R

rabbet, mounting *See:* mounting rabbet.

RAC *See:* reflective array compressor.

raceway (1) Any channel designed expressly and used solely for holding conductors. (NESC) C2-1997

(2) (raceway systems for Class 1E circuits for nuclear power generating stations) Any channel that is designed and used expressly for supporting wires, cables, or bus bars. Raceways consist primarily of, but are not restricted to, cable tray, conduits, and wireways.

(PE/NP/IC) 628-1987r, 848-1996, 384-1992r, 634-1978w

(3) (electric systems) Any channel for enclosing, and for loosely holding wires, cables, or busbars in interior work that is designed expressly for, and used solely for, this purpose. *Note:* Raceways may be of metal or insulating material and the term includes rigid metal conduit, rigid nonmetallic conduit, flexible metal conduit, electrical metallic tubing, underfloor raceways, cellular concrete-floor raceways, cellular metal-floor raceways, surface metal raceways, structural raceways, wireways and busways, and auxiliary gutters or moldings. (NESC) [86]

(4) An enclosed channel designed expressly for holding wires, cables or busbars with additional functions as permitted in this Code. (NESC/NEC) [86]

raceway penetration (raceway systems for Class 1E circuits for nuclear power generating stations) An opening for a raceway in a floor or wall to permit passage of cables from one side to the other. The raceway may or may not be continuous through the opening. (PE/NP) 628-1987r

raceway system (raceway systems for Class 1E circuits for nuclear power generating stations) An integrated assembly of raceways, fittings, supports, accessories, and anchorages. (PE/NP) 628-1987r

rachet demand (power operations) The maximum past or present demands that are taken into account to establish billings for previous or subsequent periods. (PE/PSE) 858-1987s

rachet demand clause (power operations) A clause in a rate schedule that provides that maximum past or present demands be taken into account to establish billings for previous or subsequent periods. (PE/PSE) 858-1987s

rack (1) (control boards, panels, and racks) A framework, constructed of rails or steel members, for mounting an assembly of modules for monitoring, measuring, and controlling remotely operated systems. (PE/NP) 420-1982

(2) (electronic) A protective enclosure to house modules, backplane(s), I/O connector assemblies, internal cables, and other electronic, mechanical, and thermal devices. *Synonyms:* rack; cabinet; box; box; cabinet; rack. (C/BA) 14536-1995

rack, traveler *See:* traveler rack.

racon (navigation aid terms) A radar beacon that returns a coded signal providing identification of the beacon as well as range and bearing. *See also:* radar beacon. (AES/GCS) 172-1983w

rad (photovoltaic power system) An absorbed radiation unit equivalent to 100 ergs/gram of absorber. *See also:* photovoltaic power system. (AES) [41]

radar (1) (navigation aid terms) A device for transmitting electromagnetic signals and receiving echoes from objects of interest (targets) within its volume of coverage. Presence of a target is revealed by its echo or its transponder reply. Additional information about a target provided by a radar includes one or more of the following: distance (range), by the elapsed time between transmissions of the signal and reception of the return signal; direction, by use of directive antenna patterns; rate of change of range, by measurement of Doppler shift; description or classification of target, by analysis of echoes and their variation with time. The name radar was originally an acronym for Radio Detection and Ranging. *Note:* Some radars can operate in a passive mode, in which the transmitter is turned off and information about targets is derived by receiving radiation emanating from the targets themselves or reflected by the targets from external sources. (AES/GCS) 172-1983w

(2) An electromagnetic system for the detection and location of objects that operates by transmitting electromagnetic signals, receiving echoes from objects (targets) within its volume of coverage, and extracting location and other information from the echo signal. *Notes:* 1. Radar is an acronym for radio detection and ranging. 2. Radar equipment can be operated with the transmitter turned off, as a passive direction finder on sources radiating within the band of the receiving system. *See also:* passive angle tracking. (AES) 686-1997

(3) A device that radiates electromagnetic waves and utilizes the reflection of such waves from distant objects to determine their existence or position. (IA/MT) 45-1998

radar-absorbent material (RAM) Material used to reduce the radar cross section of an object. *Note:* Also used in anechoic chambers to reduce reflection from the walls. (AES) 686-1997

radar altimeter *See:* radio altimeter.

radar astronomy That branch of astronomy that uses radar to study astronomical objects. (AP/PROP) 211-1997

radar backscattering cross-section Radar scattering cross-section as determined for coincident transmitter and receiver locations. *See also:* scattering cross section. (AP/PROP) 211-1997

radar beacon (navigation aid terms) A transponder used for replying to interrogations from a radar. *See also:* secondary radar. (AES/GCS) 686-1997, 172-1983w

radar bearing (navigation aid terms) A bearing obtained by a radar. (AES/GCS) 172-1983w

radar camouflage The art, means, or result of concealing the presence of the nature of an object from radar detection by the use of coverings or surfaces that considerably reduce the radio energy reflected toward a radar. *See also:* radar. (EEC/PE) [119]

radar cross section (RCS) (1) For a given scattering object, upon which a plane wave is incident, that portion of the scattering cross section corresponding to a specified polarization component of the scattered wave. *See also:* scattering cross section. (AP/ANT) 145-1993

(2) A measure of the reflective strength of a radar target; usually represented by the symbol σ and measured in square meters. RCS is defined as 4π times the ratio of the power per unit solid angle scattered in a specified direction of the power unit area in a plane wave incident on the scatterer from a specified direction. More precisely, it is the limit of that ratio as the distance from the scatterer to the point where the scattered power is measured approaches infinity. *Note:* Three cases are distinguished:

a) Monostatic or backscatter RCS when the incident and pertinent scattering directions are coincident but opposite in sense.

b) Forward-scatter RCS when the two directions and senses are the same.

c) Bistatic RCS when the two directions are different. If not identified, RCS is usually understood to refer to case a). In all three cases, radar cross section of a specified target is a function of frequency, transmitting and receiving polarizations, and target aspect angle (except for a sphere). For some applications, e.g., statistical detection analyses, it is described by its average value (or sometimes its median value) and statistical characteristics over an appropriate range of one or more of those parameters.

Synonyms: backscatter cross section; bistatic-scatter cross section; effective echoing area; forward-scattering cross section. (AES) 686-1997

radar display The visual representation of radar output data. See individual definitions and illustrations of various radar display formats in the table below. *Note:* The letter designations from A to P, plus R, for radar display formats were devised in the years during and following WWII in an effort to standardize nomenclature. Several of these letter designations are now rarely if ever used, as noted in the individual definitions, but they are still found in some technical literature. The additional designations of plan-position indicator (PPI) and range-height indicator (RHI) are also defined. The standardized type designations do not cover all possible display formats. (AES) 686-1997

radar duplexing assembly *See:* circulator; transmit-receive switch; duplexer.

radar equation A mathematical expression that relates the range of a radar at which specific performance is obtained to the parameters characterizing the radar, target, and environment. *Note:* The parameters in the radar equation can include the transmitter power, antenna gain and effective area, frequency, radar cross section of the target, range to the target, receiver noise figure, signal-to-noise ratio required for detection, losses in the radar system, and the effects of the propagation path. *Synonyms:* radar range equation; range equation. (AES) 686-1997

radar fix (navigation aid terms) A position fix established by means of radar data. (AES/GCS) 172-1983w

radar letter designations (radar frequency bands) The radar letter designations are consistent with the recommended nomenclature of the International Telecommunications Union (ITU), as shown in Table 2, below. Note that the high frequency (HF) and the very high frequency (VHF) definitions are identical in the two systems. The essence of the radar nomenclature is to subdivide the existing ITU bands, in accordance with radar practice, without conflict or ambiguity. The letter band designations are not to be construed as being a substitute for the specific frequency limits of the frequency bands. The specific frequency limits are to be used when appropriate, but when a letter designation of a radar-frequency band is called for, those of Table 1, below, are to be used. The letter designations described in IEEE Std 521-1984 are designed for radar usage and are used in current practice. They are not meant to be used for other radio or telecommunication purposes, unless they pertain to radar. The letter designations for Electronic Countermeasure operations as described in Air Force Regulation No 55-44, Army Regulation No 105-86, and Navy OPNAV Instruction 3430.9B are not consistent with radar practice and are not used to describe radar-frequency bands. (AES/RS) 521-1984r

radar performance figure The ratio of the pulse power of the radar transmitter to the power of the minimum signal detectable by the receiver. *Note:* Now seldom used as a measure of performance. (AES) 686-1997

radar range equation *See:* radar equation.

radar reflectivity A measure of backscattering from an inhomogeneous medium, defined as radar cross-section (RCS) per unit volume. Frequently used in radar measurements of meteorological phenomena. (AP/PROP) 211-1997

radar relay Equipment for relaying the radar video and appropriate synchronizing signals to a remote location. (AES) 686-1997

radar responder beacon *See:* racon.

radar shadow Absence of radar illumination because of an intervening reflecting, diffracting, or absorbing object. *Note:* The shadow is manifested on the display by the absence of blips from targets in the shadow area. (AES) 686-1997

radar transmitter The transmitter portion of a radio detecting and ranging system. (AP/VT/ANT) 145-1983s, [37]

radial (1) (navigation) (navigation aid terms) One of a number of lines of position defined by an azimuthal navigation facility; the radial is identified by its bearing (usually the magnetic bearing) from the facility. (AES/GCS) 172-1983w

(2) An azimuth where field strength measurements are taken, starting near the array and extending to well into the far field. Measurements along a radial can be used to establish the radiation in a certain azimuth after allowing for changes other than ground conductivity, such as near field effects, temperature changes, loss or gain due to elevation changes, shadow losses and absorption, and other effects. (T&D/PE) 1260-1996

radial air gap *See:* air gap.

radial-blade blower (rotating machinery) A fan made with flat blades mounted so that the plane of the blades passes through the axis of rotation of the rotor. *See also:* fan. (PE) [9]

radial distribution feeder *See:* radial feeder.

radial feeder A feeder supplying electric energy to a substation or a feeding point that receives energy by no other means. *Note:* The normal flow of energy in such a feeder is in one direction only. *See also:* center of distribution. (T&D/PE) [10]

radial ground A conductor connection by which separate electrical circuits or equipment are connected to earth at one point. Sometimes referred to as a *star ground.* (IA/PSE) 1100-1999

radially outer coil side *See:* bottom-coil slot.

radial magnetic pull (rotating machinery) The radial force acting between rotor and stator resulting from the radial displacement of the rotor from magnetic center. *Note:* Unless other conditions are specified, the value of radial magnetic pull will be for no load and rated voltage, and for rated no load field current and rated frequency as applicable. (PE) [9]

radial overfilled launch A launch condition created when a multimode optical fiber is illuminated by the coherent optical output of a source operating in its lowest-order transverse mode in a manner that excites predominantly the radial modes of the multimode fiber. (C/LM) 802.3-1998

radial power factor (paper-insulated power cable) The power factor of individual insulating tapes of a power cable as a function of the radial location of the insulating tapes through the insulation wall. (PE/IC) 83-1963w

radial probable error (RPE) *See:* circular probable error.

radial sensitivity The counting rate of a Geiger-Mueller counter as a function of radial position across the window of an end-window or pancake Geiger-Mueller counter. (NI/NPS) 309-1999

radial system A system in which independent feeders branch out radially from a common source of supply. *See also:* direct-current distribution; alternating-current distribution. (T&D/PE) [10]

radial-time-base display *See:* plan-position indicator.

radial transfer The transmission of information between a peripheral unit and a unit of equipment that is more central than that of the peripheral unit using a connection that is dedicated to that peripheral unit. *See also:* peripheral transfer. (C) 610.10-1994w

radial transmission feeder *See:* radial feeder.

radial transmission line (waveguide) A pair of parallel conducting planes used for propagating waves whose phase fronts are concentric coaxial circular cylinders having their common axis normal to the planes; sometimes applied to tapered versions, such as biconical lines. (MTT) 146-1980w

radial type A unit substation which has a single stepdown transformer and which has an outgoing section for the connection of one or more outgoing radial (stub end) feeders. (PE/TR) C57.12.80-1978r

radial-unbalance torque (1) (laser maser) A unit of angular measure equal to the angle subtended at the center of a circle by an arc whose length is equal to the radius of the circle. One (1) radian Δ 57.3 degrees; 2π radians = 360 degrees. (LEO) 586-1980w

Table 1
Standard Radar-Frequency Letter Band Nomenclature

Band Designation	Nominal Frequency Range	Specific Frequency Ranges for Radar Based on ITU Assignments for Region 2, see Note (1)
HF	3 MHz–30 MHz	Note (2)
VHF	30 MHz–300 MHz	138 MHz–144 MHz
		216 MHz–225 MHz
UHF	300 MHz–1000 MHz (Note 3)	420 MHz–450 MHz (Note 4)
		890 MHz–942 MHz (Note 5)
L	1000 MHz–2000 MHz	1215 MHz–1400 MHz
S	2000 MHz–4000 MHz	2300 MHz–2500 MHz
		2700 MHz–3700 MHz
C	4000 MHz–8000 MHz	5250 MHz–5925 MHz
X	8000 MHz–12000 MHz	8500 MHz–10680 MHz
K_u	12.0 GHz–18 GHz	13.4 GHz–14.0 GHz
		15.7 GHz–17.7 GHz
K	18 GHz–27 GHz	24.05 GHz–24.25 GHz
K_a	27 GHz–40 GHz	33.4 GHz–36.0 GHz
V	40 GHz–75 GHz	59 GHz–64 GHz
W	75 GHz–110 GHz	76 GHz–81 GHz
		92 GHz–100 GHz
mm (Note6)	110 GHz–300 GHz	126 GHz–142 GHz
		144 GHz–149 GHz
		231 GHz–235 GHz
		238 GHz–248 GHz (Note 7)

NOTES: (1) These frequency assignments are based on the results of the World Administrative Radio Conference of 1979. The ITU defines no specific service for radar, and the assignments are derived from those radio services that use radar: radiolocation, radionavigation, meteorological aids, earth exploration satellites, and space research.
(2) There are no official ITU radiolocation bands at HF. So-called HF radars might operate anywhere from just above the broadcast band (1.605 MHz) to 40 MHz or higher.
(3) The official ITU designation for the ultra-high-frequency band extends to 3000 MHz. In radar practice, however, the upper limit is usually taken as 1000 MHz. L and S bands being used to describe the higher UHF region.
(4) Sometimes called P band, but use is rare.
(5) Sometimes included in L band.
(6) The designation mm is derived from *millimeter* wave radar, and is also used to refer to V and W bands when general information relating to the region above 40 GHz is to be conveyed.
(7) The region from 300 GHz–3000 GHz is called the submillimeter band.

