):	A through hole of small diameter in a sheet of material opaque to radiation.

PINHOLE POROSITY:	Porosity, in either castings or metal formed by electrodeposition, resulting from numerous small holes distributed throughout the metal.
PIPE:	(1) The central cavity formed by contraction in metal, especially ingots, during solidifica- tion. (2) The defect in wrought or cast products resulting from such a cavity. (3) An Extrusion Defect due to the oxidized surface of the billet flowing toward the center of the rod at the back end. (4) A tubular metal product, cast or wrought.
PITCHBLENDE:	An ore that contains uranium.
PITCH-CATCH (UT):	Used to describe an inspection method in which the ultrasonic energy is emitted by one transducer element and received by another on the same or adjacent surface.
PITTING:	Forming small sharp cavities in a metal surface by nonuniform electrodeposition or by corrosion.
PLANCK'S CONSTANT (RT):	A fundamental physical constant; the ratio of the energy of a photon to its frequency.
PLASTIC DEFORMATION:	Working of a material beyond its elastic limit to produce a permanent change in dimen- sions.
PLASTIC FLOW:	Same as PLASTIC DEFORMATION.
PLASTICITY:	The ability of a metal to deform nonelastically without rupture.
PLATE PENETRAMETER (STRIP PENETRAMETER) (RT):	A plate of material similar to the specimen under examination, having a thickness of 1 or 2 percent of the specimen thickness, and having holes of different diameters.
PLATED CRYSTAL:	Crystal on which metallic surfaces are deposited for protection and/or to give surfaces on which the electrical potential can be impressed.
PLATEN:	That part of a casting machine against which die sections are fastened, or presses against which trim dies are fastened.
PLATING:	Forming an adherent layer of metal upon an object.
PLATING CRACK:	See CRACK, PLATING.
PLATE WAVE:	See LAMB WAVE.
POINT OF INCIDENCE (UT):	Designates the point at which the center of the sound beam leaves the wedge from an angle beam search unit.
POLARITY:	The quality of having two opposite magnetic poles, one north and one south.
POLE (MT):	The area on a magnetized part from which the magnetic field leaves or enters the part.
POROSITY:	Random pits or holes in the object.
POSITRON:	A fundamental particle of nature having a mass equal to that of the electron and possess- ing a positive charge equal to the negative charge of the electron. The mass of the positron is therefore 9.107 x 10^{-28} gm; the electrical charge carried by the positron is equal to 4.802 x 10^{-10} statcoulomb (electrostatic unit of charge).
POST-CLEANING (PT):	The removal of residual penetrant and/or developer from the item after the inspection operation.
POST-EMULSIFICATION (PT):	The technique wherein a separate emulsifying step is required to facilitate water rinse removal of the surface penetrant.
POTTER-BUCKY DIA- PHRAGM (RT):	A device incorporating an anti-scatter grid that is kept in motion during the time of a radiographic exposure so as to avoid grid images on the radiograph.
POTTER-BUCKY GRID (RT):	See POTTER-BUCKY DIAPHRAGM.
POWDER, DRY (MT):	Finely divided ferromagnetic particles suitably selected and prepared for magnetic particle inspection.

PRECIPITATE (MT):	The separating of the magnetic particles from the liquid vehicle. Used primarily for checking concentration of magnetic particles in the vehicle.
PRECIPITATION HARD- ENING:	The process by which a metal is hardened by the formation of small particles of seconda- ry composition from a solid solution. This process is usually performed at an elevated temperature considerably below the temperature of solution heat treating.
PRECIPITATION HEAT TREATMENT:	Artificial aging in which a constituent precipitates from a supersaturated solid solution.
PRE-CLEANING:	The cleaning of a part before testing so that it is free from all foreign material (paint, grease, oil, rust, scale, layout dye, wax crayon markings, etc.) which may cover a surface discontinuity and thereby inhibit the entrance of the penetrant liquid, or absorb the penetrant and render an "irrelevant indication."
PRESENTATION:	The method used to show ultrasonic wave information. May include A, B, or C scans displayed either on various types of recorders or cathode ray instrumentation's.
PRESERVATIVE, DEVEL- OPER (RT):	A constituent (e.g., sodium sulfate) that minimizes the exhaustion of a developer caused by aerial oxidation, and serves to remove oxidation products which might retard develop- ment or produce stain.
PRESSURE MARK (RT):	An effect produced by pressure on a film which after developing results in areas of either increased or decreased density. The crescent-shaped pressure mark due to severe local bending of a film is often called a crimp mark.
PRIMARY MAGNETIC FIELD (ET):	In eddy current inspection, the field produced by the test coil or coils as differentiated from the magnetic field produced by the eddy current or the resultant field.
PRIMARY RADIATION (RT):	Radiation coming directly from the source of radiation that has undergone no physical process changing its character.
PROBE (ET, MT, UT):	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT.
PROBE (ET, MT, UT): PROBE WOBBLE (ET):	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations.
PROBE (ET, MT, UT): PROBE WOBBLE (ET): PROCESS ANNEALING:	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working.
PROBE (ET, MT, UT): PROBE WOBBLE (ET): PROCESS ANNEALING: PROCESS ATTAINMENT (ABILITY):	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working. The ultimate ability of a process to find a defect of minute size at the current state-of-the-art, usually defined as the ability to detect defects as small See SENSITIVITY.
PROBE (ET, MT, UT): PROBE WOBBLE (ET): PROCESS ANNEALING: PROCESS ATTAINMENT (ABILITY): PROCESS CAPABILITY:	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working. The ultimate ability of a process to find a defect of minute size at the current state-of-the-art, usually defined as the ability to detect defects as small See SENSITIVITY. The ability of a process to repeatedly find a defect under the influence of normal day-to-day variations of process, people, materials, environment and other influences normally tied to a confidence level.
PROBE (ET, MT, UT): PROBE WOBBLE (ET): PROCESS ANNEALING: PROCESS ATTAINMENT (ABILITY): PROCESS CAPABILITY: PROCESS CONTROL:	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working. The ultimate ability of a process to find a defect of minute size at the current state-of-the-art, usually defined as the ability to detect defects as small See SENSITIVITY. The ability of a process to repeatedly find a defect under the influence of normal day-to-day variations of process, people, materials, environment and other influences normally tied to a confidence level. Is a general term used to encompass the actions and documentation, as required by official directives or logic, that are necessary for a NDI method to be effective in detecting conditions of interest (e.g., cracks, foreign objects, corrosion, alignment of parts, thickness of parts/coating and pressure/vacuum leaks).
PROBE (ET, MT, UT): PROBE WOBBLE (ET): PROCESS ANNEALING: PROCESS ATTAINMENT (ABILITY): PROCESS CAPABILITY: PROCESS CONTROL: PROCESSING DEFECTS:	An assembly containing a small coil or coils designed for eddy current inspection of small areas immediately adjacent to the coil and an electromagnet producing magnetic fields for magnetic inspection. The unit has two jointed laminated pole pieces permitting adjustment to varying surfaces configuration. Also the device contains a microphone used with an ultrasonic leak detector to receive ultrasonic energy resulting from leakage. See SEARCH UNIT. The change in angular orientation between a surface probe and the inspection surface. Probe wobble results in lift-off variations. In the sheet and wire industries, heating a ferrous alloy to a temperature close to, but below, the lower limit of the transformation range and then cooling, in order to soften the alloy for further cold working. The ultimate ability of a process to find a defect of minute size at the current state-of-the-art, usually defined as the ability to detect defects as small See SENSITIVITY. The ability of a process to repeatedly find a defect under the influence of normal day-to-day variations of process, people, materials, environment and other influences normally tied to a confidence level. Is a general term used to encompass the actions and documentation, as required by official directives or logic, that are necessary for a NDI method to be effective in detecting conditions of interest (e.g., cracks, foreign objects, corrosion, alignment of parts, thickness of parts/coating and pressure/vacuum leaks).

PROCESSING UNIT (RT):	A series of tanks forming a single unit for holding chemical solutions used during processing.
PROCESS INSPECTION:	To establish correct manufacturing procedure by inspection methods, and then by periodic inspection to ensure that the process continues to operate correctly.
PRODS (MT):	Hand held electrodes attached to cables to transmit the magnetizing current from the source to the part being inspected.
PROGRESSIVE AGING:	Aging by increasing the temperature in steps or continuously during the aging cycle.
PROGRESSIVE FORMING:	Sequential forming at consecutive stations either with a single die or with separate dies.
PROJECTOR (RT):	See exposure device.
PROOF LOAD:	A predetermined load, generally some multiple of the service load, to which a specimen or structure is submitted before acceptance for use.
PROOF STRESS:	(1) The stress that will cause a specified small permanent set in a material. (2) A specified stress to be applied to a member or structure to indicate its ability to withstand service loads.
PROPAGATION:	Advancement of a wave through a medium.
PROPORTIONAL LIMIT:	The maximum stress at which strain remains directly proportional to stress.
PROTECTIVE APRON (RT):	Apron made of attenuating materials, used to reduce radiation exposure.
PROTECTIVE MATERIAL (RT):	Shielding material used for the purpose of radiation protection.
PROTON:	An elementary particle with a single positive electrical charge and a mass approximately 1847 times that of the electron. The atomic number of an atom is equal to the number of protons in its nucleus.
PSIGG:	Pounds per square inch; gauged air pressure gauged by a regulator.
PT:	Symbol for the liquid penetrant method of nondestructive testing/inspection.
PUBLIC DOSE:	The dose received by a member of the public from exposure to radiation.
PULL CRACKS:	In a casting, cracks that are caused by residual stresses produced during cooling, and that result from the shape of the object.
PULSE (UT):	A series of vibrations or oscillations having a brief duration.
PULSE-ECHO METHOD (UT):	An inspection method in which the presence and position of a discontinuity is indicated by the echo amplitude and time position; also designates a method of inspecting bonded honeycomb structures by monitoring the echoes from the far side of the core.
PULSE LENGTH (UT):	A measure of the duration of a pulse, expressed in time or number of cycles.
PULSE REPETITION RATE (UT):	See FREQUENCY, PULSE REPETITION.
PULSE TUNING (UT):	Control, on some instruments, used to optimize the response of the search unit and cable.
PYROMETER:	Any device used for determining temperatures over a wide range, including extremely high temperatures.
	Q
DICATOR (RT):	See PENETRAMETER.
QUALITY FACTOR (RT):	The linear-energy-transfer-dependent factor by which absorbed doses are to be multiplied to obtain, for radiation protection purposes, a quantity (i.e., dose equivalent) that expresses on a common scale for all ionizing radiation the irradiation incurred by exposed persons. The quality factor weights the absorbed dose for the biological effectiveness of the particular type of radiation producing the absorbed dose. Symbol: Q.