Table 2
Comparison of Radar-Frequency Letter Band Nomenclature with ITU Nomenclature

Radar Nomenclature		International Telecommunications Union Nomenclature			
Radar Letter Designation	Frequency Range	Frequency Range	Band No	Adjective Band Designation	Corresponding Metric Designation
HF	3 MHz–30 MHz	3 MHz–30 MHz	7	High-frequency (HF)	Dekametric waves
VHF	30 MHz–300 MHz	30 MHz–300 MHz	8	Very high frequency (VHF)	Metric Waves
UHF	300 MHz–1000 MHz				
L	1 GHz–2GHz	0.3 GHz–3 GHz	9	Ultra-high frequency (UHF)	Decimetric waves
S	2 GHz–4 GHz				
C	4 GHz–8 GHz				
X	8 GHz–12 GHz	3 GHz–30 GHz	10	Super-high frequency (SHF)	Centimetric waves
K_u	12 GHz–18 GHz				
K	18 GHz–27 GHz				
K_a	27 GHz–40 GHz				
V	40 GHz–75 GHz	30 GHz–300 GHz	11	Extremely high frequency (EHF)	Millimetric Waves
W	75 GHz–110 GHz				
mm	110 GHz–300 GHz				

(2) (dynamically tuned gyro) The acceleration-sensitive torque caused by radial unbalance due to noncoincidence of the flexure axis and the center of mass of the rotor. Under constant acceleration, it appears as a rotating torque at the rotor spin frequency. When the gyro is subjected to vibratory acceleration along the spin axis at the spin frequency, this torque results in a rectified drift rate. (AES/GYAC) 528-1994

radian (metric practice) The plane angle between two radii of a circle that cut off on the circumference an arc equal in length to the radius. (QUL) 268-1982s

radiance (1) (fiber optics) Radiant power, in a given direction, per unit solid angle per unit of projected area of the source, as viewed from that given direction. Radiance is expressed in watts per steradian per square meter. *See also:* brightness; radiometry; conservation of radiance. (Std100) 812-1984w
(2) (laser maser) Radiant flux or power output per unit solid angle unit area ($W \cdot sr^{-1} \cdot cm^{-2}$). (LEO) 586-1980w
(3) (television) (radiant intensity per unit area at a point on a surface and in a given direction) The quotient of the radiant intensity in the given direction of an infinitesimal element of the surface containing the point under consideration, by the area of the orthogonally projected area of the element on a plane perpendicular to the given direction. *Note:* The usual unit is the watt per steradian per square meter. This is the radiant analog of luminance. (BT/AV) 201-1979w
(4) (light-emitting diodes) [$L_e = d^2\phi_e/d\psi\ (dA\ \cos\theta] = dI_e/(dA\ \cos\theta)$). At a point of the surface of a source, of a receiver, or of any other real or virtual surface, the quotient of the radiant flux leaving, passing through or arriving at an element of the surface surrounding the point, and propagated in the direction defined by an elementary cone containing the given direction, by the product of the solid angle of the cone and the area of the orthogonal projection of the element of the surface on a plane perpendicular to the given direction. *Note:* In the defining equation θ (theta) is the angle between the normal to the element of the surface and the direction of observation. (ED) [127]
(5) (illuminating engineering) [$L = d^2\ \Phi/[d\omega\ (dA \cdot \cos\theta)] = dI/(dA \cdot \cos\theta)$] (in a direction at a point of the surface of a receiver, or of any other real or virtual surface) Properly, this should be a second partial derivative since area and solid angle are independent variables. However, the symbol "d" is used due to the convenience in printing and typing. For this

specific use, no possible errors or confusion are foreseen. This practice is in accord with the International Lighting Vocabulary (CIE No. 17 (E-1.1.) 1970) and the practice of the National Bureau of Standards (NBS Technical Note 910-1, 1976). The quotient of the radiant flux leaving, passing through, or arriving at an element of the surface surrounding the point, and propagated in directions defined by an elementary cone containing the given direction, by the product of the solid angle of the cone and the area of the orthogonal projection of the element of the surface on a plane perpendicular to the given direction. *Note:* In the defining equation fI theta fR is the angle between the normal to the element of the surface and the given direction. (EEC/IE) [126]

radian frequency (1) The number of radians per unit time. The unit of time is generally the second and the radian frequency omega is therefore $2\pi f$, where f is the frequency in hertz. (CAS) [13]

(2) *See also:* angular frequency. (AP/PROP) 211-1997

radiant density (light-emitting diodes) (we = dQe/dV) Radiant energy per unit volume; joules per m^3. (ED) [127]

radiant efficiency of a source of radiant flux (light-emitting diodes) The ratio of the total radiant flux to the forward power dissipation (total electrical lamp power input). (ED) [127]

radiant emittance (fiber optics) Radiant power emitted into a full sphere (4π steradians) by a unit area of a source; expressed in watts per square meter. *Synonym:* radiant exitance. *See also:* radiant flux density at a surface; radiometry. (Std100) 812-1984w

radiant energy (1) (fiber optics) Energy that is transferred via electromagnetic waves, that is, the time integral of radiant power; expressed in joules. *See also:* radiometry. (Std100) 812-1984w

(2) (light-emitting diodes) Energy traveling in the form of electromagnetic waves. It is measured in units of energy such as joules, ergs or kilowatt-hours. (IE/EEC/ED) [126], [127]

(3) (laser maser) Energy emitted, transferred, or received in the form of radiation. Unit: joule (J). (LEO) 586-1980w

radiant energy density (illuminating engineering) ($w = dQ/dV$) Radiant energy per unit volume; for example, joules per cubic meter. (EEC/IE) [126]

radiant exitance *See:* radiant emittance.

radiant exposure (laser maser) Surface density of the radiant energy received. Unit: $\mathbf{J} \cdot \mathrm{cm}^{-2}$. (LEO) 586-1980w

radiant flux (1) (A) (light-emitting diodes) ($\theta_e = dQ_e/dt$) The time rate of flow of radiant energy. *Note:* It is expressed preferably in watts, or in ergs per second. **(B) (laser maser)** Power emitted, transferred, or received in the form of radiation. Unit: W. *Synonym:* radiant power. (BT/IE/EEC/LEO/AV) 201-1979, [34], [126], 586-1980

(2) (television) Power emitted, transferred, or received in the form of radiation. *Note:* It is expressed preferably in watts. (BT/AV) 201-1979w

radiant flux density at a surface (A) ($M_e = d\Phi_e/dA$, $E_e = d\Phi_e/dA$) The quotient of radiant flux at that element of surface of the area of that element: that is, watts per cm^2. When referring to radiant flux emitted from a surface, this has been called "radiant emittance" (symbol: M). The preferred term for radiant flux leaving a surface is "radiant exitance" (symbol: M). When referring to radiant flux incident on a surface, it is called "irradiance" (symbol: E). *Note:* "radiant emittance" is obsolete. **(B) (illuminating engineering)** ($d\Phi/dA$) The quotient of radiant flux at an element of surface to the area of that element; e.g., watts per square meter. When referring to radiant flux emitted from a surface, this has been called "radiant emittance" (a deprecated term) (symbol: M). The preferred term for radiant flux leaving a surface is "radiant exitance" (symbol: M). The radiant exitance per unit wavelength interval is called "spectral radiant exitance." When referring to radiant flux incident on a surface it is called "irradiance" (symbol: E). (ED/EEC/IE) [127], [126]

radiant gain (optoelectronic device) The ratio of the emitted radiant flux to the incident radiant flux. *Note:* The emitted and incident radiant flux are both determined at specified ports. *See also:* optoelectronic device. (ED) [46]

radiant heater A heater that dissipates an appreciable part of its heat by radiation rather than by conduction or convection. *See also:* appliance.

radiant heating system (electric power systems in commercial buildings) A heating system in which the heat radiated from panels is effective in providing heating requirements. The term "radiant heating" includes panel *and* radiant heating. (IA/PSE) 241-1990r

radiant incidence *See:* irradiance.

radiant intensity (1) (fiber optics) Radiant power per unit solid angle, expressed in watts per steradian. *See also:* intensity; radiometry. (Std100) 812-1984w

(2) (television) (of a source, in a given direction) The quotient of the radiant power emitted by a source, or by an element of source, in an infinitesimal cone containing the given direction, by the solid angle of that cone. *Note:* It is expressed preferably in watts per steradian. (BT/AV) 201-1979w

(3) (light-emitting diodes) ($I_e = d\Phi_e/d\omega$) The radiant flux proceeding from the source per unit solid angle in the direction considered; that is watts per steradian. (ED) [127]

(4) (laser maser) Quotient of the radiant flux leaving the source, propagated in an element of solid angle containing the given direction, by the element of solid angle. Unit: watt per steradian ($\mathrm{W} \cdot \mathrm{sr}^{-1}$). (LEO) 586-1980w

(5) (illuminating engineering) ($I = d\Phi/d\omega$) The radiant flux proceeding from a source per unit solid angle in the direction considered; for example, watts per steradian. *Note:* Mathematically a solid angle must have a point as its apex; the definition of radiant intensity, therefore, applies strictly only to a point source. In practice, however, radiant energy emanating from a source whose dimensions are negligible in comparison with the distance from which it is observed may be considered as coming from a point. Specifically, this implies that with change of distance, 1) the variation in solid angle subtended by the source at the receiving point approaches 1/(distance)^2 and that 2) the average radiance of the projected source area as seen from the receiving point does not vary appreciably. (EEC/IE) [126]

radiant power (fiber optics) The time rate of flow of radiant energy, expressed in watts. The prefix is often dropped and the term "power" is used. *Synonyms:* optical power; flux; radiant flux; power. *See also:* radiometry. (Std100) 812-1984w

radiant sensitivity (camera tubes or phototubes) The quotient of signal output current by incident radiant flux at a given wavelength, under specified conditions of irradiation. *Note:* Radiant sensitivity is usually measured with a collimated beam at normal incidence. *See also:* phototube; luminous flux; radiant flux. (ED) 161-1971w

radiated coupling Propagation of a wave through free space at radial distances greater than $\lambda/6$ from the power line carrying the disturbing energy. *See also:* coupling. (PE/PSC) 487-1992

radiated emission test site (1) (radio-noise emissions) A site meeting specified requirements suitable for measuring radio interference fields radiated by a device, equipment, or system under test. C63.5-1988

(2) (radio-noise emissions) A site meeting specified requirements suitable for measuring radio frequency fields radiated by an EUT. (EMC) C63.4-1991

radiated interference Radio interference resulting from radiated noise or unwanted signals. *See also:* electromagnetic compatibility. (EMC) [53]

radiated noise (1) (radio noise from overhead power lines and substations) Radio noise energy in the form of an electromagnetic field including both the radiation and induction components of the field. (T&D/PE) 430-1986w

(2) (power line filters) Electromagnetic interference that is radiated into the environment, either directly from equipment or from the power cord or any other cabling connected to it. (EMC) C63.13-1991

radiated power output (transmitter performance) The average power output available at the antenna terminals, less the losses of the antenna, for any combination of signals transmitted when averaged over the longest repetitive modulation cycle. *See also:* audio-frequency distortion. (VT) [37]

radiated radio noise (1) (overhead power lines) Radio noise that is propagated by radiation from a source into space in the form of electromagnetic waves; e.g., the undesired electromagnetic waves generated by corona sources on a transmission line. *Note:* Radiated radio noise includes both the radiation and the induction components of the electromagnetic fields generated by the noise source. (T&D/PE) 539-1990

(2) (measurement of radio-noise emissions) Radio-noise energy in the form of an electromagnetic field including both the radiation and induction components of the field. (EMC) C63.4-1991

radiated spurious emission power (land-mobile communications transmitters) Any part of the spurious emission power output radiated from the transmission enclosure, independent of any associated transmission lines or antenna, in the form of an electromagnetic field composed of variations of the intensity of electric and magnetic fields. (EMC) 377-1980r

radiating element A basic subdivision of an antenna that in itself is capable of radiating or receiving radio waves. *Note:* Typical examples of a radiating element are a slot, horn, or dipole antenna. (AP/ANT) 145-1993

radiating far field region (land-mobile communications transmitters) Measurement is performed at or beyond a distance of 3λ, but not less than 1 meter (m). *See also:* far-field region. (EMC) 377-1980r

radiating near-field region (1) (land-mobile communications transmitters) Measurement is limited to the region external to the induction field and extending to the outer boundary of the reactive field that is commonly taken to exist at a distance of $\lambda/2\pi$. Either the electric or magnetic component of the radiated energy may be used to determine the magnitude of power present. *See also:* near-field region. (EMC) 377-1980r

(2) That portion of the near-field region of an antenna between the farfield and the reactive portion of the near-field region, wherein the angular field distribution is dependent upon distance from the antenna. *Notes:* 1. If the antenna has a maximum overall dimension that is not large compared to the wavelength, this field region may not exist. 2. For an antenna focused at infinity, the radiating near-field region is sometimes referred to as the Fresnel region on the basis of analogy to optical terminology. (AP/ANT) 145-1993

radiation (1) (nuclear) (nuclear work) The usual meaning of radiation is extended to include moving nuclear particles, charged or uncharged. (ED) 161-1971w, [45]

(2) (data transmission) In radio communication, the emission of energy in the form of electromagnetic waves. The term is also used to describe the radiated energy. (PE) 599-1985w

(3) The electromagnetic waves or corpuscular emissions released as a result of atomic nuclear changes that penetrate into insulation to cause ionizing reactions that then change the chemical, electrical, or physical properties of the insulation. (DEI/RE) 775-1993w

(4) *See also:* ionizing radiation. (NI/NPS) 309-1999

radiation angle (fiber optics) Half the vertex angle of the cone of light emitted by a fiber. *Note:* The cone is usually defined by the angle at which the far-field irradiance has decreased to a specified fraction of its maximum value or as the cone within which can be found a specified fraction of the total radiated power at any point in the far field. *Synonym:* output angle. *See also:* numerical aperture; acceptance angle; far-field region. (Std100) 812-1984w

radiation condition A condition implying that at large distances from a source, only outgoing waves can exist. (AP/PROP) 211-1997

radiation counter An instrument used for detecting or measuring radiation by counting action. (ED) 161-1971w

radiation coupling (interference terminology) The type of coupling in which the interference is induced in the signal system by electromagnetic radiation produced by the interference source. *See also:* interference. (IE) [43]

radiation detector Any device whereby radiation produces some physical effect suitable for observation and/or measurement. *See also:* anticoincidence. (ED) [45]

radiation efficiency The ratio of the total power radiated by an antenna to the net power accepted by the antenna from the connected transmitter. *See also:* antenna. (AP/PE/ANT) 145-1993, 599-1985w

radiation, electromagnetic *See:* electromagnetic radiation.

radiation-induced data-loss characteristics (1) Characteristics that define stored data integrity as a function of total dose or dose rate after a given test pattern has been written into the device. (ED) 641-1987w

(2) The collection of threshold voltage data as a function of total dose or dose rate after initial high-conduction or low-conduction threshold voltage levels had been written into the device. (ED) 581-1978w

(3) Stored data integrity as a function of total dose or dose rate after a given test pattern has been written into the device. (ED) 1005-1998

radiation intensity (1) (data transmission) The radiation intensity in a given direction is the power radiated from an antenna per unit solid angle in that direction. (PE) 599-1985w

(2) In a given direction, the power radiated from an antenna per unit solid angle. (AP/ANT) 149-1979r, 145-1993

radiation lobe (antenna pattern) A portion of the radiation pattern bounded by regions of relatively weak radiation intensity. *See also:* antenna. (AP/ANT) 149-1979r, 145-1983s

radiation loss (1) (transmission system) That part of the transmission loss due to radiation of radio-frequency power. *See also:* waveguide. (MTT) 146-1980w

(2) (waveguide) A power loss due to electromagnetic radiation leaving a network. (MTT) 146-1980w

(3) (planar transmission lines) The loss associated with planar transmission lines having ideal conductors and lossless media, caused by energy leakage from the transmission line. (MTT) 1004-1987w

radiation mode (fiber optics) In an optical waveguide, a mode whose fields are transversely oscillatory everywhere external to the waveguide, and which exists even in the limit of zero wavelength. Specifically, a mode for which

$$\beta = [n^2(a)k^2 - (l/a)^2]^{1/2} \text{ [zc]}$$

where β is the imaginary part (phase term) of the axial propagation constant, l is the azimuthal index of the mode, $n(a)$ is the refractive index at $r = a$, the core radius, and k is the free-space wavenumber, $2\pi/\lambda$, where λ is the wavelength. Radiation modes correspond to refracted rays in the terminology of geometric optics. *Synonym:* unbound mode. *See also:* bound mode; leaky mode; refracted ray; mode. (Std100) 812-1984w

radiation pattern (1) (fiber optics) Relative power distribution as a function of position or angle. *Notes:* 1. Near-field radiation pattern describes the radiant emittance ($W \times m^{-2}$) as a function of position in the plane of the exit face of an optical fiber. 2. Far-field radiation pattern describes the irradiance as a function of angle in the far-field region of the exit face of an optical fiber. 3. Radiation pattern may be a function of the length of the waveguide, the manner in which it is excited, and the wavelength. *See also:* near-field region; far-field region. (Std100) 812-1984w

(2) The spatial distribution of a quantity that characterizes the electromagnetic field generated by an antenna. *Notes:* 1. The distribution can be expressed as a mathematical function or as a graphical representation. 2. The quantities that are most often used to characterize the radiation from an antenna are proportional to, or equal to, power flux density, radiation intensity, directivity, phase, polarization, and field strength. 3. The spatial distribution over any surface or path is also an antenna pattern. 4. When the amplitude or relative amplitude of a specified component of the electric field vector is plotted graphically, it is called an **amplitude pattern, field pattern,** or **voltage pattern.** When the square of the amplitude or relative amplitude is plotted, it is called a **power pattern.** 5. When the quantity is not specified, an amplitude or power pattern is implied. *Synonym:* antenna pattern. (AP/ANT) 145-1993

radiation pattern cut Any path on a surface over which a radiation pattern is obtained. *Note:* For far-field patterns, the surface is that of the radiation sphere. For this case, the path formed by the locus of points for which θ is a specified constant and ϕ is a variable is called a "conical cut." The path formed by the locus of points for which ϕ is a specified constant and θ is a variable is called a "great circle cut." The conical cut with θ equal to 90° is also a great circle cut. A spiral path that begins at the north pole ($\theta = 0°$) and ends at the south pole ($\theta = 180°$) is called a "spiral cut." (AP/ANT) 145-1993

radiation protection guide (electrobiology) Radiation level that should not be exceeded without careful consideration of the reasons for doing so. *See also:* electrobiology. (NIR) C95.1-1982s

radiation pyrometer (radiation thermometer) A pyrometer in which the radiant power from the object or source to be measured is utilized in the measurement of its temperature. The radiant power within wide or narrow wavelength bands filling a definite solid angle impinges upon a suitable detector. The detector is usually a thermocoupler or thermopile or a bolometer responsive to the heating effect of the radiant power, or a photosensitive device connected to a sensitive electric instrument. *See also:* electric thermometer. (EEC/PE) [119]

radiation resistance The ratio of the power radiated by an antenna to the square of the RMS antenna current referred to a specified point. *Notes:* 1. The total power radiated is equal to the power accepted by the antenna minus the power dissipated in the antenna. 2. This term is of limited utility for antennas in lossy media. (AP/ANT) 145-1993

radiation sphere (for a given antenna) A large sphere whose center lies within the volume of the antenna and whose surface lies in the far field of the antenna, over which quantities characterizing the radiation from the antenna are determined. *Notes:* 1. The location of points on the sphere are given in terms of the θ and ϕ coordinates of a standard spherical coordinate system whose origin coincides with the center of the radiation sphere. 2. If the antenna has a spherical coordinate system associated with it, then it is desirable that its coordinate system coincide with that of the radiation sphere. (AP/ANT) 145-1993

radiation thermometer *See:* radiation pyrometer.

radiation trapping (laser maser) The suppression or delay of fluorescence in an optically thick absorbing medium resulting from absorption and re-emission. (LEO) 586-1980w

radiation zone (of EMI) The area where the distance to the source of electromagnetic interference is greater than the wavelength of the interference. In the radiation zone, the circuit or system will be affected by plane waves. *Contrast:* induction zone. (PE/IC) 1143-1994r

radiative heat release The heat radiating from flames. (DEI) 1221-1993w

radiative relaxation time (laser maser) The relaxation time that would be observed if only processes involving the radiation of electromagnetic energy were effective in producing relaxation. (LEO) 586-1980w

radiative transfer theory A heuristic formulation for the calculation of the scattered specific intensity based on the conservation of energy. (AP/PROP) 211-1997

radiator (1) (illuminating engineering) An emitter of radiant energy. (EEC/IE) [126]

(2) (telecommunications) Any antenna or radiating element that is a discrete physical and functional entity. (AP/ANT) 145-1993

(3) (electric power systems in commercial buildings) A heating unit that provides heat transfer to objects within a visible range by radiation and by conduction to the surrounding air, which is circulated by natural convection. (IA/PSE) 241-1990r

radio-acoustic ranging (navigation aid terms) Determining distance by a combination of radio and sound. *Synonym:* echo ranging. (AES/GCS) 172-1983w

radioactive check source (liquid-scintillation counters) A radioactive sample used to monitor the operational status of an instrument. The approximate activity should be known. (NI) N42.16-1986

radioactive source A radionuclide prepared in a form convenient for use in testing a detector or spectrometer. (NPS) 325-1996

radioactivity standard source (1) Either a radioactivity standard that has been certified as to absolute radioactivity by a laboratory recognized as the National Standardizing Laboratory of a country for radioactivity measurements or a radioactivity standard that has been obtained from a supplier who participates in measurement assurance activities with the National Standardizing Laboratory when such standards are available. In such measurement assurance activities, the radioactivity calibration value of the suppliers should agree with the National Standardizing Laboratory value within the overall uncertainty stated by the supplier in its certification of the same batch of sources or in its certification of similar sources. (NI) N42.12-1994

(2) A radioactivity source that has been certified as to absolute radioactivity either by (a) the laboratory recognized as the National Standardizing Laboratory of the country for radioactivity measurements, NSLR, (NIST in the case of the U.S.) or (b) by a supplier who participates in measurement assurance activities with the National Standardizing Laboratory when such standards are available. In such measurement assurance activities, the radioactivity calibration value of the supplier shall agree with the National Standardizing Laboratory value within the overall uncertainty stated by the supplier in its verification of the same batch of sources or in its certification of similar sources. *Synonym:* calibrated source. (NI/NPS) 309-1999

radio altimeter (navigation aid terms) An altimeter using radar principles for height measurement. Height is determined by measurement of propagation time of a radio signal transmitted from the vehicle and reflected back to the vehicle from the terrain below. *Synonym:* radar altimeter. (AES/GCS) 686-1997, 172-1983w

radio astronomy The branch of astronomy dealing with the reception and analysis of radio waves from extraterrestrial sources. (AP/PROP) 211-1997

radio-autopilot coupler (navigation aid terms) Equipment providing means by which electrical signals from navigation receivers control the vehicle autopilot. (AES/GCS) 172-1983w

radio beacon (navigation aid terms) A facility, usually a nondirectional radio station, emitting identifiable signals intended for radio direction finding observations. *See also:* nondirectional beacon. (AES/GCS) 172-1983w

radio-beacon buoy (navigation aid terms) A buoy equipped with a marker-radio beacon. *See also:* buoy. (AES/GCS) 172-1983w

radio broadcasting Radio transmission intended for general reception. *See also:* radio transmission. (AP/BT/ANT) 145-1983s, 182-1961w

radio button A visual user interface control used to represent one of a group of mutually exclusive settings. When a radio button is selected, a visual indication is provided to indicate it is the selected button. (C) 1295-1993w

radio channel (data transmission) A band of frequencies of a width sufficient to permit its use for radio communication. *Note:* The width of the channel depends on the type of transmission and the tolerance for the frequency of emission. Normally allocated for radio transmission in a specified type of service or by a specified transmitter. (AP/PE/ANT) 145-1983s, 599-1985w

radio circuit A means for carrying out one radio communication at a time in either or both directions between two points. *See also:* radio transmission; radio channel. (EEC/PE) [119]

radio compass A direction-finder used for navigational purposes. *See also:* radio navigation. (EEC/PE) [119]

radio compass indicator A device that, by means of a radio receiver and rotatable loop antenna, provides a remote indication of the relationship between a radio bearing and the heading of the aircraft. (EEC/PE) [119]

radio compass magnetic indicator A device that provides a remote indication of the relationship between a magnetic bearing, radio bearing, and the aircraft's heading. (EEC/PE) [119]

radio control The control of mechanism or other apparatus by radio waves. *See also:* radio transmission. (EEC/PE) [119]

radio detection (radio warning) The detection of the presence of an object by radiolocation without precise determination of its position. *See also:* radio transmission. (EEC/PE) [119]

radio direction-finder (RDF) (navigation aid terms) A device used to determine the direction of arrival of radio signals. *Note:* At one time this term was used by the British to mean radio distance-finding—that is, radar. (AES/GCS) 172-1983w

radio direction finding (navigation aid terms) A procedure for determining the bearing, at a receiving point, of the source of a radio signal by observing the direction of arrival and other properties of the signal. (AES/GCS) 172-1983w

radio distress signal (SOS) Radiotelegraph distress signal consists of the group . . . --- . . . in Morse code, transmitted on prescribed frequencies. The radiotelephone distress signal consists of the spoken words May Day (*m'aidez* = help me). *Note:* By international agreement, the effect of the distress signal is to silence all radio traffic that may interfere with distress calls. (EEC/PE) [119]

radio disturbance An electromagnetic disturbance in the radio-frequency range. *See also:* radio interference; radio noise. (EMC) [53]

radio Doppler The direct determination of the radial component of the relative velocity of an object by an observed frequency change due to such velocity. *See also:* radio transmission. (EEC/PE) [119]

radio fadeout (Dellinger effect) A phenomenon in radio propagation during which substantially all radio waves that are normally reflected by ionospheric layers in or above the E region suffer partial or complete absorption. *See also:* radiation. (EEC/PE) [119]

radio field strength The electric or magnetic field strength at a radio frequency. *Synonym:* field strength. (AP/PROP) 211-1997

radio frequency (RF) (1) (A) (data transmission) (Loosely) The frequency in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion. **(B) (data transmission)** A frequency useful for radio transmission. *Note:* The present practicable limits of radio frequency are roughly 10 kHz (kilohertz) to 100 000 MHz (megahertz). Within this frequency range electromagnetic radiation may be detected and amplified as an electric current at the wave frequency. (PE) 599-1985

(2) (power line filters) A frequency in the portion of the electromagnetic spectrum that is between the audio frequency portion and the infrared portion. (EMC) C63.13-1991

(3) A frequency in the radio spectrum. *See also:* radio spectrum. (AP/PROP) 211-1997

(4) A frequency that is useful for radio transmission. (NIR) C95.1-1999

(5) (A) (Loosely) The frequency in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion. **(B)** A frequency useful for radio transmission. *Note:* The present practicable limits of radio frequency are roughly 10 kHz to 100 000 MHz. Within this frequency range, electromagnetic radiation may be detected and amplified as an electric current at the wave frequency. (EMB/MIB) 1073.3.2-2000

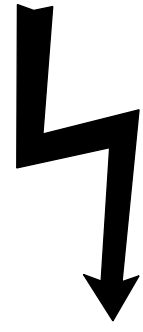
radio-frequency absorber A material designed to absorb electromagnetic energy. The material may have a flat face or may be formed into pyramids, wedges, or cones. Radar absorber material is commonly referred to as RAM. (EMC) 1128-1998

radio-frequency alternator A rotating-type generator for producing radio-frequency power. (AP/ANT) 145-1983s

radio-frequency attenuator (signal-transmission system) A low-pass filter that substantially reduces the radio-frequency power at its output relative to that at its input, but transmits lower-frequency signals with little or no power loss. *See also:* signal. (IE) [43]

radio-frequency converter A power source for producing electric power at a frequency of 10 kHz and above. (IE/IA) 169-1955w

radio-frequency electric current hazard advisory symbol Refers to the overall design and shape shown in the figure below.



RF electric current hazard advisory symbol

radio-frequency (RF) electric current hazard advisory symbol (NIR/SCC28) C95.2-1999

radio-frequency energy Includes radio frequency fields and radiation with frequencies between 3 kHz and 300 GHz, and includes microwave frequencies. (NIR/SCC28) C95.2-1999

radio-frequency energy advisory symbol Refers to the overall design, and shape shown in the figure below.

RF energy advisory symbol

radio-frequency (RF) energy advisory symbol (NIR/SCC28) C95.2-1999

radio-frequency generator (1) (signal-transmission system) A source of radio-frequency energy. (IE) [43]
(2) (induction heating) A power source for producing electric power at a frequency of 10 kHz and above. (IA) 54-1955w

radio-frequency generator, electron tube type (induction and dielectric usage) A power source comprising an electron-tube oscillator, an amplifier if used, a power supply and associated control equipment. *See also:* magnetron; Colpitts oscillator; tuned grid-tuned plate oscillator; Hartley oscillator. (IA) 54-1955w

radio-frequency hot spot A highly localized area of relatively more intense radio-frequency radiation that manifests itself in two principal ways:

a) The presence of intense electric or magnetic fields immediately adjacent to conductive objects that are immersed in lower intensity ambient fields (often referred to as re-radiation), and
b) Localized areas, not necessarily immediately close to conductive objects, in which there exists a concentration of radio-frequency fields caused by reflections and/or narrow beams produced by high-gain radiating antennas or other highly directional sources. In both cases, the fields are characterized by very rapid changes in field strength with distance.