QUALITY LEVEL (RT):	See RADIOGRAPHIC QUALITY LEVEL.	
QUALITY OF RADIATION (RT):	The quality of a radiation determines its degree of penetration, and is related to the energy of the radiation.	
QUANTUM:	If the magnitude of a quantity is always an integral multiple of a definite unit, then that unit is called the quantum of the quantity. The photon is a quantum of the electromagnet- ic field and the meson is considered to be the quantum of the nuclear field.	
QUANTUM (RT):	A discrete amount of radiation energy. The quantum energy is E=hu, where u is the frequency of the radiation and h is Plank's constant.	
QUENCH AGING:	Aging induced by rapid cooling after Solution Heat Treatment.	
QUENCH ANNEALING:	Annealing an austenitic ferrous alloy by Solution Heat Treatment.	
QUENCH CRACKS:	See CRACKS, QUENCHING.	
QUENCH HARDENING:	Hardening a ferrous alloy by austenitizing and then cooling rapidly enough so that some or all of the austenite transforms to martensite. The austenitizing temperature for hypoeu- tectoid steels is usually above Ac3 and for hypereutectoid steels usually between Acl and Accm.	
QUENCHING:	Rapid cooling. When applicable, the following more specific terms should be used: direct quenching, fog quenching, hot quenching, interrupted quenching, selective quenching, spray quenching, and time quenching.	
QUICK-BREAK:	Sometimes called "FAST BREAK." The sudden breaking of a direct current causes a transient current to be induced in the part by the rapid collapse of the magnetic field. In magnetic particle testing, fast breaking of the magnetizing current is used to generate a transient current in a part which is favorable for finding transverse defects at the ends of longitudinally magnetized bars. Such defects are often concealed by the strong polarity at the bar ends. At such locations the lines of force of the longitudinal field are leaving the bar in a direction normal to the surface, which prevents them from intercepting transverse defects in those areas. The field induced by the transient current does intercept such discontinuities.	
QUENCHING OF FLUO- RESCENCE (MT, PT):	The extinction of fluorescence by causes other than removal of the UV-A source (the exciting radiation).	
R		
RAD:	The special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 Joule/kilogram (0.01 gray).	
RADIATION (RT):	The propagation of energy through matter or space in the form of waves. In atomic physics the term has been extended to include fast-moving particles (alpha and beta rays, free neutrons, etc.). Gamma rays and Xrays, of particular interest in atomic physics, are electromagnetic radiation in which energy is propagated in packets called photons.	
RADIATION AREA:	An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem (0.05 mSv) in any one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.	
RADIATION BURN (RT):	A burn caused by overexposure to radiant energy.	
RADIATION DAMAGE (RT):	A general term for the alteration of properties of a material arising from radiation expo- sure to X-rays, gamma rays, neutrons, heavy-particle radiation or fission fragments in nuclear fuel material.	
RADIATION DETECTOR (RT):	See DETECTOR.	
RADIATION HAZARD (RT):	A situation or condition that represents potential danger to health as the result of exposure to ionizing radiation.	

RADIATION MAZE (RT):	An indirect route of access to a room that contains a radiation source. It is designed to allow easy access when the source is turned off or is fully shielded, and to reduce radiation intensity outside the room to acceptable levels when the source is turned on or exposed. Reduction of radiation intensity is achieved through multiple scattering from walls and application of the inverse square law.
RADIATION METER (RT):	An instrument consisting of one or more radiation detectors, associated electronics, and an indicator of the magnitude of the measured radiation quantity.
RADIATION MONITOR (RT):	A radiation meter that is designed and used to keep track of radiation levels in a specific area, and to record those levels, or to provide an audible or visual signal when a predeter- mined level is exceeded.
RADIATION PROTEC- TION GUIDE:	The total amounts of ionizing radiation dose over certain periods of time which may safely be permitted to exposed industrial groups. These standards, established by the Federal Radiation Council, are equivalent to what was formerly called the "maximum permissible exposure."
RADIATION PROTEC- TION (RT):	A branch of the physical, biological, and chemical sciences applying to the prevention of the risks presented by exposure of persons to ionizing radiation.
RADIATION PROTEC- TION SURVEY (RT):	Evaluation of the radiation hazards in and around an area where a radiation source is used or stored. It customarily includes an examination of the arrangement and use of the source and related equipment, and measurements of exposure rates under expected operating conditions.
RADIATION QUALITY (RT):	See BEAM QUALITY.
RADIATION SAFETY IN- TERLOCK (RT):	A device for precluding access to an area of radiation hazard either by preventing entry or by automatically removing the hazard.
RADIATION SAFETY OF- FICER:	An individual engaged in the practices of providing radiation protection. He is the repre- sentative appointed by the licensee for liaison with the Atomic Energy Commission.
RADIATION SICKNESS (RT):	See ACUTE RADIATION SYNDROME.
RADIATION SOURCE (RT):	A machine or a material emitting, or capable of emitting, ionizing radiation.
RADIATION SURVEY (RT):	See RADIATION PROTECTION SURVEY.
RADIATION TRAP (RT):	See RADIATION MAZE.
RADIOACTIVE:	Atoms that are energetically unstable and decay to a stable condition by emitting radiation are said to be radioactive.
RADIOACTIVE CONTAM- INATION:	Deposition of any radioactive material in any place where it is not desired, particularly where it may be harmful.
RADIOACTIVE DECAY (RT):	The spontaneous nuclear disintegration of a material. It occurs on an atomic scale by the loss of subatomic particles (i.e., protons, neutrons, electrons, etc.). See HALF-LIFE.
RADIOACTIVE MATERI- AL:	Includes any such material whether or not subject to licensing control by the Commission.
RADIOACTIVE SERIES (RT):	A sequence of radionuclides formed by successive nuclear transitions until a stable (non-radioactive) nuclide, the end product, is reached.
RADIOACTIVE SOURCE (RT):	A radiation source consisting of radioactive material.
RADIOACTIVE WASTE:	Equipment and materials (from nuclear operations) which are radioactive and for which there is no further use.

RADIOACTIVITY:	Spontaneous nuclear disintegration with emission of corpuscular or electromagnetic radia- tion. The principal types of radioactivity are alpha disintegration, beta decay (electron emission, positron emission, and electron capture) and isomeric transition.
RADIOACTIVITY CON- CENTRATION GUIDE:	The concentration of radioactivity in an environment which results in doses equal to those in the radiation protection guide. This Federal Radiation Council term replaces the former "maximum permissible concentration."
RADIOBIOLOGY:	The study of the scientific principles, mechanisms, and effects of the interaction of ionizing radiation with living matter.
RADIOGRAPH (RT):	A permanent visible image on a recording medium produced by penetrating radiation passing through the material being tested.
RADIOGRAPHER:	Any individual who performs or who, in attendance at the site where the sealed source or sources are being used, personally supervises radiographic operations and who is responsible to the licensee for assuring compliance with the requirements of these regulations and the conditions of the licenses.
RADIOGRAPHER'S AS- SISTANT:	Any individual who under the personal supervision of a radiographer, uses radiographer exposure devices, sealed sources or related handling tools, or survey instruments in radiography.
RADIOGRAPHER'S EXPO- SURE DEVICE:	Any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.
RADIOGRAPHIC CODE:	A code for specifying minimum standards related to radiographic practices.
RADIOGRAPHIC EXPO- SURE DEVICE (RT):	See EXPOSURE DEVICE.
RADIOGRAPHIC FILM (RT):	See FILM, RADIOGRAPHIC.
RADIOGRAPHIC PAPER (RT):	White paper coated on one side with emulsion, suitable for some purposes as an alterna- tive to X-ray film.
RADIOGRAPHIC PROJEC- TION METHOD (RT):	A method whereby image magnification is achieved by projection.
RADIOGRAPHIC QUALI- FICATION TEST:	A procedure for determining the optimum value of the d/t ratio, or the proper working distance of an X-ray tube or a radioactive source.
RADIOGRAPHIC QUALI- TY LEVEL (RT):	An expression of the quality (sensitivity) of a radiograph in terms of an image quality indicator (penetrameter). When a standard hole-type penetrameter is used, quality level is stated as a-bT, where a is the penetrameter thickness, expressed as a percentage of the maximum thickness of the specimen, and b is the diameter of the smallest discernible hole, expressed as a multiple of penetrameter thickness, T. For example, the 3- 2T quality level means that the penetrameter thickness equals 3 percent of maximum specimen thickness, and the smallest discernible penetrameter hole has a diameter equal to twice the penetrameter thickness.
RADIOGRAPHIC RANGE (RT):	See EXPOSURE LATITUDE.
RADIOGRAPHIC SCREEN (RT):	See INTENSIFYING SCREEN.
RADIOGRAPHIC SCREENS:	Metallic or fluorescent sheets used to intensify the radiation effect on films.
RADIOGRAPHIC SENSI- TIVITY (RT):	See SENSITIVITY, RADIOGRAPHIC.

A material or alloy that has approximately the same radiation absorption as the material RADIOGRAPHICALLY SIMILAR MATERIAL being radiographed. (RT): RADIOGRAPHIC CON-See CONTRAST, RADIOGRAPHIC. TRAST (RT): RADIOGRAPHIC DEFINI-See DEFINITION. RADIOGRAPHIC. TION (RT): RADIOGRAPHIC ENERGY See ENERGY, RADIOGRAPHIC. (RT): RADIOGRAPHIC EQUIV-The factor by which the thickness of a material must be multiplied in order to determine what thickness of a standard material (often steel) will have the same absorption. ALENCE FACTOR (RT): RADIOGRAPHIC INSPEC-The use of X-rays or nuclear radiation or both to detect discontinuities in material, and to TION (RT): present their images on a recording medium. RADIOGRAPHIC INTER-The identification of subsurface discontinuities indicated on the radiograph. The evaluation as to the acceptability or rejectability of the material is based upon the judicious PRETATION (RT): application of the radiographic specifications and standards governing the material. The selection of those radiographic factors such as kilovoltage, milliamperage, type of RADIOGRAPHIC TECHfilm and screen, distance, and exposure time as to render the best possible radiographic NIQUE (RT): sensitivity. **RADIOGRAPHY** (RT): A nondestructive testing method wherein a source of X-rays or gamma rays, is utilized to indicate the subsurface condition of opaque materials. A permanent record of the soundness characteristics is generally made on a specially prepared film called the radiograph. **RADIOISOTOPE:** An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. More than 1300 natural and artificial radioisotopes have been identified. RADIOLOGY: That branch of medicine that uses ionizing radiation for diagnosis and therapy. RADIONUCLIDE (RT): A nuclide that is radioactive. RADIUM: A radioactive element with the atomic number 88 and an atomic weight of 226. In nature, radium is found associated with uranium, which decays to radium, by a series of alpha and beta emissions. Radium is used as a radiation source. The maximum ultrasonic path length that can be displayed; see SWEEP. RANGE (UT): RANGE MARKERS: See MARKERS. The thinning out, or moving apart of the particles in a material as an ultrasonic wave is **RAREFACTION:** propagated. Opposite in its effect to compression. The sound wave is composed of alternate compressions and rarefactions of the material. A device designed to measure radiation per unit time, as in milliroentgens per hour. It is RATE METER (RT): used for detecting radiation fields and measuring the exposure rate. RAY: A beam of energy of small cross section. See SURFACE WAVE. RAYLEIGH WAVE (UT): RBE DOSE: RBE stands for relative biological effectiveness. An RBE dose is the dose measured in rems. (This is discussed in the report of the International Commission on Radiological Units and Measurements, 1956, NBS Handbook 62, p. 7). **READOUT (ET):** The method by which eddy current information is presented or displayed. Readout includes meters, recorders and CRTs (cathode ray tubes).

REAL-TIME RADIOGRA- PHY (RT):	A type of radiography in which an image is not produced photographically, but is instead produced on a fluorescent screen viewed by a video camera. The image may be intensi- fied or enhanced before display on a television monitor. This enables radiographic inter- pretation concurrent with irradiation of a specimen, and lends itself to remote rapid inspection of items on an assembly line. A video recorder may be used to record the image.
RECARBURIZE:	(1) To increase the carbon content of molten cast iron or steel by adding carbonaceous material, high-carbon pig iron or a high-carbon alloy. (2) To carburize a metal part to return surface carbon lost in processing.
RECEIVER (UT):	Search unit or transducer element, used to receive ultrasonic energy from a test part.
RECESS:	A groove or depression in a surface.
RECIPROCITY LAW (RT):	Law that states that the film blackening is determined by the product of the milliamperage or source strength and the time of exposure. See RECIPROCITY LAW FAILURE.
RECIPROCITY LAW FAILURE (RT):	A term used to describe situations in which the reciprocity law is not applicable. For very short or very long exposures, problems with film response time can cause the reciprocity law to fail.
RECORDING MEDIUM (RT):	A photographic film or other material that converts radiation energy into a permanent visible image.
RECOVERY TIME:	The time required for a test system to return to its original state after it has received a signal.
RECRYSTALLIZATION:	(1) The change from one crystal structure to another, as occurs on heating or cooling through a critical temperature. (2) The formation of a new, strain-free grain structure from that existing in cold worked metal, usually accomplished by heating.
RECTIFICATION:	Any method by which a unidirectional voltage can be obtained from an alternating supply.
RECTIFIED ALTERNAT- ING CURRENT:	By means of a device called a rectifier, which permits current to flow in one direction only, alternating current can be converted to direct or unidirectional current. This differs from direct current in that the current value varies from a steady level. This variation may be extreme, as in the case of half-wave rectified single-phase AC or slight, as in the case of three-phase rectified AC.
RECTIFIER:	A tube or circuit capable of converting the high voltage alternating waveform into a usable unidirectional voltage waveform.
REDUCTION:	(1) In cupping and deep drawing, a measure of the percentage decrease from blank diameter to cup diameter or of diameter reduction in redraws. (2) In forging, rolling and drawing, either the ratio of the original to final cross-sectional area or the percentage decrease in cross-sectional area.
REDUCTION FACTOR:	Dose rate without a shield divided by the dose rate with a shield interposed between a source and a point at which radiation is measured.
REDUCTION OF AREA:	(1) Commonly, the difference expressed as a percentage of original area, between the original cross-sectional area of a tensile test specimen and the minimum cross-sectional area measured after complete separation. (2) The difference expressed as a percentage of original area, between original cross-sectional area and that after straining the specimen.
REFERENCE BLOCKS:	A block or series of blocks of material containing artificial or actual discontinuities of one or more reflecting areas at one or more distances from the test surface, which are used for reference in defining the size and distance of defective areas in materials.
REFERENCE NUMBER:	A mathematical value established to summarize the combined effects of conductivity, magnetic permeability, test frequency, coil radius and thickness for use in impedance diagrams.

REFERENCE RADI- OGRAPHS:	A group of radiographs containing images of discontinuities. These can be used as com- parison "standards" for acceptability of materials.
REFERENCE SPECIMEN	A manufactured article, a piece of material or an actual part having one ore more discontinuities that provide responses similar to the defect requiring detection. The refer- ence specimen serves as a comparative reference to aid recognition of a response from the defect being inspected for. It should not be used to set an accept/reject amplitude thresh- old, since the defect is not reproducible. Examples would include a metal part with a true fatigue crack, and composite laminate with a natural or induced delamination or disband.
REFERENCE STANDARD:	A reproducible article having one ore more machined notches, flat-bottomed holes, or other reproducible simulated defects or characteristics of interest. The reference standard is used to adjust multiple instruments to yield the same response from a given part discontinuity, and is also used to adjust a single instrument to yield the same response over time. A reference standard can be something manufactured for that purpose, or it can be a part, similar to the one being inspected, having a reproducible reference defect or characteristic.
REFLECTION (UT):	An indication that has arisen as a result of an incident sound beam being reflected at the boundary of two materials of dissimilar acoustic impedance.
REFLECTION DENSITY (RT):	The common logarithm of the ratio of the brightness of a non-absorbing perfect diffuser to that of the sample, both being illuminated at an angle of 45 degrees to the surface, the direction of measurement being normal to the surface.
REFLECTOGRAM:	A picture of recording of the indications presented on the cathode ray tube of the ultrasonic instrument.
REFLECTOGRAPH:	A recording or chart made of either the signals transmitted through a part or reflected back from defects within a part, or both.
REFLECTOR (UT):	An interface at which an ultrasonic beam reflects.
REFRACTED BEAM (UT):	The beam that occurs in the second medium when an ultrasonic beam passes obliquely from one medium to another when each medium has different sound velocities.
REFRACTION (UT):	Change in direction of an ultrasonic beam as it passes obliquely through the interface between two materials with different acoustic velocity; see SNELL'S LAW.
REFRACTIVE INDEX (UT):	The ratio of the velocity of a wave in one medium to the velocity of the wave in a second medium is the refractive index of the second medium with respect to the first. It is a measure of the amount a wave will be refracted when it enters the second medium after leaving the first.
REFRACTORY:	(1) A material of very high melting point with properties that make it suitable for such uses as furnace linings and kiln construction. (2) The quality of resisting heat.
REFRACTORY ALLOY:	(1) A heat-resistant alloy. (2) An alloy having an extremely high melting point. See REFRACTORY METAL. (3) An alloy difficult to work at elevated temperatures.
REFRACTORY METAL:	A metal having an extremely high melting point. In the broad sense, it refers to metals having melting points above the range of iron, cobalt and nickel.
REINFORCEMENT OF WELD:	(1) In a butt joint, weld metal on the face of the weld that extends out beyond a surface plane common to the members being welded. (2) In a fillet weld, weld metal that contributes to convexity. (3) In a flash, upset or gas pressure weld, the original diameter or thickness.
REJECT (SUPPRESSION) (UT):	A control used for minimizing or eliminating low amplitude signals (electrical or material "noise") so that larger signals are emphasized. Use of this control can reduce the vertical linearity of the amplifier.
REJECTION LEVEL (UT):	The setting of the signal level above or below which all parts are rejectable as, in an automatic system, at which objectionable parts will actuate the reject mechanism of the system.

RELATIVE BIOLOGICAL EFFECTIVENESS (RBE):	The relative effectiveness of a given kind of ionizing radiation in producing a biological response as compared with 250,000 electron volt gamma rays.
RELATIVE EXPOSURE:	Exposure expressed relative to a standard exposure that is arbitrarily assigned the value of 1.0.
RELATIVE SPEED (RT):	The exposure time of any radiographic film relative to one particular type of film whose speed is arbitrarily assigned the value of 100.
RELEVANT DISCONTI- NUITY:	Discontinuity that is detrimental to the intended use of a part or material.
RELUCTANCE:	The degree of difficulty with which the magnetic flux is produced within a material. Material of high permeability has low reluctance.
REM:	The special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to absorbed dose in rads multiplied by the quality factor (1 rem = 0.01 sievert).
REMNANT MAGNETISM:	This is the term applied to the magnetism remaining in a magnetic circuit after the magnetizing force is removed.
REMOVER (PT):	See PENETRANT REMOVER.
REP:	Roentgen equivalent physical. An obsolete unit of radiation dosage now superseded by the rad.
REPETITION RATE (UT):	The rate at which the individual pulses of acoustic energy are generated; also PULSE RATE.
REPLENISHER (RT):	A modified form of the original developer which, when added to partially exhausted developer, restores its efficiency.
RESIDUAL ELEMENTS:	Elements present in an alloy in small quantities, but not added intentionally.
RESIDUAL FIELD (MT):	See FIELD, RESIDUAL.
RESIDUAL MAGNETISM (MT):	The magnetic field remaining in a part after the current has been removed.
RESIDUAL METHOD (MT):	Bath is applied after current has been shut off; that is, the indicating particles are on the part when residual (remaining) magnetic field is present.
RESIDUAL STRESS:	Stress present in a body that is free of external forces or thermal gradients.
RESILIENCE:	(1) The amount of energy per unit volume released upon unloading. (2) The capacity of a metal, by virtue of high yield strength and low elastic modulus, to exhibit considerable elastic recovery upon release of load.
RESISTANCE:	Resistance is the opposition to the flow of an electrical current through a conductor. Its unit is the ohm.
RESOLUTION (RT):	The smallest distance between adjacent distinguishable images on a radiograph or viewing screen. It may be expressed as the number of lines (or line parts) per millimeter that can be seen as discrete images.
RESOLVING POWER (UT):	The measure of the capability of an ultrasonic system to separate in time two discontinui- ties at slightly different distances or to separate the multiple reflections from the back surface of flat plates.
RESONANCE (UT):	The condition in which the frequency of the forced vibration (ultrasonic wave) is the same as the natural frequency of the body (test piece) which results in abnormally large amplitudes of vibration.
RESONANCE METHOD:	A technique in which continuous ultrasonic waves are varied in frequency to identify resonant characteristics in order to discriminate some property of a part as thickness, stiffness, or bond integrity.

RESONANT FREQUENCY:	The frequency at which a body will vibrate freely after being set in motion by some outside force.
RESTRAINER (RT):	The constituent (e.g., potassium bromide) that reduces the activity of the developing agent but enhances its preferential action by reducing the rate of development of unexposed grains to a greater extent than it does that of exposed grains. It thus tends to reduce chemical fog.
RESTRICTED AREA:	Any area access to which is controlled by the licensee.
RESTRIKING:	(1) Striking a trimmed but slightly misaligned or otherwise faulty forging one or more blows to improve alignment, improve surface, maintain close tolerance, increase hardness or to effect other improvements. (2) A sizing operation in which coining or stretching are utilized to correct or alter profiles and to counteract distortion.
RESULTANT (VECTOR FIELD) (MT):	When two or more magnetizing forces operating in different directions are simultaneously applied to a ferromagnetic material, a resultant field is produced, having a direction which is determined by the relative strengths and directions of the applied magnetizing forces. Such a field is also referred to as a vector field. If either or both of the applied magnetizing forces are themselves varying in direction or amount, the resultant field is moving or swinging in direction and strength. Such a moving resultant field is sometimes referred to as a "swinging field."
RESIDUAL METHOD (MT):	The method in which magnetic particles are applied to the material after the magnetizing current has been discontinued.
RESIDUAL STRESS:	Internal stress remaining in a piece of metal following some processing operation, such as hardening, cold working, etc.
RESISTANCE:	The opposition to the flow of an electrical current through a conductor or circuit that does not include inductive or capacitive elements. It can be expressed as the ratio of the applied voltage to the current.
RESOLUTION, DEFECT:	A property of a test system that enables the separation of indication due to defects in a test specimen that are located in close proximity to each other.
RESONANCE METHOD:	A method that varies the frequency of continuous ultrasonic waves to excite standing waves in a body generally used for thickness measurement.
RETENTIVITY (MT):	The ability of a material to retain magnetism after the current has been removed.
RETICULATION (RT):	The swelling of film emulsion because of sudden change of temperature, in excess of 15°F during processing.
REVERSAL (RT):	The production of a positive instead of a negative image in an emulsion or vice versa.
RF DISPLAY (UT):	A CRT signal display that is not rectified. Displayed signals are both above and below the sweep or base line.
RIGGING:	The engineering design, layout, and fabrication of pattern equipment for producing cast- ings; including a study of the casting solidification program, feeding and gating, risering, skimmers, and fitting flasks.
RIMMED STEEL:	A low-carbon steel containing sufficient iron oxide to give a continuous evolution of carbon monoxide while the ingot is solidifying, resulting in a case or rim of metal virtually free of voids. Sheet and strip products made from the ingot have very good surface quality.
RINGING METHOD (UT):	A bonded structure inspection method in which unbonds are indicated by increased ampli- tude ringing signals.
RINGING SIGNALS (UT):	Closely spaced multiple signals can be caused by multiple reflections in a thin material or continued vibration of a transducer element.
RINGING TIME (UT):	The time that the mechanical vibrations of a transducer element continue after the electrical pulse has stopped.