RF hot spots are normally associated with very nonuniform exposure of the body (partial body exposure). This is not to be confused with an actual thermal hot spot within the absorbing body. (NIR) C95.1-1999

radio frequency interference (RFI) *See:* radio interference.

radio frequency link (test, measurement, and diagnostic equipment) A radio frequency channel or channels used to connect the unit under test with the testing device. *Synonym:* RF link. (MIL) [2]

radio frequency protection guides (radio frequency electromagnetic fields) The radio frequency field strengths or equivalent plane wave power densities which should not be exceeded without:

a) careful consideration of the reasons for doing so,
b) careful estimation of the increased energy deposition in the human body, and
c) careful consideration of the increased risk of unwanted biological effects.

(NIR) C95.1-1982s

radio-frequency pulse A radio-frequency carrier amplitude modulated by a pulse. The amplitude of the modulated carrier is zero before and after the pulse. *Note:* Coherence of the carrier (with itself) is not implied. (IM/WM&A) 194-1977w

radio-frequency switching relay A relay designed to switch frequencies that are higher than commercial power frequencies with low loss. (PE/EM) 43-1974s

radio-frequency system loss (mobile communication) The ratio expressed in decibels of the power delivered by the transmitter to its transmission line to the power required at the receiver-input terminals that is just sufficient to provide a specified signal-to-noise ratio at the audio output of the receiver. *See also:* mobile communication system. (VT) [37]

radio-frequency transformer A transformer for use with radio-frequency currents. *Note:* Radio-frequency transformers used in broadcast receivers are generally shunt-tuned devices that are tunable over a relatively broad range of frequencies. *See also:* radio transmission. (CHM) [51]

radio gain (radio-wave propagation) Of a radio system, the reciprocal of the system loss. (AP) 211-1977s

radio horizon (1) (data transmission) (of an antenna) The locus of the farthest points at which direct rays from the antenna become tangential to the planetary surface. *Note:* On a spherical surface the horizon is a circle. The distance to the horizon is affected by atmospheric reflection. (AP/ANT) 145-1983s
(2) The locus of points at which the direct rays from a point source of radio waves are tangent to the surface of the Earth. *Note:* In general, the radio and geometric horizons differ because of atmospheric refraction. (AP/PROP) 211-1997

radio-influence field (RIF) Radio-influence field is the radio noise field emanating from an equipment or circuit, as measured using a radio noise meter in accordance with specified methods. *See also:* electromagnetic compatibility. (EMC/CHM) [51]

radio-influence tests Tests that consist of the application of voltage and the measurement of the corresponding radio-influence voltage produced by the device being tested. (SWG/PE) C37.40-1981s, C37.100-1992

radio-influence voltage (RIV) (1) (outdoor apparatus bushings) A high-frequency voltage generated as a result of ionization, which may be a propagated by conduction, induction, radiation or a combined effect of all three. (PE/TR) 21-1976
(2) (high-voltage ac cable terminations) The radio noise appearing on conductors of electric equipment or circuits, as measured using a radio-noise meter as a two-terminal voltmeter in accordance with specified methods. (PE/IC) 48-1996
(3) (overhead-power-line corona and radio noise) The radio frequency voltage appearing on conductors of electrical equipment or circuits, as measured using a radio noise meter as a two-terminal voltmeter in accordance with specified methods (generally termed conducted measurements). *Note:* The term *influence* was coined to avoid the general admission that power systems would generate and conduct interference. The term *influence* is used only in North America; the term *interference* is preferred elsewhere. (T&D/PE) 539-1990
(4) (power and distribution transformers) A radio frequency voltage generally produced by partial discharge and measured at the equipment terminals for the purpose of determining the electromagnetic interference effect of the discharges. *Notes:* 1. "RIV" can be measured with a coupled radio interference measuring instrument and is commonly measured at approximately 1 MHz, although a wide frequency range is involved. 2. "RIV" values are often used as an "index" of "partial discharge" intensity. 3. The RIV of equipment was historically measured to determined the influence of energized equipment on radio broadcasting, hence—RIV. (PE/TR) C57.12.80-1978r
(5) A high-frequency voltage, generated by all sources of ionization current, that appears at the terminals of electric-power apparatus or on power circuits. (SPD/PE) C62.11-1999

radio interference Degradation of the reception of a wanted signal caused by radio frequency (RF) disturbance. *Notes:* 1. RF disturbance is an electromagnetic disturbance having components in the RF range. 2. The words "interference" and "disturbance" are often used indiscriminately. The expression "radio frequency interference" is also commonly applied to an RF disturbance or an unwanted signal. *Synonym:* radio frequency interference. (EMB/T&D/PE/MIB) 1073.3.2-2000, 539-1990

radio interferometer A type of radio telescope that uses two or more physically separated collecting elements in order to achieve high angular resolution of the brightness temperature distribution of a radio source. (AP/PROP) 211-1997

radiolocation (navigation aid terms) Position determination by means of radio aids for purposes other than those of navigation. (AES/GCS) 172-1983w

radio magnetic indicator (RMI) (navigation aid terms) A combined indicating instrument which converts omnibearing indications to a display resembling an ADF (automatic direc-

RADIOMETRIC TERMS

TERM NAME	SYMBOL	QUANTITY	UNIT
Radiant energy	Q	Energy	joule (J)
Radiant power *Syn:* optical power	ϕ	Power	watt (W)
Irradiance	E	Power incident per unit area (irrespective of angle)	$W \cdot m^{-1}$
Spectral irradiance	E	Irradiance per unit wave	$W \cdot m^{-2}$
	λ	Length interval at a given wavelength	$\cdot nm^{-2}$
Radiant emittance *Syn:* radiant excitance	W	Power emitted (into a full sphere) per unit area	$W \cdot m^{-1}$
Radiant intensity	I	Power per unit solid angle	$W \cdot sr^{-1}$
Radiance	L	Power per unit angle per unit projected area	$W \cdot sr^{-1} \cdot m^{-2}$
Spectral radiance	L	Radiance per unit wavelength	$W \cdot sr^{-1}$
	λ	interval at a given wavelength	$\cdot m^{-2} \cdot nm^{-1}$

tion finder) display, one in which the indicator points toward the omnirange station; it combines omnibearing, vehicle heading, and relative bearing. (AES/GCS) 172-1983w

radiometric sextant (navigation aid terms) An instrument which measures the direction to a celestial body by detecting and tracking the nonvisible natural radiation of the body; such radiation includes radio, infrared, and ultraviolet. (AES/GCS) 172-1983w

radiometry (1) (fiber optics) The science of radiation measurement. The basic quantities of radiometry are listed below. (Std100) 812-1984w

(2) The measurement of quantities associated with radiant energy and power. (EEC/IE) [126]

radio navigation (navigation aids) Navigation based upon the reception of radio signals. (AES/GCS) 172-1983w

radio noise (1) (radio noise from overhead power lines and substations) Any unwanted disturbance within the radio frequency band, such as undesired electromagnetic waves in any transmission channel or device. (T&D/PE) 430-1986w

(2) (radio noise from overhead power lines and substations) An electromagnetic noise that may be superimposed upon a wanted signal and is within the radio-frequency range. (EMC) C63.5-1988, C63.4-1991

(3) (overhead-power-line corona and radio noise) Electromagnetic noise having components in the radio frequency range. (T&D/PE) 539-1990

radio noise field strength (overhead-power-line corona and radio noise) A measure of the field strength of the radiated radio noise at a given location. *Notes:* 1. In practice, the quantity measured is not the electromagnetic field strength of the interfering waves but some quantity that is proportional to, or bears a known relation to, the electromagnetic field strength. 2. The radio noise field strength is measured in average, rms, quasi-peak, or peak values, according to which detector function of the radio noise meter is used. 3. The radio noise field strength is expressed either in μV/m, or in dB above 1 μV/m, per unit bandwidth, or in a specified bandwidth. (T&D/PE) 539-1990

radiophare (navigation aid terms) A term often used in international terminology, meaning radio beacon. (AES/GCS) 172-1983w

radio propagation path (mobile communication) For a radio wave propagating from one point to another, the great-circle distance between the transmitter and receiver antenna sites. *See also:* mobile communication system. (VT) [37]

radio proximity fuse A radio device contained in a missile to detonate it within predetermined limits of distance from a target by means of electromagnetic interactions with the target. *See also:* radio transmission. (AP/ANT) 145-1983s

radio range (navigation aid terms) A radio facility that provides radial lines of position by having characteristics in its emission which are convertible to bearing information and useful in the lateral guidance of aircraft. (AES/GCS) 172-1983w

radio range-finding The determination of the range of an object by means of radio waves. *See also:* radio transmission. (EEC/PE) [119]

radio receiver A device for converting radio-frequency power into perceptible signals. (VT) [37]

radio relay system (radio relay) A point-to-point radio transmission system in which the signals are received and retransmitted by one or more intermediate radio stations. *See also:* radio transmission. (EEC/PE) [119]

radio shielding A metallic covering in the form of conduit and electrically continuous housings for airplane electric accessories, components, and wiring, to eliminate radio interference from aircraft electronic equipment. (EEC/PE) [119]

radio signal A carrier in the RF range that is modulated by an electromagnetic signal. (T&D/PE) 539-1990

radiosonde An automatic radio transmitter in the meteorological-aids service, usually carried on an aircraft, free balloon, kite, or parachute, that transmits meteorological data. *See also:* radio transmitter. (AP/ANT) 145-1983s

radio source In radio astronomy, a celestial object or region that emits radio waves. (AP/PROP) 211-1997

radio spectrum The radio frequency portion of the electromagnetic spectrum. The frequency ranges are shown in the following table:

Frequency designation	Frequency range
Ultra low frequency (ULF)	$<$ 3 Hz
Extremely low frequency (ELF)	3 Hz to 3 kHz
Very low frequency (VLF)	3–30 kHz
Low frequency (LF)	30–300 kHz
Medium frequency (MF)	300 kHz to 3 MHz
High frequency (HF)	3–30 MHz
Very high frequency (VHF)	30–300 MHz
Ultra high frequency (UHF)	300 MHz to 3 GHz
Super high frequency (SHF)	3–30 GHz
Extremely high frequency (EHF)	30–300 GHz
Submillimeter	300 GHz to 3 THz

(AP/PROP) 211-1997

radio star (communication satellite) A discrete source in the celestial sphere emitting electrical random noise. *See also:* background noise. (COM) [25]

radio station A complete assemblage of equipment for radio transmission or reception, or both. *See also:* radio transmission. (EEC/PE) [119]

radio telescope An instrument used to detect and collect radio emissions from an object or region in space. (AP/PROP) 211-1997

radio transmission The transmission of signals by means of radiated electromagnetic waves other than light or heat waves. (EEC/PE) [119]

radio transmitter A device for producing radio-frequency power, for purposes of radio transmission. (AP/ANT) 145-1983s

radio warning *See:* radio detection.

radio wave An electromagnetic wave of radio frequency. Current usage includes frequencies up to 3 THz. *See also:* radio spectrum. (AP/PROP) 211-1997

radio-wave propagation The transfer of energy by electromagnetic radiation at radio frequencies. (AP/PROP) 211-1997

radix (1) (mathematics of computing) A quantity whose successive integer powers are the implicit multipliers of the sequence of digits that represent a number in some positional notation systems. For example, if the radix is 5, then 143.2 means 1 times 5 to the second power, plus 4 times 5 to the first power, plus 3 times 5 to the zero power, plus 2 times 5 to the minus-one power. *Synonyms:* base number; radix number; base. (C) 1084-1986w

(2) (radix-independent floating-point arithmetic) The base for the representation of floating point numbers. (MM/C) 854-1987r

radix alignment In text formatting, the formatting of numbers in a column such that their radix points, whether explicit or implicit, form a vertical line. *See also:* decimal alignment. (C) 610.2-1987

radix complement (mathematics of computing) The complement obtained by subtracting each digit of a given numeral from the largest digit in the numeration system, then adding 1 to the least significant digit of the result and executing any required carries. For example, twos complement in binary notation, tens complement in decimal notation. *Synonyms:* noughts complement; zero complement; true complement; base complement; complement on *n*. *Contrast:* diminished-radix complement. (C) 1084-1986w

radix exchange sort A radix sort in which items are compared and, if necessary, exchanged in multiple passes, using successive digits within the numeric representation of the sort key, starting with the most significant digit. *Synonym:* divide-and-conquer sort. (C) 610.5-1990w

radix insertion sort A radix sort in which each item is inserted into its proper position in the sorted set according to the digital properties of the numerical representation of the sort keys. (C) 610.5-1990w

radix list sort A radix sort implemented using the list sorting technique. (C) 610.5-1990w

radix-minus-one complement (1) A numeral in radix notation that can be derived from another by subtracting each digit from one less than the radix, for example, nines complement in decimal notation, ones complement in binary notation. (C) [20], [85]

(2) (mathematics of computing) *See also:* diminished-radix complement. (C) 1084-1986w

radix notation A positional representation system in which the ratio of the place values of adjacent digits is a positive integer (the radix). *Synonyms:* radix numeration system; radix scale. (C) 1084-1986w

radix number *See:* radix.

radix numeration system *See:* radix notation.

radix point (mathematics of computing) In positional notation, the character, expressed or implied, that separates the integral part of a numerical expression from the fractional part. For example, binary point, decimal point, hexadecimal point, or octal point. *Synonyms:* base point; arithmetic point; point. (C) 1084-1986w

radix point character A character within a picture specification that represents the radix point. *Synonym:* virtual point picture character. (C) 610.5-1990w

radix scale *See:* radix notation.

radix search A searching technique that takes advantage of the digital properties of the numerical representation of the search keys. *Contrast:* radix sort. *See also:* radix trie search; digital tree search; multiway radix trie search; binary radix trie search. (C) 610.5-1990w

radix sort A sort that takes advantage of the digital properties of the numerical representation of the sort keys; for example, sorting on keys with base 10 representation by first sorting on the hundreds place, then the tens place, then the ones place. *Contrast:* radix search. *See also:* radix insertion sort; radix list sort; digital sort; straight radix sort; radix exchange sort. (C) 610.5-1990w

radix transformation function In hashing, a hash function the result of which is the original key in a different numerical base from its original base. For example, in the function below, the original key (assumed to be in base 10) is expressed in base 16.