RIPPLE (RT):	The periodic variation in the potential differences between the cathode and anode of an X-ray tube, resulting from rectification of an alternating current. As the ripple is decreased by the use of filtering circuits, a constant potential is more nearly approached.
RINSE (PT):	In penetrant inspection, the operation by which the excess surface penetrant is removed from the part. Sometimes also referred to as the WASH.
RISER:	A reservoir of molten metal connected to the casting to provide additional metal to the casting, required as the result of shrinkage before and during solidification.
R-METER:	An ionization-type instrument designed to measure radiation dose.
ROCKWELL HARDNESS TEST:	A test for determining the hardness of a material based upon the depth of penetration of a specified penetrator into the specimen under certain arbitrarily fixed conditions of test.
ROD-ANODE TUBE (RT):	A special type of X-ray tube in which the target is situated at the outer end of a long tubular anode. It usually produces panoramic radiation.
ROENTGEN (R)(RT):	The international unit of the quantity of X or gamma radiation which cause the emission of ions carrying 1 electrostatic unit quantity of charge per 0.001293 grams of air. It is usually employed to express the radiation output of a given source in terms of roentgens per hour at one meter (Rhm). Under the International System of Units this will be expressed in coulombs/kilogram (1 r = $2.579560 \times 10^{-4} \text{ C/ kg}$).
ROENTGENS PER HOUR AT ONE METER (RT):	A specification of the output of a source of X- or gamma radiation in terms of the exposure rate, in roentgens per hour, measured in air at a distance of one meter from the source. Abbreviation: Rhm.
ROLL BENDING:	Curving sheets, bars and sections by means of rolls.
ROLL FLATTENING:	Flattening of sheets, that have been rolled in packs, by passing them separately through a two-high cold mill, there being virtually no deformation. Not to be confused with roller leveling.
ROLL FORGING:	Forging with rotating dies that are not full round, the desired shape, either straight or tapered, being produced by a groove in the dies.
ROLL FORMING:	Metal forming by the use of power-driven rolls whose contour determines the shape of the product. Sometimes used to denote power spinning.
ROLL STRAIGHTENING:	Straightening of metal stock of various shapes by passing it through a series of staggered rolls, the rolls usually being in horizontal and vertical planes.
ROLLING:	Reducing the cross-sectional area of metal stock, or otherwise shaping metal products, through the use of rotating rolls.
ROOT CRACK:	A crack in either the weld or heat-affected zone at the root of a weld.
ROOT OF JOINT:	The location of closest approach between parts of a joint to be welded.
ROOT PENETRATION:	The depth to which weld metal extends into the root of a joint.
ROTATING-ANODE TUBE (RT):	An X-ray tube in which the anode can rotate. The axis of rotation is offset from the axis of the electron beam, so that the focus lies on a circle on the rotating surface.
ROUGHNESS:	Relatively finely spaced surface irregularities, the height, width and direction of which establish the predominant surface pattern.
ROUGHNESS HEIGHT RATING:	Quantitative expression of the roughness of a surface; arithmetical average, normally expressed in microinches, of the absolute values of surface height deviation from the mean surface height. Abbreviation is rhr.
RT:	Symbol for the radiographic method of nondestructive testing/inspection.
RUPTURED METAL:	See BURSTS.
RUST:	A corrosion product consisting of hydrated oxides of iron. Applied only to ferrous alloys.

SAFELIGHT (RT):	A special lamp used in the darkroom to provide working visibility without affecting the photosensitive emulsion of the radiographic film.
SALT SCREEN (RT):	See INTENSIFYING SCREEN.
SALVAGE INSPECTION:	Inspection for salvage parts that can be repaired.
SAMARIUM-145:	A radioisotope of the element samarium.
SAMPLING INSPECTION:	Inspecting a random sample from a lot of parts to determine the lot quality, the sample size having been chosen in accordance with statistical methods.
SAND:	A granular material resulting from the disintegration of rock. Foundry sands are mainly silica. "Bank sands" are found in sedimentary deposits and contain less than 5% clay. "Dune" sand occurs in wind blown deposits near large bodies of water and is very high in silica content. "Moulding sand" contains more than 5% clay; usually between 10 and 20%. "Silica sand" is a granular material containing at least 95% silica and often more than 99%. "Sand core" is nearly pure silica. "Miscellaneous sand" includes zircon, olivine, calcium carbonate, lava, and titanium minerals.
SAND BLAST:	(Grit Blast) The use of sand or grit at high velocity through air pressure to clean surfaces.
SAPONIFICATION (PT):	The process of converting chemicals into soap; involves the alkaline hydrolysis of a fat or oil, or the neutralization of a fatty acid.
SATURATION (MT):	The point in the magnetization of a magnetizable object at which an increase in the magnetizing force produced no increase in the magnetic field within the part. See VERTI-CAL SATURATION (SCOPE) (UT): A term used to describe an indication of such a size as to reach full scope amplitude (100%). Beyond this point there is no visual display to estimate the actual real height of the response signal unless the equipment is provided with dB readout.
SCAB:	A defect consisting of a flat volume of metal joined to a casting through a small area. It is usually set in a depression, a flat side being separated from the metal of the casting proper by a thin layer of sand.
SCALE:	Oxide formed on metal by chemical action of the surface metal with oxygen from the air.
SCALE PIT:	Shallow surface depression in metal, caused by scale.
SCALING:	(1) Forming a thick layer of oxidation products on metals at high temperatures. (2) Depositing water-insoluble constituents on a metal surface, as in cooling tubes and water boilers.
SCANNING (ET, UT):	Relative movement of the search unit over a test part.
SCARFING:	Cutting surface areas of metal objects, ordinarily by using a gas torch. The operation permits surface defects to be cut from ingots, billets or the edges of plate that is to be beveled for butt welding.
SCATTER (RT):	One of the causes of haziness or fog. Some of the incident radiation is scattered by atomic electrons of the object being radiographed much as light is dispersed by fog. Any material, whether specimen, cassette, tabletop walls, floors, etc., receiving direct radiation, is a source of scattered radiation.
SCATTER UNSHARPNESS (RT):	See UNSHARPNESS.
SCATTERED ENERGY (UT):	Energy that is reflected in a random fashion by small discontinuities in the path of a sound beam.
SCATTERED RADIATION (RT):	Radiation that, as the result of interaction with matter, has had its direction changed and, for some interactions, its energy decreased.
SCATTERING (RT):	A change of direction, and possibly reduction of energy, of an incident particle or photon as the result of interaction with an atom, nucleus, or other particle.

SCATTERING ANGLE (RT):	The angle between the directions of propagation of the incident and scattered radiation.
SCHLIEREN SYSTEM (UT):	An optical system used to visually display an ultrasonic beam passing through a transparent medium.
SCHWARZCHILD EXPO- NENT (RT):	A mathematical index that may be applied to one of the variables in order to correct for the failure of the reciprocity law over a limited range.
SCINTILLATION (RT):	A localized flash of light caused by a particle or photon of ionizing radiation incident on a fluorescent material.
SCINTILLATION COUNTER:	A device for counting atomic particles by means of tiny flashes of light (scintillations) which the particles produce when they strike certain crystals.
SCINTILLATOR (RT):	A substance that emits a localized flash of light when excited by an incident particle or photon of ionizing radiation.
SCLEROSCOPE TEST:	A hardness test where the loss in kinetic energy of a falling metal "tup," absorbed by indentation upon impact of the tup on the metal being tested, is indicated by the height of rebound.
SCORING:	(1) Marring or scratching of any formed part by metal pickup on the punch or die. (2) Reducing the thickness of a material along a line to weaken it purposely along that line.
SCOTCH TAPE TRANS- FER (MT):	The use of colorless tape to lift a magnetic particle indication from a part.
SCRATCH:	A shallow mark or injury produced by abrasion.
SCRATCH HARDNESS:	The hardness of a metal determined by the width of a scratch made by a cutting point drawn across the surface under a given pressure.
SCREEN (RT):	Alternative term for intensifying screen.
SCREENS, FLUORES- CENT (RT):	See FLUORESCENT SCREENS.
SCREENS, INTENSIFYING (RT):	See INTENSIFYING SCREENS.
SCREENS, LEAD (RT):	Layers of lead foil, used in intimate contact with the film during exposure. They act to improve radiographic quality or to decrease exposure time, or both.
SCREEN MOTTLE (RT):	(Fluorescent Screen Exposures) The visual impression of irregularity of density, in areas where the exposure is macroscopically uniform, due to the random spatial distribution of X-ray quanta absorbed in the screens. Screen mottle is much larger in scale and "softer" in outline than film graininess. See FILM GRAININESS.
SCREEN-TYPE FILM (RT):	A radiographic film produced specially to be used with fluorescent screens. This type of film has high sensitivity to the fluorescent light emitted by such screens under the effect of ionizing radiation. (Improperly called screen film.)
SCREEN UNSHARPNESS (RT):	See UNSHARPNESS.
SEALED SOURCE:	Any by-product material that is encased in a capsule designed to prevent leakage or escape of the by-product material.
SEALING:	(1) Closing pores in anodic coatings to render them less absorbent. (2) Plugging leaks in a casting by introducing thermosetting plastics into porous areas and subsequently setting the plastic with heat.
SEAM:	A discontinuity caused by a void or crack in rolled material parallel to the axis of the material which although closed is not welded. A line of junction; a line, groove, ridge, or interstice formed by or between two contracting edges.

SEARCH UNIT (UT):	A device for generating and/or receiving ultrasonic energy; may contain one or more transducer elements or, in the case of the Harmonic Bond Tester, a microphone and coil.
SEASON CRACKING:	Cracking resulting from the combined effects of corrosion and internal stress. A term usually applied to stress-corrosion cracking of brass.
SECONDARY MAGNETIC FIELD (ET):	In eddy current testing, the magnetic field produced by the eddy currents in the test material. The secondary field opposes the primary field.
SECONDARY RADIATION (RT):	Radiation other than primary radiation emerging from irradiated matter.
SEEABILITY (PT, MT):	The characteristic of an indication that enables an observer to see it against the conditions of background, outside light, etc.
SEGREGATION:	Where a metallic constituent which cools last, forms a final brittle film between crystals. It may also be a concentration of non-metallic impurities. Segregations may occur at the center or be grouped in some regular form about the center.
SELF-ABSORPTION:	Gamma ray emission from large sources wherein the gamma radiation emitted from the center of the source will be appreciably absorbed by the outer layers of the source material.
SELF-EMULSIFIABLE (PT):	(Water-Washable) Self-emulsifiable material is an oil base material containing an emulsi- fying agent that forms an emulsion when rinsed with water.
SELF-RECTIFYING TUBE (RT):	Any hot-cathode X-ray tube that permits current to flow only from the cathode to the anode, when the anode is kept cool.
SEMI-KILLED STEEL:	Steel that is incompletely deoxidized and contains sufficient dissolved oxygen to react with the carbon to form carbon monoxide to offset solidification shrinkage.
SEMIPERMANENT MOLD:	A permanent mold in which sand or plastic cores are used.
SENSITIVITY (MT, ET, RT, PT, UT):	The capacity or degree of responsiveness to magnetic particle inspection. The ability of an ultrasonic system to detect a very small discontinuity. The ability of a penetrant to detect surface defects. Higher sensitivity indicates finer cracks can be detected.
SENSITIVITY, DEFECT (RT):	The minimum dimension of a discontinuity, considered to be a defect, that can be de- tected in a radiograph under specified conditions.
SENSITIVITY, IQI (RT):	See IQI SENSITIVITY.
SENSITIVITY (PERCENT- AGE):	A ratio of the smallest detectable thickness difference divided by the thickness of material being examined.
SENSITIVITY, RADIO- GRAPHIC:	The ratio of the smallest difference in thickness that is detectable on the radiograph to the thickness of the specimen. It may be expressed as a percentage, and is an indication of ability to detect a small discontinuity. In practice, it is determined by the use of an image quality indicator (penetrameter).
SENSITIVITY, SPECTRAL (RT):	The variation in radiographic exposure, as a function of X-ray energy, required to produce a given film density.
SENSITOMETRIC CURVE (RT):	See CHARACTERISTIC CURVE.
SENSITOMETRY (RT):	A quantitative measurement of the response of a film to exposure and development.
SEPARATION ANGLE:	The angle on the impedance plane between the thickness change curve and the lift-off curve for a specific material.
SETTLING TEST (MT):	See CONCENTRATION TEST.
SG:	Swept gain. See DISTANCE AMPLITUDE CORRECTION.
SHADOW (UT):	A region in a body, which cannot be reached by ultrasonic energy, traveling in a given direction; caused by the geometry of the body or a discontinuity in it.