Original key	Calculation	Hash value
72	$72_{10} = 48_{16}$	48
157	$157_{10} = 9D_{16}$	9D

(C) 610.5-1990w

radix trie search A radix search in which the items in the set to be searched are placed in a trie. *Note:* The trie is traversed taking branches according to the search argument until a terminal node is encountered, and if the search is successful, the external node is equal to the search argument. *See also:* multiway radix trie search; binary radix trie search. (C) 610.5-1990w

radome A cover, usually intended for protecting an antenna from the effects of its physical environment without degrading its electrical performance. (AP/ANT) 145-1993

rads in Si (1) (metal-nitride-oxide field-effect transistor) Amount of radiation measured by its ionizing effect in silicon; 1 rad equals 100 erg of energy deposited in a gram of irradiated solid. This number can be translated into the density of electron-hole pairs (ehp/cm^3) by the following operation:

$$n_{eh}[\text{ehp/volume}] = \gamma[\text{energy/mass}] \times \rho[\text{mass/volume}] \times N_{eh}[\text{ehp/energy}]$$

where

n_{eh} = volume density of ehp,
γ = total radiation dose as energy dissipated per unit mass, typically expressed in rads,
d = density of solid in mass/volume,
N_{eh} = number of ehps created per energy dissipated.

In many solids, $N_{eh} \sim 1/b\text{Eg}$, and in silicon particularly, $b = 3.6[\text{ehp}]^{-1}$. *Note:* [15], and Eg = 1.0 eV. This means that one ehp is created per 3.6 electron-volts of energy dissipated. In order to permit the use of the total dose expressed in rads directly, use is made of the identity that 1 erg = 6.2×10^{11} eV. From this $N_{eh} \sim 6.2 \times 10^{11}$ [eV/erg] [ehp]/3.6[eV], and since 1 rad = 100 ergs/g, this makes $N_{eh} \sim 1.7 \times 10^{13}$ [ehp/g rads]. Thus, for silicon, n_{eh} [ehp/cm^3] = $1.7 \times 10^{13} \times \gamma$[rads] $\times \rho$[g/ cm^3]. (ED) 581-1978w

(2) Amount of radiation measured by its ionizing effect in silicon; one rad equals 100 erg of energy deposited in a gram of irradiated solid. (ED) 1005-1998

ragged left margin In text formatting, a left margin that is not aligned. *Contrast:* left justification. (C) 610.2-1987

ragged right margin In text formatting, a right margin that is not aligned. *Contrast:* right justification. (C) 610.2-1987

RAID *See:* redundant arrays of inexpensive disks.

RAID level 2 A form of RAID storage, known as level 2, in which Hamming codes are used for error correction. (C) 610.10-1994w

RAID storage Acronym for redundant arrays of inexpensive disks; a type of storage that uses several magnetic or optical disks, known as a disk array, working in tandem to increase disk capacity, improve data transfer rates, and provide higher system reliability. *Note:* Six basic architectures of RAID stor-

age, referred to as levels 0 through 5, have been defined; see corresponding figure.

Level	Description
0	Data striping without parity
1	Mirrored disk array
2	
3	Parallel disk array
4	Independent disk array
5	Independent disk array

types of RAID storage

(C) 610.10-1994w

rail clamp A device for connecting a conductor or a portable cable to the track rails that serve as the return power circuit in mines. *See also:* mine feeder circuit.

(EEC/PE/MIN) [119]

rain Precipitation in the form of liquid water drops with diameters greater than 0.5 mm, or, if widely scattered, smaller diameters. For observation purposes, the intensity of rainfall at any given time and place may be classified as Very light: scattered drops that do not completely wet an exposed surface regardless of duration; Light: the rate of fall being no more than 2.5 mm/h; Moderate: from 2.6 to 7.6 mm/h, the maximum rate of fall being no more than 0.76 mm in 6 min; Heavy: over 7.7 mm/h. When rain gauge measurements are not readily available to determine the rain intensity, estimates may be made according to a descriptive system set forth in observation manuals. *Notes:* 1. For corona studies, probability distributions for rain are produced from data obtained during "measurable rain"; i.e., rain intensities that can be measured with standard rain counters such as tipping buckets or instantaneous rate meters. 2. For ac lines, heavy rain levels are often considered representative of maximum or L_5 levels. Heavy rain data are often generated by artificial tests on conductors strung in high-voltage test setups. 3. The only other form of liquid precipitation, drizzle, is to be distinguished from rain in that drizzle drops are generally less than 0.5 mm in diameter, are very much more numerous, and reduce visibility much more than does light rain. (T&D/PE) 539-1990

rain clutter Radar echoes from rain that impair or obscure the echoes from desired targets. *See also:* precipitation clutter.

(AES) 686-1997

rainproof (power and distribution transformers) So constructed, protected, or treated as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions.

(NEC/NESC/PE/TR) C57.12.80-1978r, [86]

rain rate A measure of the volume of water collected per unit area per unit time due to rain. The common unit is millimeters per hour. *Note:* Precipitation rate may refer to other hydrometeors such as snow, in which case the common units are either millimeters per hour or equivalent rainfall rate in millimeters per hour. *Synonym:* rainfall rate.

(AP/PROP) 211-1997

rainfall rate *See:* rain rate.

raintight (1) So constructed or protected that exposure to a beating rain will not result in the entrance of water under specified test conditions. (NESC/NEC) [86]

(2) (power and distribution transformers) So constructed or protected as to exclude rain under specified test conditions.

(PE/TR) C57.12.80-1978r

rake An inclination from the perpendicular.

(T&D/PE) 751-1990

RAM (1) (random-access memory) A memory that permits access to any of its address locations in any desired sequence with similar access time to each location. *Note:* The term RAM, as commonly used, denotes a read/write memory.

(ED) 641-1987w

(2) Reliability, availability, and maintainability of the plant. In economic analysis, the increase in RAM due to data integration or automation is sometimes quantified as a benefit. In computer applications, this refers to random access memory, which is not used in this text. (PE/EDPG) 1150-1991w

(3) High-speed read/write memory with an access time that is the same for all storage locations. *See also:* memory board; dynamic random-access memory; main storage; static random-access memory. (C) 610.10-1994w

RAM disk A simulated storage disk created and maintained by a special driver that stores data electronically (in RAM, or random-access storage) rather than magnetically. *Note:* Such storage is inherently dynamic. *Synonym:* virtual disk.

(C) 610.10-1994w

Raman-Nath region (acousto-optic device) The region that occurs when the Bragg Region inequality is reversed, that is $L < n\Lambda^2/\lambda_0$. The angle of incidence is generally zero degrees, and light is diffracted into many diffraction orders.

(UFFC) [23]

RAMIS *See:* Rapid Access Management Information System.

RamLink The packet-transfer architecture portion of this standard, which describes how packets are transferred between the master and slaves. Several signal-layer specifications can be used, including *RingLink* and *SyncLink*.

(C/MM) 1596.4-1996

ramp (1) (thyristor) A controlled change in output at a predetermined linear rate, from one value to another.

(IA/IPC) 428-1981w

(2) (railway control) A roadway element consisting of a metal bar of limited length, with sloping ends, fixed on the roadway, designed to make contact with and raise vertically a member supported on the vehicle. (PE/EEC) [119]

(3) (A) (pulse terminology) (single transition) A linear feature. **(B) (automatic control)** *See also:* unit-ramp signal.

(IM/WM&A) 194-1977

ramp-forced automatic control response The total (transient plus steady-state) time response resulting from a sudden increase in the rate of change of input from zero to some finite value. *Synonym:* ramp response. (PE/EDPG) [3]

ramp-forced response time (automatic control) The time interval by which an output lags an input, when both are varying at a constant rate. (PE/EDPG) [3]

ramping The rate at which a generating unit increases or decreases its output, usually expressed in megawatts per minute.

(PE/PSE) 858-1993w

ramp response (null-balancing electric instrument) A criterion of the dynamic response of an instrument when subjected to a measured signal that varies at a constant rate. *See also:* accuracy rating. (EEC/EMI) [112]

ramp response time (null-balancing electric instrument) The time lag, expressed in seconds, between the measured signal and the equivalent positioning of the end device when the measured signal is varying at constant rate. *See also:* accuracy rating. (EEC/EMI) [112]

ramp response-time rating (null-balancing electric instrument) The maximum ramp response time for all rates of change of measured signal not exceeding the average velocity corresponding to the span step-response-time-rating of the instrument when the instrument is used under rated operating conditions. Example: If the span step-response-time-rating is four seconds, the ramp response-time rating shall apply to any rate of change of measured signal not exceeding 25% of span per second. *See also:* accuracy rating. (EEC/EMI) [112]

ramp shoe *See:* shoe.

random (1) (data transmission) A condition not localized in time or frequency. (PE) 599-1985w

(2) (automatic control) Describing a variable whose value at a particular future instant cannot be predicted exactly, but can only be estimated by a probability distribution function.

(PE/EDPG) [3]

(3) (modeling and simulation) Pertaining to a process or variable whose outcome or value depends on chance or on a process that simulates chance, often with the implication that all possible outcomes or values have an equal probability of occurrence; for example, the outcome of flipping a coin or executing a computer-programmed random number generator. (C) 610.3-1989w

random access (1) (A) (computers) Pertaining to the process of obtaining data from, or placing data into storage where the time required for such access is independent of the location of the data most recently obtained or placed in storage. **(B) (computers)** Pertaining to a storage device in which the access time is effectively independent of the location of the data. (MIL/C) [2], [20], [85]

(2) (data management) An access mode in which specific logical records are obtained from or placed into a file in a nonsequential manner. *Contrast:* direct access; sequential access. *See also:* direct access. (C) 610.5-1990w

random-access memory (RAM) (1) A memory that permits access to any of its address locations in any desired sequence with similar access time to each location (adapted from IEC 748-2). *Note:* The term RAM, as commonly used, denotes a read/write memory with unlimited data rewrite capability and equal read and write times. (ED) 1005-1998

(2) A type of temporary data storage (memory) that can be read and changed while the computer is in use. Data stored in random-access memory is lost if the system loses power. (PE/SUB) 1379-1997

random access method* *See:* direct access method.

* Deprecated.

random access programming (test, measurement, and diagnostic equipment) Programming without regard for the sequence required for access to the storage position called for in the program. (MIL) [2]

random array antenna *See:* array antenna.

random drift rate (gyros) The nonsystematic, time-varying component of drift rate under specified operating conditions. It is expressed as an rms value, or standard deviation of angular displacement per unit time. (AES/GYAC) 528-1994

random error (1) Errors that have unknown magnitudes and directions and that vary with each measurement. (PE/PSIM) 4-1995

(2) (measurement) A component of error whose magnitude and direction vary in a random manner in a sequence of measurements made under nominally identical conditions. (IM/HFIM) 314-1971w

random errors (1) (navigation aid terms) Those errors which cannot be predicted except on a statistical basis. (AES/GCS) 172-1983w

(2) Those errors that cannot be predicted except on a statistical basis. (AES/RS) 686-1990

random failure (1) (software) A failure whose occurrence is unpredictable except in a probabilistic or statistical sense. *See also:* transient error; intermittent fault. (C) 610.12-1990

(2) Any failure whose cause and/or mechanism makes its time of occurrence unpredictable. (SWG/PE/NP) C37.100-1992, 650-1979s

random failures The pattern of failures for equipment that has passed out of its infant-mortality period and has not reached the wear-out phase of its operating lifetime. The reliability of an equipment in this period may be computed by the equation:

$R = e^{-\lambda t}$

where

λ is failure rate

t is time period of interest

(SUB/PE) C37.1-1994

random-incidence microphone (audible noise measurements) (overhead power lines) A microphone that has been designed to have a flat frequency response in a diffuse sound field where sound waves are arriving equally from all directions. (T&D/PE) 539-1990, 656-1992

randomizing *See:* hashing.

randomly polarized Electromagnetic radiation in which the direction of the electric field vector changes randomly in time and/or space. (AP/PROP) 211-1997

random medium A medium in which the spatial variations of permittivity, discrete and/or continuous, are best described in terms of statistical measures. (AP/PROP) 211-1997

random noise (1) (overhead-power-line corona and radio noise) Noise that comprises transient disturbances occurring at random. *Notes:* 1. Random noise is the part of noise that is unpredictable except in a statistical sense. The term is most frequently applied to limiting cases where the number of transient disturbances per unit time is large, so that the spectral characteristics are the same as those of thermal noise. Thermal noise and shot noise are special cases of random noise. 2. A random noise whose instantaneous magnitudes occur according to the Gaussian distribution is called "Gaussian random noise." 3. In power line noise, "random noise" is a component of the total noise caused by discharges. *Synonym:* fluctuation noise. (T&D/PE/C/EMC/PSR) 539-1990, C37.93-1976s, 165-1977w, C63.5-1988, C63.4-1988s

(2) Electromagnetic noise, the values of which at given instants are not predictable. *Note:* The part of the noise that is unpredictable except in a statistical sense. The term is most frequently applied to the limiting case in which the number of transient disturbances per unit time is large, so that the spectral characteristics are the same as those of thermal noise. Thermal noise and shot noise are special cases of random noise. (EMC) C63.12-1987

(3) A nondeterministic fluctuation in the output of a waveform recorder, described by its frequency spectrum and its amplitude statistical properties. (IM/WM&A) 1057-1994w

(4) (broadband local area networks) *See also:* noise. (LM/C) 802.7-1989r

random noise bandwidth (overhead-power-line corona and radio noise) The width in hertz of a rectangle having the same area and maximum amplitude as the square of the amplifier frequency response to a sinusoidal input. (T&D/PE) 539-1990

random number (mathematics of computing) A number selected by chance from a given set of numbers, and satisfying one or more of the standard tests for statistical randomness. (C) 1084-1986w

random number sequence (A) A sequence of random numbers, each of which is statistically independent of its predecessors. **(B)** Loosely, a pseudo-random number sequence. **(C)** A sequence of numbers in which no number can be predicted from knowledge of its predecessors. (C) 610.5-1990

random-ordered list *See:* unordered list.