SHALLOW DISCONTINUI- TY:	A discontinuity open to the surface of a solid object which possesses little depth in proportion to the width of this opening. A scratch or nick may be a "shallow discontinuity" in this sense.
SHALLOW-DOSE EQUIV- ALENT:	As it applies to external exposure of the skin or an extremity, is taken as the dose equivalent at a tissue depth of 0.007 centimeters (7 mg/cm2) averaged over an area of 1 square centimeter.
SHARPNESS (RT):	See definition RADIOGRAPHIC (RT).
SHEAR:	That type of force which causes or tends to cause two contiguous parts of the same body to slide relative to each other in a direction parallel to their plane of contact.
SHEAR FRACTURE:	A fracture in which a crystal (or a polycrystalline mass) has separated by sliding or tearing under the action of shear stresses.
SHEAR LIP:	A narrow, slanting (hence "shear") ridge along the edge of a fracture surface. The term sometimes also denotes a narrow, often crescent-shaped, fibrous region at the edge of an otherwise cleavage fracture, even though this fibrous region is in the same plane as the rest of the fracture surface.
SHEAR STRENGTH:	The stress required to produce fracture in the plane of cross-section, the conditions of loading being such that the directions of force and of resistance are parallel and opposite although their paths are offset a specified minimum amount.
SHEAR WAVE (UT):	A type of wave in which the particle motion is perpendicular to the direction of propaga- tion.
SHEET:	A flat-rolled metal product of some maximum thickness and minimum width arbitrarily dependent on the type of metal. It is thinner than plate.
SHEET SEPARATION:	In spot, seam or projection welding, the gap which exists between faying surfaces surrounding the weld, after the joint has been welded.
SHIELD:	A layer or mass of material used to reduce the passage of ionizing radiation.
SHOCK-PROOF (RT):	A term applied to those components of the high-voltage circuit of X-ray equipment which are entirely surrounded by grounded metal enclosures, e.g., shock-proof tube, shock-proof cable.
SHOCKPROOF TUBE (RT):	An X-ray tube surrounded by a grounded conducting enclosure.
SHOE (UT):	Device used to adapt a straight beam search unit for use in a specific type of inspection such as inspection of a curved surface, angle beam or surface wave inspection, inspection around a fastener hole, etc. Also, see WEDGE.
SHORTNESS:	A form of brittleness in metal. It is designated as "cold," "hot," and "red," to indicate the temperature range in which the brittleness occurs.
SHOT PEENING:	Cold working the surface of a metal by metal-shot impingement.
SHRINK MARK:	A surface depression on a casting that sometimes occurs next to a thick section that cools more slowly than adjacent sections.
SHRINKAGE CAVITIES:	Cavities in castings caused by lack of sufficient molten metal as the casting cools.
SHRINKAGE CAVITY (ON RADIOGRAPH):	A small bubble in metal that appears as a dendritic, filamentary, or jagged darkened area on a radiograph film.
SHRINKAGE CRACKS:	Hot tears associated with shrinkage cavities.
SHRINKAGE POROSITY OR SPONGE:	(NONFERROUS ALLOYS).

SHRINKAGE POROSITY OR SPONGE (NONFER- ROUS ALLOYS, RADIO- GRAPHIC):	A localized lacy, or honeycombed, darkened area on a film that indicates porous metal.
SHUTTER (RT):	A device that incorporates a movable shield used to block the useful beam emitted from an X-ray tube assembly or source housing.
SIDE LOBE ENERGY (UT):	Ultrasonic energy emitted from a search unit to the sides of the main sound beam.
SIEVERT (Sv):	SIEVERT (Sv): The SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor (1 Sv = 100 rems).
SIGNAL (UT):	Vertical deflection from the base line on an A-scan.
SIGNAL-TO-NOISE RATIO (UT):	The ratio of the signal from the variable of interest (flaw, thickness change or conductivi- ty change) to signals from variables which are of no interest (lift-off, geometry and finish changes and electronic components).
SILKY FRACTURE:	A metal fracture in which the broken metal surface has a fine texture usually dull in appearance. Characteristic of tough and strong metals.
SILVER HALIDE (RT):	A compound of silver with one of the halogen elements, e.g., silver bromide.
SINGLE-PHASE ALTER- NATING CURRENT:	This term refers to a simple current, alternating in direction. Commercial single-phase current follows a sine wave. Such a current requires only two conductors for its circuit. Most common commercial frequencies are 25, 50 and 60 cycles per second.
SKIN EFFECT (MT, EC):	The phenomenon that causes current to flow along the surface of a conductor. As fre- quency increase, skin depth decreases.
SKIP DISTANCE (UT):	In angle beam testing, the distance from the sound entry point to the first reflection point on the same test surface; also sometimes called V-Path.
SKY SHINE (RT):	Scatter radiation caused by interaction of the X-ray photons with the atoms in the air molecules, or structures in the vicinity, and radiates back toward the earth. Skyshine can be detected at considerable distance from the source, therefore, it should be considered when establishing barriers, etc.
SLAG:	A non-metallic residue that forms on molten metal as a result of the combining of impurities.
SLAG INCLUSIONS:	Nonmetallic solid material entrapped in weld metal or between weld metal and base metal.
SLAG LINES:	Elongated cavities containing slag or other foreign matter.
SLIP LINES:	(Slip Bands) Traces of slip planes observed at low magnifications on the polished surface of a crystal which has been deformed after polishing.
SLIP PLANES:	In a given metal, slip occurs most easily along certain croplatographic planes. Hence, these planes are termed slip planes.
SLOUGHING (RT):	The loosening of an emulsion from its base, commencing at the edges. It is usually caused by prolonged immersion in a liquid at too high a temperature or of unsuitable chemical composition.
SLUGGING (STUBBING):	The addition of a separate piece or pieces of material in a joint before or during welding.
S-N DIAGRAM:	A plot showing the relationship of stress, S, and the number of cycles, N, before failure in fatigue testing.
SNELL'S LAW (UT):	Law that defines the angle of incidence and angle of refraction or mode conversion; expressed as: $\sin \emptyset l$ divided by $\sin \emptyset 2 = V1$ divided by V2

where:	$\emptyset 1$ = angle (measured from the normal to the interface surface) of the incident sound beam.
	Ø2 = angle (measured from the normal to the interface surface) of the refracted or mode converted beam.
	V1 = velocity of incident sound beam. V2 = velocity of refracted or mode converted sound beam.
SOAKING:	Prolonged holding at a selected temperature.
SOAK TIME (PT):	The period of time wherein parts are immersed in a bath of liquid penetrant.
SOD (RT):	Source to object distance. The distance between x-ray tube or radioisotope and the object being radiographed.
SOFT RADIATION (RT):	A qualitative term used to describe the relatively less penetrating types of ionizing radia- tion.
SOFT X-RAYS:	A term used to express the quality or penetrating power of X radiation; their penetrating power is relatively light.
SOLARIZATION (RT):	The instances decreased (photographic) density produced by exposure additional to that required to give maximum density. This may result in reversal.
SOLDER EMBRITTLE- MENT:	Reduction in mechanical properties of a metal as a result of local penetration of solder along grain boundaries.
SOLDERING:	Sticking or adhering of metal to portions of the die.
SOLENOID:	A solenoid is a coil consisting of a number of loops of wire or cable to carry electric current. It may be used for both magnetizing and demagnetizing purposes.
SOLIDIFICATION SHRINKAGE:	The decrease in volume of a metal during solidification.
SOLUBLE (PT):	The amount of a substance that will dissolve in a given amount of another substance and is typically expressed as the number of parts by weight dissolved by 100 parts of solvent at a specified temperature and pressure or as a percent by weight or by volume.
SOLUTION HEAT TREAT- MENT:	A heat treatment in which an alloy is heated to a sufficiently high temperature to permit many or all of the alloying elements to become randomly dispersed throughout the metal.
SOLVENT ACTION:	The dissolution of a fluid or solid by another material.
SOLVENT CLEANING (PT):	The process of removing the excess penetrant from the surface of a part by washing or wiping with a solvent for the penetrant.
SOLVENT DEVELOPER (PT):	A developer in which the developing powder is applied as a suspension in a quick drying solvent.
SOURCE (RT):	The origin of radiation; an X-ray tube or radioisotope.
SOURCE ASSEMBLY (RT):	A component of a gamma radiography exposure device to which the sealed source is affixed or in which the sealed source is contained. The source assembly includes the sealed source.
SOURCE CAPSULE (RT):	The immediate container that, along with the contained radioactive material, constitutes a sealed source of ionizing radiation.
SOURCE-FILM DISTANCE (SFD) (RT):	The distance between the focal spot of an X-ray tube or radiation source and the film generally expressed in inches.
SOURCE GUIDE TUBE (CONDUIT) (RT):	A flexible or rigid tube for guiding the sealed source from the exposure device to the exposure head.
SOURCE HOUSING (RT):	An enclosure for a sealed source that provides attenuation for the radiation emitted by the source. The enclosure may have an aperture through which the useful beam is emitted or through which the source is extracted.