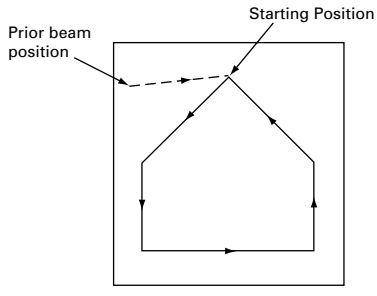
random paralleling (rotating machinery) Paralleling of an alternating-current machine by adjusting its voltage to be equal to that of the system, but without adjusting the frequency and phase angle of the incoming machine to be sensibly equal to those of the system. *See also:* asynchronous machine. (PE) [9]

random photon summing (sodium iodide detector) The simultaneous detection of two or more photons originating from the disintegrations of more than one atom. (NI) N42.12-1994

random probing Open-address hashing in which collision resolution is handled by randomly selecting positions in the hash table until an available position is found. *Contrast:* uniform probing; linear probing. (C) 610.5-1990w

random separation Installed with no deliberate separation. (NESC) C2-1997

random-scan A technique employed in random-scan display devices in which the beam moves from point to point, creating an image composed of vectors. *See also:* vector graphics.



random-scan

(C) 610.6-1991w

random-scan display device A type of CRT display device in which the beam moves from point to point, creating an image composed of vectors. *Note:* This method is often called "vector graphics." *Synonyms:* stroker display; vector display device; refresh line-drawing display device. *Contrast:* raster display device. *See also:* refresh display device.
(C) 610.10-1994w, 610.6-1991w

random summing (germanium detectors) The simultaneous detection of two or more photons originating from the disintegration of more than one atom. (PE/EDPG) 485-1983s

random surface A boundary surface, between two different but otherwise homogeneous media, whose height fluctuations are best described in terms of statistical measures.
(AP/PROP) 211-1997

random walk (1) (angle) The angular error buildup with time, due to white noise in angular rate. This error is typically expressed in degrees per square root of hour [$^\circ/\sqrt{\text{h}}$].
(AES/GYAC) 528-1994

(2) (rate) The drift rate error buildup with time, due to white noise in angular acceleration. This error is typically expressed in degrees per hour, per square root of hour [$(^\circ/\text{h})/\sqrt{\text{h}}$].
(AES/GYAC) 528-1994

random winding (rotating machinery) A winding in which the individual conductors of a coil side occupy random position in a slot. *See also:* rotor; stator. (PE) [9]

random-wound motorette A motorette for random-wound coils. (PE) [9]

range (1) (electric pipe heating systems) (electric heat tracing systems) The capability span of an instrument, the region between the lower and upper limits of a measured or generated function. With respect to electric pipe heating systems, range is usually defined as the difference between the lowest available set point and the highest available set point.
(PE/EDPG) 622A-1984r, 622B-1988r

(2) (radiation protection) The set of values lying between the upper and lower detection limits.
(NI) N320-1979r, N323-1978r

(3) (A) (computers) The set of values that a quantity or function may assume. **(B) (computers)** The difference between the highest and lowest value that a quantity or function may assume. *See also:* error range. (C) [20], [85]

(4) (A) (electronic navigation) An ambiguous term meaning either: a distance, as in artillery techniques and radar measurements or a line of position, located with respect to ground references, such as a very-high frequency omnidirectional radio range (VOR) station, or a pair of lighthouses, or an aural radio range (A–N) radio beacon. *Note:* In electronic navigation, the reader must be particularly wary, since the two meanings of the word range often occur in close proximity. *See also:* radio range. **(B) (health physics instrumentation)** All values lying between the upper and lower indicated limits.
(NI) N42.17B-1989

(5) Distance between a radar and a target.
(AES) 686-1997

range and elevation guidance for approach and landing (REGAL) (navigation aids) A ground-based navigation system used in conjunction with a localizer to compute vertical guidance for proper glide-slope and flare-out during an instrument approach and landing; it uses a digitally-coded vertically-scanning fan beam that provides data for both elevation angle and distance. *See also:* navigation.
(AES/RS/GCS) 686-1982s, [42], 172-1983w

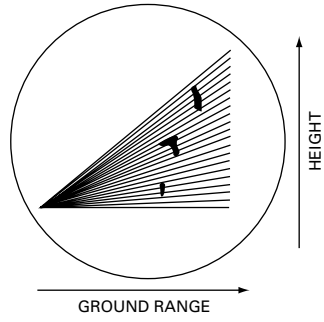
range check A consistency check that ensures that an item of data falls between pre-established maximum and minimum values. (C) 610.5-1990w

range curvature A term applied to a number of signal and image effects [for a synthetic-aperture radar (SAR)] that are due to the spherical nature of RF wavefronts. *Note:* These effects include quadratic phase used to synthesize an aperture, range walk, and image keystone distortions for spotlight SAR systems. (AES) 686-1997

range equation *See:* radar equation.

range extender (telephone switching systems) Equipment inserted in a switched connection to allow an increased loop resistance. (COM) 312-1977w

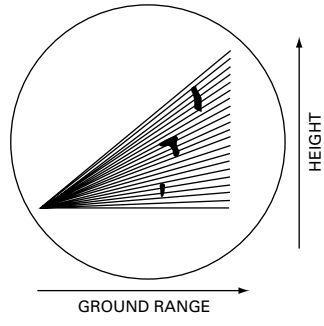
range-height indication (A) A type of radar display format. *See also:* display. **(B)** An intensity-modulated display in which horizontal and vertical distances of a blip from an origin in the lower-left part of the display represent target ground range and target height, respectively. The display is generated by successive range, sweeps starting at the origin and inclined at an angle that varies progressively in accordance with the elevation scan of the radar antenna at a selected azimuth. The height scale of the display is usually expanded relative to the range scale.



RHI display

(AES/RS) 686-1990

range-height indicator (RHI) (A) A type of radar display format. *See also:* display. **(B)** An intensity-modulated display in which horizontal and vertical distances of a blip from an origin in the lower-left part of the display represent target ground range and target height, respectively. *Note:* The display is generated by successive range weeps starting at the origin and inclined at an angle that varies progressively in accordance with the elevation scan of the radar antenna at a selected azimuth. The height scale of the display is usually expanded relative to the range scale.



Range-height indicator

(AES) 686-1997

range lights (illuminating engineering) Groups of color-coded boundary lights provided to indicate the direction and limits of a preferred landing path normally on an aerodrome without

runways but exceptionally on an aerodrome with runways. (EEC/IE) [126]

range mark A calibration marker used on a display to aid in measuring target range. *Synonym:* range marker. (AES) 686-1997

range marker *See:* range mark.

range noise The noise-like variation in the apparent distance of a target, caused by changes in phase and amplitude of the target-scattering sources, and including radial components of glint and scintillation error. (AES) 686-1997

range of a radio system The maximum distance for which a radiowave transmitting system, with specified installation and operating conditions, produces a usable signal strength at a specified radio receiver installation. (AP/PROP) 211-1997

range offset processing Synthetic-aperture processing in which the spectrum is translated from intermediate frequency (IF) to a carrier offset from zero frequency by approximately half the IF bandwidth. *See also:* synthetic-aperture radar. (AES) 686-1997

range resolution The ability to distinguish between two targets solely by the measurement of their ranges. Range resolution is usually expressed in terms of the minimum range separation at which two targets at the same azimuth and elevation angles can be distinguished. *Note:* The required separation should be specified for targets of given relative power level at the receiver. Equal powers are often assumed, but it may be necessary to specify the separation at two or more power ratios where resolution of targets of different powers is important. (AES) 686-1997

range walk The migration of a point scatterer from range cell to range cell during the signal integration period. *Note:* Range walk can occur in synthetic-aperture radar; typically caused by range curvature and/or target rotational or radar line-of-sight translational motion. Range walk also can occur in a very high resolution radar if the relative range rate between the target and the radar is high, relative to the ratio of the range cell to the integration period. (AES) 686-1997

ranging (communication satellite) The measurement of distance between two points and a precisely known reference point. A multiplicity of tones or a PN (pseudonoise) sequence ranging code is often used. (COM) [19]

rank (networks) (degrees of freedom on a node basis) The number of independent cut-sets that can be selected in a network. The rank R is equal to the number of nodes V minus the number of separate parts P. Thus $R = V - P$. *See also:* network analysis. (Std100) 270-1966w

rapid access loop (test, measurement, and diagnostic equipment) In internal memory machines, a small section of memory which has much faster accessibility than the remainder of the memory. (MIL) [2]

Rapid Access Management Information System (RAMIS) A nonprocedural database manipulation language that provides data management and decision support facilities. (C) 610.13-1993w

rapid prototyping A type of prototyping in which emphasis is placed on developing prototypes early in the development process to permit early feedback and analysis in support of the development process. *Contrast:* waterfall model. *See also:* transform analysis; structured design; modular decomposition; object-oriented design; input-process-output; spiral model; stepwise refinement; incremental development; data structure-centered design; transaction analysis. (C) 610.12-1990

rapid start fluorescent lamp (illuminating engineering) A fluorescent lamp designed for operation with a ballast that provides a low-voltage winding for preheating the electrodes and initiating the arc without a starting switch or the application of high voltage. (EEC/IE) [126]

rapid-starting systems (fluorescent lamps) The designation given to those systems in which hot-cathode electric discharge lamps are operated with cathodes continuously heated through low-voltage heater windings built as part of the ballast, or through separate low-voltage secondary transformers. Sufficient voltage is applied across the lamp and between the lamp and fixture to initiate the discharge when the cathodes reach a temperature high enough for adequate emission. The cathode-heating current is maintained even after the lamp is in full operation. *Note:* In Europe this system is sometimes referred to as an instant-start system. (EEC/LB) [94]

raptor A bird of prey. (T&D/PE) 751-1990

Rascal A dialect of Pascal. *See also:* Pascal. (C) 610.13-1993w

raster (1) (television) (cathode-ray tubes) A predetermined pattern of scanning lines that provides substantially uniform coverage of an area. (ED/BT/AV) 161-1971w, 201-1979w **(2)** *See also:* raster grid; pixel. (C) 610.6-1991w

raster burn A change in the characteristics of that area of the target that has been scanned, resulting in a spurious signal corresponding to that area when a larger or tilted raster is scanned. (ED) 161-1971w

raster CRT *See:* raster display device.

raster display device A cathode ray tube display device in which the electron beam makes a line by line sweep of the screen, called raster scanning, creating an image composed of dots by modifying the intensity of the beam. *Note:* This method is often called "raster graphics." *Synonym:* raster CRT. *Contrast:* random-scan display device. *See also:* raster scan; cell-organized raster display device; matrix-addressed storage display device. (C) 610.6-1991w, 610.10-1994w

raster font *See:* vector font.

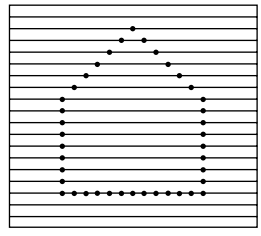
raster graphics The representation of an image by an array of pixels arranged in rows and columns. *Contrast:* vector graphics. *See also:* raster display device. (C) 610.6-1991w

raster grid The grid of addressable coordinates on the display surface of a display device. (C) 610.6-1991w, 610.10-1994w

raster order (A) The order in which pixels are scanned in a raster display device; usually left-to-right; top-to-bottom. **(B)** The order in which pixel information is stored in memory such that it may be displayed on a raster display device. (C) 610.10-1994

raster plotter A plotter that generates a display image on a display surface using a line-by-line scanning technique. *Contrast:* digital plotter; analog plotter. *See also:* electrostatic plotter. (C) 610.10-1994w

raster scan (1) (computer graphics) A technique employed in raster display devices in which the electron beam "scans" the display surface line by line, illuminating the pixels, creating an image on the display surface. *See also:* raster graphics.



raster scan

(C) 610.6-1991w, 610.10-1994w

(2) A method of sweeping the electron beam of a cathode-ray tube screen or an antenna beam that is characterized by more than one sweep either from side to side or from top to bottom. (AES) 686-1997

raster unit The distance between two adjacent addressable locations on a cathode ray tube display device. (C) 610.6-1991w

ratchet demand (electric power utilization) The maximum past or present demands that are taken into account to establish billings for previous or subsequent periods. *See also:* alternating-current distribution. (PE/PSE) [54]

ratchet demand clause (electric power utilization) A clause in a rate schedule that provides that maximum past or present demands be taken into account to establish billings for previous or subsequent periods. *See also:* alternating-current distribution. (PE/PSE) [54], 346-1973w

ratchet relay A stepping relay actuated by an armature-driven ratchet. *See also:* relay. (EEC/REE) [87]

rate The change in a value over a specified period of time. *Note:* Instantaneous rate is the derivative of the value with respect to time and cannot generally be measured. The measured rate approaches the instantaneous rate as the specified period of time approaches zero. (LM/C) 802.1F-1993r

rate action (process control) That component of proportional plus rate control action or of proportional plus reset plus rate control action for which there is a continuous linear relation between the rate of change of the directly controlled variable and the position of a final control element. *See also:* control action. (PE/EDPG) [3]

rate base (power operations) The net plant investment or valuation bases specified by a regulatory authority, upon which a utility is permitted to earn a specified rate of return. (PE/PSE) 858-1987s

rate biasing (laser gyro) The action of intentionally rotating the laser gyro about the input axis to avoid the region in which lock-in occurs. *See also:* anti-lock means. (AES/GYAC) 528-1994

rate center In the United States, a defined geographic location used by telephone companies to determine distance measurements for interLATA and intraLATA mileage rates. (C) 610.7-1995

rate, chopping *See:* chopping rate.

rate compensation heat detector (fire protection devices) A device that will response when the temperature of the air surrounding the device reaches a predetermined level, regardless of the rate of temperature rise. (NFPA) [16]

rate control action (electric power system) Action in which the output of the controller is proportional to the input signal and the first derivative of the input signal. Rate time is the time interval by which the rate action advances the effect of the proportional control action. *Note:* Applies only to a controller with proportional control action plus derivative control action. *See also:* speed-governing system. (PE/PSE) 94-1970w

rated A qualifying term that, applied to an operating characteristic, indicates the designated limit or limits of the characteristic for application under specified conditions. *Note:* The specific limit or limits applicable to a given device is specified in the standard for that device, and included in the title of the rated characteristic, that is, rated *maximum* voltage, rated frequency *range,* etc. (SWG/PE) C37.100-1992

rated accuracy (1) (automatic null-balancing electric instrument) The limit that errors will not exceed when the instrument is used under any combination of rated operating conditions. *Notes:* 1. It is usually expressed as a percent of the span. It is preferred that a + sign or − sign or both precede the number or quantity. The absence of a sign infers a ± sign. 2. Rated accuracy does not include accuracy of sensing elements or intermediate means external to the instrument. *See also:* accuracy rating. (EEC/EMI) [112]

(2) (direct-current instrument shunts) The limit of error, expressed as a percentage of the rated output voltage, with two thirds rated current applied for one half hour to allow for self heating. It represents the expected accuracy of the shunt obtainable under normal conditions of use. (PE/PSIM) 316-1971w

rated accuracy of instrument shunts (electric power system) The limit of error, expressed as a percentage of rated voltage drop, with two-thirds rated current applied for one-half hour to allow for self-heating. *Note:* Practically, it represents the expected accuracy of the shunt obtainable over normal operating current ranges. *See also:* accuracy rating. (PE/PSIM) [55]

rated alternating voltage (rated alternating-current winding voltages) (rectifier unit) (rectifier) The root-mean-square voltages between the alternating-current line terminals that are specified as the basis for rating. *Note:* When the alternating-current winding of the rectifier transformer is provided with taps, the rated voltage shall refer to a specified tap that is designated as the rated-voltage tap. *See also:* rectification; rectifier transformer. (IA/EEC/PCON) [62], [110], C57.18-1964w

rated apparent efficiency (thyristor) Rated output volt-amperes divided by rated input power, generally expressed as percent. (IA/IPC) 428-1981w

rated asymmetrical making current The maximum rms current, at rated frequency, including the dc component, against which a device is required to close and latch under specified conditions. (SWG/PE) C37.100-1992

rated average tube current The current capacity of a tube, in average amperes, as assigned to it by the manufacturer for specified circuit conditions. *See also:* rectification. (EEC/PCON) [110]

rated burden (capacitance potential devices) The maximum unity-power-factor burden, specified in watts at rated secondary voltage, that can be carried for an unlimited period when energized at rated primary line-to-ground voltage, without causing the established limitations to be exceeded. *See also:* outdoor coupling capacitor. 31-1944w

rated capacity (C) (1) (nickel-cadmium cell) The capacity assigned to a nickel-cadmium cell by its manufacturer for a specific constant current charge, with a given discharge time, at a specified electrolyte temperature, to a given end-of-discharge voltage. *Note:* The conditions used to establish rated capacity are based on a constant current charge. (PE/PV/EDPG) 1115-1992, 1144-1996