SOURCE MATERIAL:	In atomic energy law, any material, except special nuclear material, which contains 0.05% or more of uranium, thorium, or any combination of the two.
SOURCE MATERIAL (RT):	Any material, except special nuclear material, which contains 0.05 percent or more of uranium, thorium, or any combination of the two.
SOURCE-SHIFT RADIOG- RAPHY (RT):	See TRIANGULATION.
SOURCE SIZE, EFFEC- TIVE:	The apparent dimensions, as viewed along the beam axis, of that portion of the source from which ionizing radiation are emitted. For the purpose of calculating geometric unsharpness, the effective dimensions must always be used.
SPALL:	Cracking off, or flaking off of small particles of metal, usually in thin layers, from the surface.
SPECIFIC ACTIVITY (RT):	Specific activity is a measure of the activity per unit weight generally measured in curies per gram (SI) dis/sec-dm (See CURIE).
SPECIAL NUCLEAR MA- TERIAL:	In atomic energy law, includes plutonium, uranium-233, uranium containing more than the natural abundance of uranium-235, or any material artificially enriched by any of these substances.
SPECIFIC ACOUSTIC IM- PEDENCE (UT):	A factor that determines the amount of reflection that occurs at an interface and repre- sents the product of the density of the medium in which the wave is propagating and the wave velocity.
SPECIFIC ACTIVITY (RT):	Total radioactivity of a given isotope per gram of element.
SPECIFIC HEAT:	The number of British thermal units required to raise the temperature of 1 pound of metal 1°F.
SPECIFIC IONIZATION:	Number of ion pairs per unit length of path of the ionizing particle in a medium, e.g., per cm of air per micron of tissue.
SPECTRAL SENSITIVITY (RT):	The areas of the EMR spectrum to which a film is sensitive. Silver bromide films are all sensitive to ultraviolet and blue light as well as X-rays. Screen-type medical X-ray films are designed to be particularly sensitive to blue light and ultraviolet radiation from fluorescent screens, but some X-ray films are designed to be used without screens and are particularly sensitive to direct exposure from X-rays.
SPECTRUM:	An orderly array of the components of a beam of electromagnetic waves according to their frequency, wavelength, or energies.
SPEED EFFECT (ET):	The phenomenon in electromagnetic testing of which the evidence is a change in the signal voltage resulting from EMFs produced by the relative motion between a specimen and test coil assembly. These EMFs cause eddy currents that result in a space redistribution of the magnetic field.
SPEED, FILM (RT):	See FILM SPEED.
SPHEROIDLZING:	Heating and cooling to produce a spheroidal or globular form of carbide in steel.
SPILL:	The accidental release of radioactive liquids.
SPINNING:	Shaping of seamless hollow cylindrical sheet- metal parts by the combined forces of rotation and pressure.
SPLIT GATE:	A gate having the sprue axis in the die parting.
SPOT EXAMINATION:	Local examination of welds or castings
SPRINGBACK:	(1) The elastic recovery of metal after stressing. (2) The degree to which metal tends to return to its original shape or contour after undergoing a forming operation.
STABILIZER (RT):	A device that automatically compensates for variation of main voltage and/or frequency in an electric circuit. An example is the stabilization of filament heating current, and there- fore the anode current, in an Xray tube.
STABILIZING TREAT- MENT:	Any treatment intended to stabilize the structure of an alloy or the dimensions of a part.
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STABLE ISOTOPE:	A nuclide that does not undergo radioactive decay.
STABLE ISOTOPE (RT):	A non-radioactive nuclide of a particular element.
STACKED CRYSTAL:	Several crystals cemented together with the faces of the same polarity in the same direction.
STAMPING:	A general term covering almost all press operation. It includes blanking, shearing, hot or cold forming, drawing, bending, coining.
STANDARD:	(1) A reference used as a basis for comparison or calibration. (2) A concept that has been established by authority, custom, or agreement to serve as a model or rule in the measurement of quantity or the establishment of a practice or procedure.
STANDARD CUBIC CEN- TIMETER PER SECOND:	Unit of leakage rate equivalent to one cubic centimeter at atmospheric pressure (14.7 pounds per square inch) and standard temperature (77°F) leaking each second. Abbreviation is STD.cm ³ /s.
STANDARD DEPTH OF PENETRATION (ET):	The depth at which the eddy current field has fallen to I/e , or 37 percent, of its strength at the surface. In practice, it is generally used to define the sensing limit of the eddy current field.
STANDARDIZATION	The process of adjusting an instrument for a comparative test where an indication from a part under inspection is compared to a reference indication. Standardization prepares the instrument for a comparative test.
STANDING WAVES (UT):	Waves that exist in a body when the thickness of the body is equal to an integral number of $\frac{1}{2}$ wave lengths (thickness equal to $\frac{1}{2}$, 1, 1 $\frac{1}{2}$, 2, or 2 $\frac{1}{2}$, etc., wave lengths); used with the resonance method.
STATIONARY GRID (RT):	A grid in which the opaque strips are so thin and so close together that it can remain stationary during exposure without causing images of the strips that would interfere with interpretation of the radiograph (e.g., Lysholm grid).
STATISTICAL INSPEC- TION:	The inspection of a proportion of the number of parts (such as 5 to 10%) as predeter- mined by probability analysis. This method does not provide complete assurance of the lot quality.
STC:	See DISTANCE AMPLITUDE CORRECTION.
STD. cm3/s:	Abbreviation for standard cubic centimeters per second.
STEP-WEDGE CALIBRA- TION FILM (RT):	A step-wedge comparison film, the densities of which are traceable to a nationally recog- nized standardizing body. It is used for reference when determining the density or densi- ties of a radiograph.
STEP-WEDGE COMPARI- SON FILM (RT):	A strip of processed film carrying a stepwise array of increasing photographic density.
STEP-WEDGE PENE- TRAMETER (STEP PENE- TRAMETER):	A penetrameter of similar material to the specimen under examination, having steps ranging usually from 1 to 5 percent of the specimen thickness. Each step may contain one or more drilled holes for the assessment of definition.
STEPPED WEDGE (RT):	A device that is used, with appropriate penetrameters on each step, for the inspection of parts having great variations in thickness or a complex geometry. The stepped wedge must be made of material radiographically similar to that being radiographed.
STEREOFLUOROSCOPY (RT):	The production of a pair of radiographs suitable for stereoscopic viewing.
STEREORADIOGRAPHY (RT):	The process of finding the position and dimensions of details within a specimen by measurements made on radiographs taken from different directions.

STEREOSCOPIC (RT):	A type of viewing that employs an optical instrument (stereoscope) to combine the images of two radiographs taken from slightly different angles, thus achieving a three-dimensional effect.
STEREOSCOPY (RT):	The three-dimensional visual effect resulting from binocular vision.
STIFFNESS:	The ability of a metal or shape to resist elastic deflection. For identical shapes, the stiffness is proportional to the modulus of elasticity.
STOCHASTIC EFFECTS:	The health effects that occur randomly and for which the probability of the effect occur- ring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.
STOP BATH (RT):	A chemical solution (or clean running water) used for arresting the activity of the devel- oper remaining in the film emulsion.
STORAGE FOG (RT):	Fog caused by storing film in a high humidity/temperature environment.
STRAIGHT BEAM (UT):	A vibrating pulse wave train traveling normal to the test surface.
STRAIN:	The change per unit of length in a linear dimension of a stressed body. It may be thought of as the deformation caused by an applied load and is measured in inches of change per inch of stressed length, or in percentage of dimensional change of a specified stressed length.
STRAIN AGING:	Aging induced by cold working.
STRAIN ENERGY:	(1) The work done in deforming a body. (2) The work done in deforming a body within the elastic limit of the material. It is more properly elastic strain energy and can be recovered as work rather than heat.
STRAIN HARDENING:	An increase in hardness and strength caused by plastic deformation at temperatures lower than the recrystallization range.
STRAY RADIATION (RT):	Radiation other than the useful beam. It includes leakage, secondary, and scattered radia- tion.
STRESS:	Force per unit area, often thought of as force acting through a small area within a plane.
STRESS CONCENTRA- TION FACTOR (Kt):	The ratio of the greatest stress, in the region of a notch or other stress raiser as deter- mined by advanced theory, photo-elasticity or direct measurement of elastic strain, to the corresponding nominal stress.
STRESS-CORROSION CRACKING:	Failure by cracking under combined action of corrosion and stress, either external (applied) or internal (residual). Cracking may be either intergranular or transgranular, depending on metal and corrosive medium.
STRESS RAISERS:	Changes in contour of discontinuities in structure that cause local increases in stress.
STRESS RELIEVING:	Heating to a suitable temperature, holding long enough to reduce residual stresses and then cooling slowly enough to minimize the development of new residual stresses. See TEMPER.
STRESS RUPTURE TEST:	A tension test performed at constant load and constant temperature, the load being held at such a level as to cause rupture. Also known as "creep-rupture test."
STRETCH FORMING:	Shaping of a sheet or part, usually of uniform cross-section, by first applying suitable tension or stretch and then wrapping it around a die of the desired shape.
STRETCHER LEVELING:	Leveling where a piece of metal is gripped at each end and subjected to a stress higher than its yield strength to remove warp and distortion. Sometimes called "patent leveling."
STRETCHER STRAIGHT- ENING:	A process for straightening rod, tubing and shapes by the application of tension at the ends of the stock. The products are elongated a definite amount to remove warpage.
STRETCHER STRAINS:	Elongated markings that appear on the surface of some materials when deformed just past the yield point. These markings lie approximately parallel to the direction of maximum shear stress and are the result of localized yielding. Same as Luders Lines.

STRIKING:	Electrodepositing, under special conditions, a very thin film of metal which will facilitate further plating with another metal or with the same metal under different conditions.
STRINGER:	In wrought materials, an elongated configuration of microconstituents or foreign material aligned in the direction of working. Commonly, the term is associated with elongated oxide or sulfide inclusions in steel.
STRIPPING EMULSION (RT):	A photographic emulsion, for use in autoradiography, which can be removed from its base and placed in contact with a specimen containing radioactive material.
SUBJECT CONTRAST:	See CONTRAST, SUBJECT.
SUBJECT CONTRAST (RT):	The ratio (or the logarithm of the ratio) of the radiation intensities transmitted by selected portions of the specimen.
SUBJECT RANGE (RT):	The range of thickness or radiation opacity of material in a specimen.
SUBJECTIVE CONTRAST (RT):	A qualitative estimate of the contrast in a radiograph or fluorescent screen reproduction.
SUBSTITUTIONAL SOLID SOLUTION:	An alloy composed of two or more chemical elements in which both metals are randomly distributed at equivalent lattice positions throughout the metal.
SUBSTRATE:	Layer of metal underlying a coating, regardless of whether the layer is basis metal.
SUBSURFACE CORRO- SION:	Formation of isolated particles of corrosion products beneath the metal surface. This results from the preferential reaction of certain alloy constituents by inward diffusion of oxygen, nitrogen and sulfur.
SUB-SURFACE DEFECT:	Any defect which does not break the surface of the part in which it exists.
SUBSURFACE INDICA- TION:	Any indication that does not open onto the surface of the part in which it exists.
SUPERFICIAL ROCKWELL HARDNESS TEST:	Form of Rockwell Hardness Test using relatively light loads, which produce minimum penetration. Used for determining surface hardness or hardness of thin sections or small parts, or where large hardness impression might be harmful.
SUPPRESSION (UT):	See REJECT.
SURFACE FINISH:	(1) Condition of a surface as a result of a final treatment. (2) Measured surface profile characteristics, the preferred term being ROUGHNESS.
SURFACE INDICATION:	Any indication that is open onto the surface of the part in which it exists.
SURFACE IRREGULARI- TY:	An image on a radiograph film that corresponds to an irregularity visible on the surface of an object being tested.
SURFACE IRREGULARI- TY (RT):	An image on a radiograph that corresponds to an irregularity visible on the surface of a specimen.
SURFACE IRREGULARI- TIES:	Any change in material surface that renders the specimen unserviceable.
SURFACE TENSION (PT):	That property due to molecular forces, by which the surface of all liquids tends to bring the contained volume into a form having the least superficial area.
SURFACE WAVE (UT):	A type of wave which travels along a surface; characterized by elliptical particle motion having effective penetration less than one wave length.
SURFACTANT (PT):	(Surface active agent) A soluble compound that reduces the surface tension of liquids, or reduces interfacial tension between two liquids or a liquid and a solid.
SURGE METHOD (MT):	Inspection by first employing a high surge of magnetizing force, followed by a reduced magnetic field during application of a finely divided ferromagnetic inspection medium.
SURGE SUPPRESSOR:	A device that automatically reduces abnormally high voltage or current transients to acceptable levels.

SURVEY:	An evaluation of the radiological conditions and potential hazards incident to the presence of radiation. When appropriate, such an evaluation includes a physical survey of the location and measurements or calculations of the levels of radiation.
SURVEY METER (RT):	A portable instrument that measures dose rate of exposure or radiation intensity.
SUSPENSION (MT):	The correct term applied to the liquid bath in which is suspended the ferromagnetic particles used in the wet magnetic particle inspection method.
SWAGING:	Forming a taper or a reduction on metal products such as rod and tubing by forging, squeezing or hammering.
SWEEP (UT):	The uniform and repeated movement of an electron beam across the CRT.
SWEEP DELAY (UT):	See DELAYED SWEEP. A delay in time, after the initial pulse, of starting the sweep presentation; also used to denote the control used for adjusting the time of starting the sweep presentation.
SWEEP LENGTH (UT):	Length of time or distance represented by the horizontal base line on an A-scan.
SYSTEM CONCEPT (PT):	A combination of penetrant and emulsifier supplied by one manufacturer and intended to perform a specific type or process of inspection. The term "Family Concept" has been changed to "System Concept" to comply with DOD standardization requirements.
	т
TARGET (RT):	The area on the anode of an X-ray tube on which the electron stream impinges and from which the primary beam of X-rays is emitted.
TARNISH:	Surface discoloration of a metal caused by formation of a thin film of corrosion product.
TCG:	See DISTANCE AMPLITUDE CORRECTION.
TEAR, HOT:	Same as CRACK, HOT; but developing before the casting has completely solidified.
TEAR, MACHINING:	See CRACKS, MACHINING.
TECHNIQUE CHART (RT):	See EXPOSURE CHART.
TEMPER:	(1) In heat treatment, reheating hardened steel or hardened cast iron to some temperature below the eutectoid temperature for the purpose of decreasing the hardness and increasing the toughness. The process also is sometimes applied to normalized steel. (2) In tool steels, "temper" is sometimes used, but inadvisedly, to denote the carbon content. (3) In nonferrous alloys and in some ferrous alloys (steels that cannot be hardened by heat treatment), the hardness and strength produced by mechanical or thermal treatment, or both, and characterized by a certain structure, mechanical properties, or reduction in area during cold working.
TEMPER BRITTLENESS:	Brittleness that results when certain steels are held within, or are cooled slowly through, a certain range of temperature below the transformation range. The brittleness is revealed by notched-bar impact tests at or below room temperature.
TEMPERATURE ENVEL- OPE (PT):	The temperature range over which a particular penetrant inspection test will operate.
TEMPERING:	Reheating a quench-hardened or normalized ferrous alloy to a temperature below the transformation range and then cooling at any rate desired.
TEMPLATE:	A guide, gage or pattern for checking dimensions or locations.
TEMPORARY MAGNETS:	A body of normally soft steel or piece iron which is readily magnetized but retains only a very small field after the active power of the external magnetic field is removed.
TENSILE STRENGTH:	The maximum stress that a material is capable of withstanding without breaking under a gradually and uniformity applied load. Other terms commonly used to express the same thing are ultimate tensile strength and, less accurately, breaking strength.