(2) (battery) The manufacturer's statement of the number of ampere-hours or watt-hours that can be delivered by a fully charged battery at a specific discharge rate and electrolyte temperature, to a given end-of-discharge voltage. (IA/PSE) 446-1995

(3) The capacity assigned to a cell by its manufacturer for a given discharge rate, at a specified electrolyte temperature and specific gravity, to a given end-of-discharge voltage. (SCC29/PV) 485-1997, 1145-1999

rated capacitance switching transient overvoltage ratio The largest value of transient overvoltage ratio that a device will produce at either its source or load terminals when switching its rated capacitance switching current. (SWG/PE) C37.30-1992s

rated capacitive switching current The rms symmetrical value of the highest capacitive load current that a device is required to make and interrupt at a rated maximum voltage as part of its designated operation duty cycle. *Note:* The capacitive switching current rating should be at least 135% of the rated capacitor bank. The excess current can be caused by harmonics, overvoltage, or plus tolerance in the capacitor kvar. (SWG/PE) C37.100-1992

rated circuit voltage Used to designate the rated, root-mean-square, line-to-line, voltage of the circuit on which coupling capacitors or the capacitance potential device in combination with its coupling capacitor or bushings designed to operate. *See also:* outdoor coupling capacitor. 31-1944w

rated closing time (1) (of a fault-initiating switch) The specified interval in a closing operation between the energizing of the trip coil, at the minimum standard control voltage, and the making of the fault-initiating switch contacts. (SWG/PE) C37.30-1992s

(2) (of a generator circuit breaker) The interval between energizing of the close circuit at rated control voltage and rated fluid pressure of the operating mechanism and the closing of the main circuit. (SWG/PE) C37.013-1997

rated continuous controller current (thyristor) The rated root-mean-square (rms) value of the maximum controller current which can be carried continuously without exceeding es-

tablished limitations under prescribed conditions of operation. (IA/IPC) 428-1981w

rated continuous current (1) (neutral grounding devices) The current expressed in amperes, root-mean-square, that the device can carry continuously under specified service conditions without exceeding the allowable temperature rise. (PE/SPD) 32-1972r

(2) (of a switching device or an assembly) The maximum rms current, in amperes at rated frequency, that a device or an assembly will carry continuously without exceeding the limit of observable temperature rise. (SWG/PE) C37.30-1992s

(3) The maximum rms current in amperes, at rated frequency, which a device will carry continuously without exceeding the allowable temperature rise and total temperature. (SWG/PE) C37.40-1993

(4) (of a generator circuit breaker) The designated limit of current in rms amperes at power frequency that a generator circuit breaker shall be required to carry continuously without exceeding any of its designated limitations. (SWG/PE) C37.013-1997

(5) The designed limit in rms amperes or dc amperes that a switch or circuit breaker will carry continuously without exceeding the limit of observable temperature rise. (IA/MT) 45-1998

rated continuous output current (converters having ac output) (self-commutated converters) The maximum output current that can be carried continuously without exceeding established limitations under prescribed conditions of operation. (IA/SPC) 936-1987w

rated controller current (thyristor) Rated root-mean-square (rms) value of the controller current which is specified by the manufacturer under the prescribed operation mode as a basis of declaring the duty cycles and overcurrent capability. (IA/IPC) 428-1981w

rated current (1) (power and distribution transformers) The primary current selected for the basis of performance specifications of a current transformer. (PE/TR) C57.13-1993, C57.12.80-1978r

(2) (shunt reactors over 500 kVA) (of a shunt reactor) Derived from the rated voltage and rated kilovoltamperes (kVA). (PE/TR) C57.21-1981s

(3) (neutral grounding devices) (electric power) The thermal current rating. The rated current of resistors whose rating is based on constant voltage is the initial root-mean-square symmetrical value of the current that will flow when rated voltage is applied. *See also:* grounding device. (PE/SPD) 32-1972r

(4) The rms power frequency current in amperes that can be carried for the duty specified, at rated frequency without exceeding the specified temperature limits, and within the limitations of established standards. (PE/TR) C57.16-1996

rated differential capacitance voltage (1) (maximum) The greatest value of differential capacitance voltage that may be impressed on the contacts of the interrupter unit at which the interrupter switch is required to make and interrupt all values of capacitance current up to its rated switching current. (SWG/PE) C37.30-1992s

(2) (minimum) The least value of differential capacitance voltage that may be impressed on the contacts of the interrupter unit at which the interrupter switch is required to make and interrupt all values of capacitance current up to its rated switching current. (SWG/PE) C37.30-1992s

rated direct current (thyristor converter) The current in terms of which all test and service current ratings are specified (for example, the per-unit base), except in the case of high-peak loads which are specified in erms of peak load duty. (IA/IPC) 444-1973w

rated direct current current The rated dc current of a smoothing reactor is the maximum continuous dc current at rated conditions. (PE/TR) 1277-2000

rated direct current voltage The rated dc voltage of a smoothing reactor is the maximum continuous dc voltage, pole to ground, that will be experienced by the smoothing reactor. (PE/TR) 1277-2000

rated direct-current winding voltage (rectifier) The root-mean-square voltage of the direct-current winding obtained by turns ratio from the rated alternating-current winding voltage of the rectifier transformer. *See also:* rectifier transformer. (Std100) C57.18-1964w

rated direct voltage (power inverter) The nominal direct input voltage. *See also:* self-commutated inverters. (IA) [62]

rated duty That duty that the particular machine or apparatus has been designed to comply with. (Std100) 270-1966w

rated dynamic short circuit load current (thyristor) The maximum permissible peak transient current which can be supplied into a short circuited load. This is stated in terms of I^2t, number of cycles and maximum peak value. In general this places a constraint on the minimum source of impedance. (IA/IPC) 428-1981w

rated efficiency (thyristor) Rated output power divided by rated input power, generally expressed as percent. (IA/IPC) 428-1981w

rated excitation-system voltage (rotating machinery) The main exciter rated voltage. (PE) [9]

rated fault-closing current The highest rms total current, including the dc component, that the device shall be required to close at rated maximum voltage and rated frequency and carry for a specified time under specified conditions. (SWG/PE) C37.100-1992

rated field current (excitation systems for synchronous machines) The direct current in the field winding of the synchronous machine when operating at rated voltage, current, power factor, and speed. (PE/EDPG) 421.1-1986r

rated field voltage (excitation systems for synchronous machines) The voltage required across the terminals of the field winding of the synchronous machine under rated continuous load conditions of the synchronous machine with its field winding at 75°C for field windings designed to operate at rating with a temperature rise of 60°C or less; or 100°C for field windings designed to operate at rating with a temperature rise greater than 60°C. (PE/EDPG) 421.1-1986r

rated 15-cycle current (of a disconnecting device or assembly) (15-cycle current rating) The rms symmetrical current of an asymmetrical wave produced by a circuit having a prescribed X/R ratio, which the device or assembly is required to carry for 15 cycles. *Note:* This rating is an index of the ability of the disconnecting device to withstand heat that may be generated under short-circuit conditions. (SWG/PE) C37.40-1993

rated frequency (1) (converters having ac output) (self-commutated converters) (frequency range) The rated value of the fundamental frequency of the output voltage or the range over which the fundamental frequency may be adjusted. (IA/SPC) 936-1987w

(2) (A) (power system or interconnected system) The frequency used in the specification of apparatus upon which test conditions and frequency limits are based. **(B) (power system or interconnected system)** The system frequency at which a power system normally operates. (PE/PSE) 94-1991

(3) (arresters) The frequency, or range of frequencies, of the power systems on which the arrester is designed to be used. (Std100) [84]

(4) (grounding device) The frequency of the alternating current for which it is designed. *Note:* Some devices, such as neutral wave traps, may have two or more rated frequencies; the rated frequency of the circuit and the frequencies of the harmonic or harmonics the devices are designed to control. *See also:* grounding device. (PE/SPD) 32-1972r

(5) (frequency rating) (of a fuse) The system frequency for which it is designed. (SWG/PE) C37.40-1993

(6) The frequency of the alternating current for which the LTC is designed. (PE/TR) C57.131-1995

(7) The power frequency at which a device is designed to operate. (SWG/PE) C37.100-1992

rated fundamental output current (converters having ac output) (self-commutated converters) The fundamental output current specified by the manufacturer as a basis for rating. (IA/SPC) 936-1987w

rated head (1) (hydraulic turbines) The value stated on the turbine nameplate. (PE/EDPG) 125-1977s

(2) (power operations) The head at which a turbine operating at rated speed will deliver rated capacity at specified gate and efficiency. (PE/PSE) 858-1987s

rated high-frequency transient making current The peak value of the high-frequency current, with specified damping, against which a device is required to close and latch under specified conditions. (SWG/PE) C37.100-1992

rated ice-breaking ability The maximum thickness of ice deposited on the device that will not interfere with the successful opening or closing of a device. (SWG/PE) C37.30-1992s

rated impedance (loudspeaker measurements) The rated impedance of a loudspeaker driver or system is that value of a pure resistance which is to be substituted for the driver of system when measuring the electric power delivered from the source. This should be specified by the manufacturer. 219-1975w

rated impulse protective level (arresters) The impulse protective level with the residual voltage referred to the nominal discharge current. (PE) [8]

rated impulse withstand voltage (apparatus) An assigned crest value of a specified impulse voltage wave that the apparatus must withstand without flashover, disruptive discharge, or other electric failure. (PE) [8]

rated inductance (of a series reactor) The total installed inductance at a specified frequency. It may consist of mutual as well as self inductance components. (PE/TR) C57.16-1996

rated input power (1) (thyristor) The total real power at the lines of the controller at rated line current and voltage. (IA/IPC) 428-1981w

(2) The input power to the ferroresonant regulator with the rated load and under stated operating conditions. (PEL) 449-1998

rated input voltamperes (1) The input voltamperes to the ferroresonant regulator with the rated load and under stated operating conditions. (PEL) 449-1998

(2) (thyristor) The product of rated line voltage and current. (IA/IPC) 428-1981w

rated insulation class (neutral grounding devices) (electric power) An insulation class expressed in root-mean-square kilovolts, that determines the dielectric tests that the device shall be capable of withstanding. *See also:* grounding device; outdoor coupling capacitor. (SWG/PE) C37.60-1981r

rated internal pressure (power cable joints) The rated internal pressure of a joint is the nominal internal operating pressure. This will depend on the types of cable being joined ad the service conditions. (PE/IC) 404-1986s

rated interrupting current (rated interrupting capacity) (current interrupting rating) (of a fuse) The designated value of the highest available rms short-circuit current that the fuse is required to interrupt successfully under stated conditions. (SWG/PE) C37.40-1993

rated interrupting time (of a generator circuit breaker) The maximum permissible interval between the energizing of the trip circuit at rated control voltage and rated fluid pressure of the operating mechanism and the interruption of the main circuit in all poles on an opening operation. (SWG/PE) C37.013-1997

rated kilovolt-ampere (1) (current-limiting reactor) The kilovolt-amperes that can be carried for the time specified at rated frequency without exceeding the specified temperature limitations, and within the limitations of established standards. *See also:* reactor. C57.16-1958w

(2) (shunt reactors over 500 kVA) (of a shunt reactor) The apparent power at rated voltage for which the shunt reactor is designed. (PE/TR) C57.21-1981s

(3) (power and distribution transformers) (of a transformer) The output that can be delivered for the time specified at rated secondary voltage and rated frequency without exceeding the specified temperature-rise limitations under prescribed conditions. (PE/TR) C57.12.80-1978r

(4) (power and distribution transformers) (of a grounding transformer) The short-time kilovolt-ampere rating is the product of the rated line-to-neutral voltage at rated frequency, and the maximum constant current that can flow in the neutral for the specified time without causing specified temperature-rise limitations to be exceeded, and within the limitations of established standards for such equipment. (PE/TR) C57.12.80-1978r

rated kilowatts (power and distribution transformers) (of a constant-current transformer) The kilowatt output at the secondary terminals with rated primary voltage and frequency, and with rated secondary current and power factor, and within the limitations of established standards. (PE/TR) C57.12.80-1978r

rated kVA tap (power and distribution transformers) (in a transformer) A tap through which the transformer can deliver its rated kVA output without exceeding the specified temperature rise. (PE/TR) C57.12.80-1978r

rated life (1) (glow lamp) The length of operating time, expressed in hours, that produces specified changes in characteristics. *Note:* In lamps for indicator use the characteristic usually is light output; the end of usual life is considered to be when light output reaches 50% of initial, or when the lamp becomes inoperative at line voltage. In lamps used as circuit components, the characteristic is usually voltage; life is determined as the length of time for a specified change from initial. (EEC/EL) [104]

(2) (of a ballast or a lamp) The number of burning hours at which 50% of the units have burned out and 50% have survived. (IA/PSE) 241-1990r

rated line current (thyristor) Rated root-mean-square (rms) value of the current in the lines at rated controller current for the specified controller connection. (IA/IPC) 428-1981w

rated line frequency (thyristor) The frequency or range of frequencies at which the controller can operate. *Note:* Some wide ranges may require a derating curve to express this rating meaningfully. (IA/IPC) 428-1981w

rated line kilovoltampere rating (rectifier transformer) The kilovoltampere rating assigned to it by the manufacturer corresponding to the kilovoltampere drawn from the alternating-current system at rated voltage and kilowatt load on the rectifier under the normal mode of operation. *See also:* rectifier transformer. (Std100) C57.18-1964w

rated line voltage (thyristor) Rated root-mean-square (rms) value of the line voltage. (IA/IPC) 428-1981w

rated load (1) (elevators) The load which the device is designed and installed to lift at the rated speed. *See also:* elevator. (EEC/PE) [119]

(2) (rectifier unit) The kilowatt power output that can be delivered continuously at the rated output voltage. It may also be designated as the one-hundred-percent-load or full-load rating of the unit. *Note:* Where the rating of a rectifier unit does not designate a continuous load it is considered special. *See also:* continuous rating; rectification. (IA) [62]

rated load-break current (load break current rating) The designated value of the maximum rms current that a device having operable means for interrupting load currents is required to interrupt successfully under stated conditions when opened by manual or remote control means. (SWG/PE) C37.40-1993

rated-load current (air-conditioning equipment) The rated-load current for a hermetic refrigerant motor-compressor is the current resulting when the motor-compressor is operated at the rated load, rated voltage and rated frequency of the equipment it serves. (NEC/NESC) [86]

rated-load field voltage (rotating machinery) (nominal collector ring voltage) The voltage required across the terminals of the field winding of an electric machine under rated continuous-load conditions with the field winding at:

a) 75°C for field windings designed to operate at rating with a temperature rise of 60°C or less;
b) 100°C for field windings designed to operate at rating with a temperature rise greater than 60°C.