TENTH-VALUE LAYER (TVL) (RT):	The thickness of the layer of a specified substance which, when introduced into the path of a given narrow beam of radiation, reduces the intensity of this radiation to one-tenth the original value.
TEST BLOCK:	See REFERENCE STANDARD.
TEST FREQUENCY:	The number of complete input cycles per unit time of a periodic quantity such as alternat- ing current employed for a specified inspection. The test frequency is always considered to be the fundamental whenever harmonics are generated in the process of testing certain materials such as ferromagnetic materials.
TEST PART:	A part, material, or assembly being inspected.
TEST SURFACE:	The test part surface through which the ultrasonic energy used for inspection initially enters the test part.
THERMAL ANALYSIS:	A method for determining transformations in a metal by noting the temperatures at which thermal arrests occur. These arrests are manifested by changes in slope of the plotted or mechanically traced heating and cooling curves. When such data are secured under nearly equilibrium conditions of heating and cooling, the method is commonly used for deter- mining certain critical temperatures required for the construction of equilibrium diagrams.
THERMAL CAPACITY:	A measure of the amount of heat that can be obtained in a given mass of material.
THERMAL FATIGUE:	Fracture resulting from the presence of temperature gradients which vary with time in such a manner as to produce cyclic stresses in a structure.
THERMAL FOCUS (RT):	That part of the anode of an X-ray tube submitted to direct heating by the electron beam.
THERMAL SHOCK:	The development of a steep temperature gradient and accompanying high stresses within a structure.
THERMAL STRESSES:	Stresses in metal, resulting from non-uniform temperature distribution.
THERMIONIC EMISSION (RT):	The emission of electrons from the surface of a heated material by virtue of their thermal energy.
THERMOLUMINESCENCE (RT):	The property possessed by certain crystals, of emitting light when heated after having been exposed to ionizing radiation.
THERMOLUMINESCENCE DOSIMETER (TLD) (RT):	A dosimeter, commonly used as a personnel monitor that uses thermoluminescent materi- al. The total amount of light emitted upon heating of the material is proportional to the amount of radiation energy absorbed.
THETA (θ) :	Symbol for the half angle of beam spread; the Greek letter Theta.
THORIATED TUNGSTEN FILAMENT (RT):	A vacuum-tube filament consisting of tungsten mixed with thorium oxide to give im- proved electron emission. Also known as thoriated emitter.
THORIUM:	A heavy malleable, radioactive metal used in the manufacture of thoriated tungsten target material in the X-ray tube head.
THREE-PHASE ALTER- NATING CURRENT:	Commercial, electricity is commonly transmitted as three single phase currents, that is, three separate currents following separate sine curves, each at 60 cycles (or other frequency) per second, but with the peaks of their individual curves one-third of a cycle apart. At least three (sometimes four) conductors are required for three-phase alternating current.
THRESHOLD:	In reference to currents or magnetic fields, the minimum strength necessary to create a looked-for effect is called the threshold value. For example, the minimum current necessary to produce a readable indication at a given defect, is the threshold value of current for that purpose.
THRESHOLD DOSE (RT):	The minimum absorbed dose or dose equivalent that will produce a specified effect.
THROUGH TRANSMIS- SION METHOD (UT):	An inspection method in which ultrasonic energy is generated by one search unit and received by another at the opposite surface of the test part.

3-2T RADIOGRAPHY:	Quality level of radiography in which the finished radiograph displays a discernible image or a penetrameter hole that has a diameter equal to twice the penetrameter thickness. The penetrameter thickness equals 3 percent of the material thickness.
THYLIUM-170:	A radioisotope of the element thulium.
TIME DELAY (UT):	See SWEEP DELAY.
TLD (RT):	See THERMOLUMINESENCE DOSIMETER.
TOE CRACK:	A base-metal crack at the Toe of Weld.
TOE OF WELD:	The junction between the face of a weld and the base metal.
TOLERANCE:	The specified permissible deviation from a specified nominal dimension, or the permissible variation in size of a part.
TOMOGRAPH (RT):	A radiograph of a specified plane of a deep structure.
TOMOGRAPHY (RT):	The radiography of a predetermined interior plane of a thick material. In one method the Xray tube and the film are moved simultaneously in opposite directions about a pivotal point in the plane of the layer.
TORSION:	A twisting action resulting in shear stresses and strains.
TOUGHNESS:	Ability of a metal to absorb energy and deform plastically before fracturing. It is usually measured by the energy absorbed in a notch impact test, but the area under the stress-strain curve in tensile testing is also a measure of toughness.
TOXIC:	The quality of certain materials being proportionally poisonous, as indicated by jeopardy to life, health or comfort.
TRACER:	An element or compound that has been made radioactive so that it can be easily followed (traced) in biological and industrial processes. Radiation emitted by the radioisotope pinpoints its location.
TRANSDUCER:	Any device that is capable of converting energy from one form to another.
TRANSDUCER (UT):	An electroacoustical device for converting electrical energy into acoustical energy and vice versa.
TRANSDUCER ELEMENT (UT):	A piezoelectric element in a search unit.
TRANSFER:	Compensation for differences in signal amplitude from equivalent reflectors in a test part and the reference standard used in an inspection.
TRANSIENT CURRENTS:	These currents are of short duration, generated by sudden changes in the electrical or magnetic conditions existing in an electrical or magnetic circuit.
TRANSMISSION ANGLE (UT):	The incident angle of the transmitted ultrasonic beam. It is zero degrees when the ul- trasonic beam is perpendicular to the test surface.
TRANSMISSION CHAR- ACTERISTICS (UT):	Test part characteristics that influence the transmitting and receiving of ultrasonic energy in an inspection; includes surface effects and internal effects.
TRANSMISSION TARGET (RT):	A relatively thin target so arranged that the X-ray beam emerges from the surface oppo- site that on which the electron stream is incident.
TRANSMITTER (UT):	Search unit or transducer element, used to generate ultrasonic energy to be transmitted into a test part.
TRANSVERSE:	Literally, "across," usually signifying a direction or plane perpendicular to the direction of working.
TRANSVERSE WAVE (UT):	See SHEAR WAVE.
TREES:	Visible projections of electrodeposited metal formed at sites of high current density.

TREPANNING:	A type of boring where an annular cut is made into a solid material with the coincidental formation of a plug or solid cylinder.
TRITIUM:	A radioactive isotope of hydrogen with two neutrons and one proton in the nucleus. It is heavier than deuterium (heavy hydrogen). Tritium is used in industrial thickness gages, as a label in tracer experiments, and in controlled fusion experiments.
TUBE CURRENT (RT):	The current flowing between the cathode and anode during the generation of radiation by an X-ray tube.
TUBE DIAPHRAGM (RT):	An adjustable device, normally attached to a tube housing, that limits the cross section of the emergent X-ray beam.
TUBE FILTER (RT):	A filter that can be attached to the X-ray tube housing.
TUBE HOUSING (RT):	An enclosure that contains an X-ray tube and has a port through which the useful beam is emitted. The tube housing may also contain transformers and other appropriate components.
TUBE RATING (RT):	The maximum electrical power (in watts) that can be safely applied to an X-ray tube for a specified period.
TUBE SHIELD (RT):	The housing of an X-ray tube that normally provides protection against electric shock and affords a degree of protection against radiation.
TUBE-SHIFT RADIOGRA- PHY (RT):	See TRIANGULATION.
TUBE SHUTTER (RT):	A device attached to a tube housing, generally of lead and usually remotely operated, used to permit or to prevent the emergence of the X-ray beam.
TUBE STAND (RT):	A support, often in the form of one or more vertical pillars with adjustable attachments, for holding an X-ray tube in position for use.
TUBE WINDOW (RT):	The relatively thin section of the X-ray tube through which the useful beam emerges. (Materials have different absorption properties, and thus some "Windows" are designated by their material, e.g., "Beryllium Window".)
TUNED:	Having a relatively narrow bandwidth; used to describe instruments having an initial pulse with a relatively narrow bandwidth and/or an amplifier with response to a relatively narrow range of frequencies.
TUNGSTEN ALLOY (HEAVY ALLOY) (RT):	A shielding material containing tungsten, copper, and nickel, and having a density about 50 percent greater than that of lead.
TUNGSTEN INCLUSIONS:	Inclusions in welds resulting from particles or splinters of tungsten welding electrodes.
TURBIDITY (PT, MT):	The state of being turbid, characterized by being cloudy, muddy, dully, impure or pollut- ed.
TVG:	See DISTANCE AMPLITUDE CORRECTION.
TWO-CRYSTAL METHOD (UT):	Use of two transducers for sending and receiving. May be send-receive or through- transmission method.
TWO-FILM TECHNIQUE (RT):	A procedure wherein two films of different relative speeds are used simultaneously to radiograph both the thick and the thin sections of an item.
2-2T RADIOGRAPHY:	Quality level of radiography in which the finished radiograph displays a discernible image of a penetrameter hole that has a diameter equal to twice the penetrameter thickness. The penetrameter thickness equals 2 percent of the material thickness.
TYPE A PACKAGING (RT):	The name given, in the regulations concerning the transport of radioactive materials, to packaging capable of preventing any loss or dispersion of the radioactive contents and of maintaining its function of shielding against radiation in normal transport conditions.

TYPE B PACKAGING (RT):	The name given, in the regulations concerning the transport of radioactive materials, to packaging capable of resisting not only normal transport conditions like type A packaging but also a serious accident.
	U
ULTIMATE COMPRESS- IVE STRENGTH:	The maximum compressive stress that a material can withstand under a gradually and uniformly applied load.
ULTIMATE STRENGTH:	The maximum conventional stress, tensile, compressive or shear, that a material can withstand.
ULTRA-BLUE LIGHT (PT):	Monochromatic blue light of approximately 4300 AU wavelength used to cause certain dye penetrants to fluoresce.
ULTRASONIC (UT):	Pertaining to mechanical vibrations having a frequency greater than approximately 20,000 hertz.
ULTRASONIC ABSORP- TION:	A dampening of ultrasonic vibrations that occurs when the wave transverses a medium.
ULTRASONIC SPEC- TRUM:	The frequency span associated with elastic waves greater than the highest audible frequency, generally regarded as being higher than 2.0 x 10 4 cycles per second, to approximately 109 cps.
ULTRASONIC TESTING:	A nondestructive method of testing materials by transmitting high frequency sound waves through them.xxxxxx
UMBRA (RT):	A region behind an object in a beam of radiation such that a straight line drawn from any point in this region to any point in the source passes through the object. The umbra is sometimes referred to as the region of total shadow.
UNBOND:	An area within a bonded interface between two adherends in which the intended bonding action failed to take place. Also used to denote specific areas deliberately prevented from bonding in order to simulate a defective bond, such as in the generation of reference standards.
UNDERBEAD CRACK:	A subsurface crack in the base metal near the weld.
UNDERCUT (RT):	A depression or groove adjoining the toe of a weld in a metal object. Appears on a radiograph as a dark area.
UNDERCUT (RT):	Undercut is a term that is used to describe the excessive radiation intensity that may be found at the edge of an object. Such undercutting is usually associated with scattered radiation.
UNDER-DEVELOPMENT (RT):	Development that is less than that required to produce the optimum results in a particular radiograph. It may arise from development for too short a time, or at too low a temperature, or from the use of exhausted developer.
UNDERFILL:	Storage of metal so that the true shape is not completely filled.
UNIAXIAL STRESS:	A state of stress in which two of the three principal stresses are zero.
UNIDIRECTIONAL:	Having one direction only.
UNIDIRECTIONAL VOLT- AGE:	A voltage of which the polarity, but not necessarily the magnitude is constant.
UNIFORM STRAIN:	The strain occurring prior to the beginning of localization of strain (necking); the strain to maximum load in the tension test.
UNRESTRICTED AREA (RT):	Any area to which access is not controlled for purposes of radiation protection.
UNSHARPNESS (RT):	Unsharpness is a term used to describe the lack of definition of an edge due to geometric factors related to the source size and the source-to-film distance.
UPSETTING:	Working metal so that the cross-sectional area of a portion or all of the stock is increased.

	USE FACTOR (RT):	The fraction of the workload during which the useful beam is pointed in the direction under consideration when designing shielding. Symbol: U.
	USEFUL BEAM (RT):	All radiation that emerges from a source housing or an X-ray tube assembly through a port, diaphragm, or cone.
_	USEFUL DENSITY RANGE (RT):	The range of density over which the gradient is adequate for the recognition of image details. The upper density limit is determined mainly by the brightness available in the film illuminator, and the lower density limit by the sensitivity required.
	Ultraviolet A (UV-A)	The term given to electromagnetic radiation having wavelengths from 320-400 nm. Typical units used in penetrant and magnetic particle inspection provide an intensity of 100 to 150 foot-candles at 15 inches from the face of the filter and are used to excite fluorescent materials in a range visible to the eye. Often referred to as "black light."
	UT:	Symbol for the ultrasonic method of nondestructive testing/inspection.
	UV-A INTENSITY (PT, MT):	The amount of properly filtered UV-A measured at the surface of the part being inspected.
	UV-A FILTER (PT, MT):	A filter that transmits ultraviolet light (320-400-nm wavelength) while suppressing the transmission of visible light of the longer wavelengths.
		ν
	v:	Symbol for velocity.
	V-PATH:	See SKIP DISTANCE.
	VACUUM DEPOSITION:	Condensation of thin metal coatings on the cool surface of work in a vacuum.
	VACUUM MELTING:	Melting in a vacuum to prevent contamination from air, as well as to remove gases already dissolved in the metal; the solidification may also be carried out in a vacuum or at low pressure.
	VAN DE GRAAF GENER- ATOR:	An electrostatic type X-ray generator in the million and multi-million volt category.
	VECTOR FIELD (MT):	See FIELD, RESULTANT.
	VELOCITY (UT):	The distance an ultrasonic wave travels in unit time.
	VERTICAL LIMIT (UT):	The maximum readable level of vertical indications, determined either by an electrical or a physical limit of an A-scan presentation.
	VERTICAL LINEARITY (UT):	Constant relationship between the amplitude of the indications on an A-scan display and the corresponding magnitudes of the reflected ultrasonic waves from reflectors of known size.
_	VERY HIGH RADIATION AREA:	An area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in 1 hour 1 meter from a radiation source or from any surface that the radiation penetrates.
		NOTE: At very high doses received at high dose rates, unit of absorbed dose (e.g., rads and grays) are appropriate, rather than units of dose equivalent (e.g., rems and sieverts). The maximum dose rate 1 meter from the aperture of the Lorad LPX-160A Industrial X-ray Unit is 2.4 grays (240 RDAs) per minute at 0.5 meters thus the maximum dose received in one hour would equate to about 0.6 grays (60 RDAs) per minute. As such, "Very High Radiation" areas can exist for this and comparable radiation sources.
	VIBRATION MODE (UT):	See MODE OF VIBRATION.
	VICKERS HARDNESS TEST:	Same as diamond pyramid hardness test.
	VIDEO PRESENTATION (UT):	A CRT presentation in which rectified signals are displayed.
	VIEWING MASK (RT):	A device for limiting the field of examination of the radiograph.

VISCOSITY:	Quality, state or degree of being viscous. That property of a body by virtue of which, when flow occurs inside it, forces arise in such a direction as to opposite the flow.
VISCOSITY:	A measurement of a liquids resistance to change of shape or flow. Also referred to as flow resistance.
VISIBLE:	Capable of being discerned by the eye.
VISIBLE DYE PENE- TRANT (PT):	An intensely colored (usually red) highly penetrating liquid which will provide maximum contrast with the white developer when used for detection of surface discontinuities under normal light.
VISIBILITY (MT):	The ability of magnetic particles to be seen against a contrasting background.
VOID:	Discontinuities in which there is a physical separation between opposite walls.
VOLTAGE:	The unit of electromotive force that tends to cause an electric current to flow through a conductor.
VOLTAGE REGULATOR:	A device that automatically compensates for variations in line-power voltage, thus main- taining nearly constant voltage on the electrical circuit.
	W
WATER-BREAK (MT):	A method of testing the water suspension for the proper amount of wetting agent. The inability of the rinse water to cover the entire surface in an unbroken film.
WATER-COOLED TUBE (RT):	An X-ray tube for which the principal method of cooling is dissipation of heat, directly or indirectly, by means of water.
WATER DELAY COLUMN (UT):	A hollow column filled with water and attached to a search unit; causes a time delay between the initial pulse and front surface signal.
WATER PATH (UT):	In immersion inspection or inspection using a water column delay, the distance from the search unit face to the test part front surface.
WATER TOLERANCE (IT):	The amount of water that a penetrant or emulsifier can absorb before its effectiveness is impaired.
WATER TRAVEL (UT):	In immersion testing the distance from the face of the search unit to the entry surface of the material under test.
WATER WASHABLE (PT):	A water-washable penetrant is an oil-like material containing an emulsifying agent that makes it washable by water rinsing.
WATER-WASHABILITY (PT):	The property of a penetrant that permits it to be cleaned from the surface of a part by washing with water.
WAVE FRONT (UT):	In a wave disturbance, a continuous surface drawn through the most forward points which have the same phase.
WAVE INTERFERENCE (UT):	The production of a series of maxima and minima of sound pressure, as a consequence of the superimposition of waves having different phases.
WAVELENGTH:	The distance between two points having the same phase in two consecutive cycles of a periodic wave, along a line in the direction of propagation.
WAVELENGTH (UT):	The distance between two corresponding points of the periodic pattern of particle motion that is a characteristic of ultrasonic energy propagation.
WAVE TRAIN (UT):	Succession of ultrasonic waves arising from the same source, having the same characteristics, and propagating along the same path.
WEAR FACE (UT):	A device attached to the face of a search unit to prevent wear of the transducer element.
WEDGE (RT):	See STEP WEDGE.
WEDGE (UT):	A device used to direct ultrasonic energy into a test part at an angle; also, see SHOE.

WEDGE FILTER (RT):	A filter so constructed that its thickness varies continuously or in steps from one edge to the other. Wedge filters may be used to increase the uniformity of radiation in certain types of exposures.
WELD BEAD:	A deposit of filler metal from a single welding pass.
WELD CRACK:	A crack in weld metal.
WELDING STRESS:	Residual stress caused by localized heating and cooling during welding.
WELD LINE:	The junction of the weld metal and the base metal, or the junction of the base-metal parts when filler metal is not used.
WELD METAL:	That portion of a weld which has been melted during welding.
WELD NUGGET:	The weld metal in spot, seam or projection welding.
WELD STRUCTURES:	The micro-structures of a weld deposit and heat affected base metal.
WET CONTINUOUS PRO- CESS (MT):	The method of applying the wet suspension to the inspection surfaces just prior to applying the magnetizing current.
WET DEVELOPER (IT):	A developer in which the developing powder is applied as a suspension or solution in a liquid, usually water.
WET METHOD (MT):	The magnetic particle inspection method employing ferromagnetic particles suspended in a liquid bath.
WETTING ACTION (MT):	The ability of a solution to adhere to the surface of an object.
WETTING AGENT (RT, MT):	In film processing, a chemical additive to the final water rinse to promote complete wetting of the film, thus assuring adequate washing away and neutralization of the prior processing solutions and prevention of water spots during the drying cycle. In magnetic particle inspection a material added to liquid that enables it to wet and cover surfaces that the liquid itself would ordinarily not wet.
WHEEL SEARCH UNIT (UT):	Ultrasonic device which couples ultrasonic energy to a test part through the rolling contact area of a wheel containing a liquid and one or more transducer elements.
WHITE CAST IRON:	Cast iron that gives a white fracture because the carbon is in a combined form.
WHOLE BODY:	Means, for purposes of external exposure, head, trunk (including male gonads), arms above the elbow or legs above the knee.
WIRE PENETRAMETER (RT):	An image quality indicator incorporating a series of wires that are graded in diameter and usually of similar material to the specimen under examination.
WOBBULATION (ET):	An effect which produces variations in an output signal of a test system and arises from variations in coil spacing due to lateral motion of the test specimen in passing through an encircling coil.
WORK HARDENING:	Same as STRAIN HARDENING.
WORKLOAD (RT):	The output of a radiation machine or a radioactive source integrated over a suitable time and expressed in appropriate units.
WROUGHT IRON:	A commercial iron consisting of slag (iron silicate) fibers entrained in a ferrite matrix.
	X
X-RADIATION (RT):	See X-RAYS.
X-RADIOGRAPHY (RT):	The process of producing radiographs using X-rays.
X-RAYS (RT):	A form of radiant energy resulting from the bombardment of a suitable target by electrons produced in a vacuum by the application of high voltages. X-rays have wavelengths between 10^{-11} cm and 10^{-6} cm.
X-RAY FILM (RT):	A film base that is coated (usually on both sides) with an emulsion designed for use with X-rays.

X-RAY PAPER (RT):	White paper coated on one side with emulsion for use with or without an intensifying screen. It is suitable for use with X-rays.	
X-RAY SPECTROMETER (RT):	An instrument used to determine the wavelengths of X-rays and the relative intensities of different wavelengths in an X-ray beam.	
X-RAY SPECTROSCOPY (RT):	The study of X-ray spectrums and their interpretation.	
X-RAY TUBE:	A glass vacuum tube that decelerates the high velocity electrons, and produces X-rays.	
X-RAY TUBE (RT):	A vacuum tube intended for the production of X-rays by bombarding the anode with a beam of electrons accelerated under a difference of potential between anode and cathode.	
X-RAY TUBE ASSEMBLY (RT):	A tube housing with the tube installed. It may include high voltage and filament trans- formers and other appropriate elements when they are contained within the tube housing.	
XERO-RADIOGRAPHY (RT):	A process using the photoconductive property of amorphous selenium to produce a radio- logical image, instead of photographic film.	
	Y	
YIELD POINT:	The load (in psig) at which a marked increase in deformation occurs without an increase in load.	
YIELD STRENGTH:	The stress at which a material exhibits a specified deviation from proportionality of stress and strain. An offset of 0.2% is used for many metals.	
YOKE (MT):	A "C" shaped piece of soft magnetic material either solid or laminated, around which is wound a coil carrying the magnetizing current.	
YOKE MAGNETIZATION (MT):	A longitudinal magnetic field induced in a part, or in an area of a part, by means of an external electromagnet shaped like a yoke.	
Ζ		
Z:	Symbol for acoustic impedance.	
ZIRCON SAND:	A highly absorptive material used as a blocking or masking medium for drilled holes, slots and highly irregular geometric parts to reduce or eliminate scattered radiation.	
ZONE MELTING:	Highly localized melting, usually by induction heating, of a small volume of an otherwise solid piece. By moving the induction coil along the rod, the melted zone can be transferred from one end to the other. In a binary mixture where there is a large difference in composition on the liquidus and solidus lines, high purity can be attained by concentrating one of the constituents in the liquid as it moves along the rod.	