(PE) [9]

rated load power factor (thyristor) A range of load power factors over which a controller may be operated. (IA/IPC) 428-1981w

rated-load torque (rotating machinery) (rated torque) The shaft torque necessary to produce rated power output at rated-load speed. *See also:* asynchronous machine. (PE) [9]

rated load voltage (thyristor) The root-mean-square (rms) voltage delivered at the controller load terminals with rated line voltage and rated continuous controller current. (IA/IPC) 428-1981w

rated locked rotor current The steady state current taken from the line with the rotor locked and with rated voltage and rated frequency applied to the motor. (PE/NP) 1290-1996

rated making current (1) The maximum rms current against which the device is required to close successfully when switched from the open to the closed position. (SWG/PE) C37.40-1993

(2) The maximum current that the switch shall be required to close (initiate) and carry under specified conditions. For transient currents, fault initiation, capacitive discharge, etc., the rated making current shall be the prospective current available from the circuit without the influence of the switching device. (SWG/PE) C37.30-1997

rated maximum interrupting of main contacts voltage (field discharge circuit breakers) The maximum direct-current (dc) voltage, including voltage induced in the machine field by current in the machine armature, at which the field discharge circuit breaker main contacts are required to interrupt the excitation source current. The magnitude of the dc component of the total voltage across the main contacts is equal to the displacement of the axis. (SWG/PE) C37.100-1992, C37.18-1979r

rated maximum voltage (1) (maximum voltage rating) (high-voltage switchgear) The highest root-mean-square (rms) voltage at which the device is designed to operate. *Note:* This voltage corresponds to the maximum tolerable zone primary voltage at distribution transformers for distribution cutouts and single-pole air switches, and at substations and on transmission systems for power fuses given in ANSI C84.1-1977. (SWG/PE) C37.40-1981s, C37.60-1981r

(2) (of a generator circuit breaker) The highest rms voltage for which the circuit breaker is designed, and the upper limit for operation. The rated maximum voltage is equal to the maximum operating voltage of the generator to which the circuit breaker is applied. (SWG/PE) C37.013-1997

rated mechanical operations (high voltage air switches, insulators, and bus supports) The minimum number of operating cycles that an air switch can perform without requiring replacement of parts. (SWG/PE) C37.30-1971s

rated mechanical terminal load (high voltage air switches, insulators, and bus supports) The static force of conductors equivalent to the external mechanical load, applied at each terminal in specified directions, than an air switch can withstand. (SWG/PE) C37.30-1971s

rated mechanism fluid operating pressure (of a generator circuit breaker) The pressure at which a gas- or liquid-operated mechanism is designed to operate. (SWG/PE) C37.013-1997

rated minimum displacement factor (thyristor) The minimum ratio of input power to the input volt-amperes (at fundamental line frequency) at which a controller may be operated. (IA/IPC) 428-1981w

rated minimum interrupting current (high-voltage switchgear) The designated value of the smallest current that a fuse is required to interrupt at a designated voltage under prescribed conditions. (SWG/PE) C37.40-1981s

rated minimum tripping current (automatic circuit reclosers) The minimum rms current which causes a device to operate. (SWG/PE) C37.60-1981r

rated momentary current (1) (maximum voltage rating) (high-voltage switchgear) The maximum current measured at the major peak of the maximum cycle, which the device or assembly is required to carry. *Notes:* 1. The current is expressed as the root-mean-square (rms) value including the direct-current component, as determined from the envelope of the current wave by the method shown in Appendix A of IEEE Std C37.41-1981. 2. This rating is an index of the ability of the disconnecting device to withstand electromagnetic forces under short-circuit conditions. (SWG/PE) C37.40-1981s

(2) (of an air switch) The rms total current that a switch is required to carry for at least one cycle at rated frequency. (SWG/PE) C37.30-1992s

rated nominal voltage class (field discharge circuit breakers) The voltage to which operating and performance characteristics are referred. (SWG/PE) C37.100-1992, C37.18-1979r

rated nonrepetitive peak line voltage (thyristor) The maximum value of the transient peak instantaneous voltage, ULSM, appearing across the lines with the controller disconnected. (IA/IPC) 428-1981w

rated nonrepetitive peak OFF-state voltage (thyristor) The maximum instantaneous value of any nonrepetitive transient off-state voltage which may occur across the thyristor without damage. (IA/IPC) 428-1981w

rated OFF voltage (magnetic amplifier) The output voltage existing with trip off control signal applied. (MAG) 107-1964w

rated ON voltage (magnetic amplifier) The output voltage existing with trip on control signal applied. Rated on voltage shall be specified either as root-mean-square or average. *Note:* While specification may be either root-mean-square or average it remains fixed for a given amplifier. (MAG) 107-1964w

rated operating conditions (automatic null-balancing electric instrument) The limits of specified variables or conditions within which the performance ratings apply. *See also:* measurement system. (EEC/EMI) [112]

rated output (1) (self-commutated converters) (converters having ac output) The apparent output power for specified load conditions. (IA/SPC) 936-1987w

(2) (electrical heat tracing for industrial applications) Total wattage or watt/unit length of heating cable, at rated voltage, temperature and length. (BT/AV) 152-1953s

(3) Total power or power/unit length of heating cable, at rated voltage or current, maintain temperature, and length, normally expressed as W/m or W/ft. (IA/PC) 515.1-1995

(4) The total power or power/unit length of heating cable or surface heating device, at rated voltage, temperature, and length normally expressed as W/m (W/ft) or kW. (IA) 515-1997

rated output capacity (inverters) The kilovoltampere output at specified load power-factor conditions. *See also:* self-commutated inverters. (IA) [62]

rated output current (1) (converters having ac output) (self-commutated converters) The total rms (root-mean-square) output current specified by the manufacturer as a basis of declaring the duty cycles and overcurrent capability, and of selecting the conductor to the load. (IA/SPC) 936-1987w

(2) (magnetic amplifier) Rated output current that the amplifier is capable of supplying to the rated load impedance, either continuously or for designated operating intervals, under nominal conditions of supply voltage, supply frequency, and ambient temperature such that the intended life of the

amplifier is not reduced or a specified temperature rise is not exceeded. Rated output current shall be specified either as root-mean-square or average. *Notes:* 1. When other than rated load impedance is used, the root-mean-square value of the rated output current should not be exceeded. 2. While specification may be either root-mean-square or average, it remains fixed for a given amplifier. (MAG) 107-1964w

rated output frequency (inverters) The fundamental frequency or the frequency range over which the output fundamental frequency may be adjusted. *See also:* self-commutated inverters. (IA) [62]

rated output power (thyristor) The total real power available to the controller load at rated controller current and rated load voltage. (IA/IPC) 428-1981w

rated output voltage (magnetic amplifier) The voltage across the rated load impedance when rated output current flows. Rated output voltage shall be specified by the same measure as rated output current (that is, both shall be stated as root-mean-square or average). *Note:* While specification may be either root-mean-square or average, it remains fixed for a given amplifier. (MAG) 107-1964w

rated output voltamperes (magnetic amplifier) (thyristor) The product of the rated output voltage and the rated output current. (MAG/IA/IPC) 107-1964w, 428-1981w

rated output voltamperes of the ferroresonant regulator The sum of the rated output winding voltamperes under stated operating conditions. (PEL) 449-1998

rated output winding voltamperes The product of the output voltage and output current (root-mean-square values) at the rated load and under stated operating conditions. (PEL) 449-1998

rated peak single pulse transient current (low voltage varistor surge arresters) Maximum peak current which may be applied for a single 8×20-μs impulse, with rated line voltage also applied, without causing device failure. (PE) [8]

rated peak single-surge transient current The maximum peak current that may be applied for a single impulse (with rated line voltage also applied) without causing device failure. (SPD/PE) C62.62-2000

rated performance (automatic null-balancing electric instrument) The limits of the values of certain operating characteristics of the instrument that will not be exceeded under an combination of rated operating conditions. (EEC/EMI) [112]

rated permissible tripping delay Y (of a generator circuit breaker) The maximum time the circuit breaker is required to carry rated short-circuit current after closing on this current and before interrupting. (SWG/PE) C37.013-1993s

rated power output (hydraulic turbines) The value stated on the generator nameplate. (PE/EDPG) 125-1977s

rated primary current (current transformer) Current selected for the basis of performance specifications. *See also:* instrument transformer. (PE/PSR/TR) C37.110-1996, C57.13-1978s

rated primary line-to-ground voltage The root-mean-square line-to-ground voltage for which the potential device, in combination with its coupling capacitor or bushing, is designed to deliver rated burden at rated secondary voltage. The rated primary line-to-ground voltage is equal to the rated circuit voltage (line-to-line) divided by $(3)^{1/2}$. *See also:* primary line-to-ground voltage. 31-1944w

rated primary voltage (power and distribution transformers) (constant-voltage transformer) The voltage calculated from the rated secondary voltage by turn ratio. *Notes:* 1. See turn ratio of a transformer and its note, for the definition of the turn ratio to be used. 2. In the case of a multiwinding transformer, the rated voltage of any other winding is obtained in a similar manner. (PE/TR) C57.12.80-1978r

(2) (A) (instrument transformers) The rated primary voltage (of a potential (voltage) transformer) is the voltage selected for the basis of performance guarantees.

(B) (instrument transformers) The rated primary voltage (of a current transformer) designates the insulation class of the primary winding. *Note:* A current transformer can be applied on a circuit having a nominal system voltage corresponding to or less than the rated primary voltage of the current transformer. *See also:* instrument transformer. (PE/TR) C57.13-1978

rated primary voltage of a constant current transformer (power and distribution transformers) The primary voltage for which the transformer is designed, and to which operation and performance characteristics are referred. (PE/TR) C57.12.80-1978r

rated range of regulation of a voltage regulator The amount that the regulator will raise or lower its rated voltage. The rated range may be expressed in per unit, or in percent, of rated voltage, or it may be expressed in kilovolts. (PE/TR) C57.15-1999

rated reactance (of a series reactor) The product of rated inductance and rated angular frequency that provides the required reduction in fault current or other desired modification to power circuit characteristics. (PE/TR) C57.16-1996

rated recurrent peak voltage (low voltage varistor surge arresters) Maximum recurrent peak voltage which may be applied for a specified duty cycle and waveform. (PE) [8]

rated secondary current (1) (power and distribution transformers) (constant-voltage transformer) The secondary current obtained by dividing the rated kVA by the rated secondary voltage, kV. *Note:* The relationship above applies directly for single-phase transformers, but requires additional consideration of the connections involved in three-phase transformers. (PE/TR) C57.12.80-1978r

(2) (power and distribution transformers) The rated current divided by the marked ratio. (PE/TR/PSR) C57.13-1993, C57.12.80-1978r, C37.110-1996

rated secondary current of a constant-current transformer (power and distribution transformers) The secondary current for which the transformer is designed and to which operation and performance characteristics are referred. (PE/TR) C57.12.80-1978r

rated secondary voltage (1) (power and distribution transformers) (constant-voltage transformer) The voltage at which the transformer is designed to deliver rated kVA and to which operating and performance characteristics are referred. (PE/TR) C57.12.80-1978r

(2) (power and distribution transformers) (voltage transformer) The voltage divided by the marked ratio. (PE/TR) C57.12.80-1978r

(3) (capacitance potential devices) This is the root-mean-square secondary voltage for which the potential device, in combination with its coupling capacitor or bushing, is designed to deliver its rated burden when energized at rated primary line-to-ground voltage. *See also:* outdoor coupling capacitor; secondary voltage. 31-1944w

(4) The rated voltage divided by the marked ratio. (PE/TR) C57.13-1993

rated short-circuit withstand current The maximum rms total current that it can carry momentarily without electrical, thermal, or mechanical damage or permanent deformation. The current shall be the rms value, including the dc component, at the major peak of the maximum cycle as determined from the envelope of the current wave during a given test time interval. (SWG/PE) C37.100-1992, C37.23-1987r

rated short-term output current (converters having ac output) (self-commutated converters) The maximum output current that can be carried for a specified time without exceeding the established limitations under prescribed conditions of operation. (IA/SPC) 936-1987w

rated short-time current (1) (metal-enclosed bus and calculating losses in isolated-phase bus) (rated for isolated-phase bus) The maximum symmetrical current that the bus must carry without exceeding a specified total temperature in a given time interval. (SWG/PE) C37.23-1987r

(2) (high-voltage switchgear) (short-time current rating) (of a disconnecting device) The maximum root-mean-square (rms) total current (including the direct-current component) which the device is required to carry successfully for a specified short-time interval. *Note:* The ratings recognized the limitations imposed by both thermal and electromagnetic effects. (SWG/PE) C37.40-1981s

rated short-time of main contacts voltage (field discharge circuit breakers) The highest direct-current (dc) voltage at which the circuit breaker main contacts shall be required to interrupt exciter short-circuit current. (SWG/PE) C37.100-1992, C37.18-1979r

rated short-time overcurrent The rms power frequency current, of magnitude greater than the continuous current rating, that can be carried for a specified period of time and depending on the ambient temperature may result in defined loss of the reactor's service life. (PE/TR) C57.16-1996

rated short-time withstand current The maximum rms total current that a circuit breaker can carry momentarily without electrical, thermal, or mechanical damage or permanent deformation. The current shall be the rms value, including the dc component, at the major peak of the maximum cycle as determined from the envelope of the current wave during a given test time interval. *Synonyms:* withstand rating; short-time rating. (IA/PSP) 1015-1997

rated single pulse transient energy (low voltage varistor surge arresters) Energy which may be dissipated for a single impulse of maximum rated current at a specified waveshape, with rated root-mean-square (rms) voltage or rated direct-current (dc) voltage also applied, without causing device failure. (PE) [8]

rated single-surge transient energy Energy that may be dissipated in a surge-protective device for a single impulse of maximum rated current at a specified waveshape, with rated root-mean-square voltage or rated dc voltage also applied, without causing device failure. (SPD/PE) C62.62-2000

rated source impedance (thyristor) The equivalent impedance of the line voltage source, including the connections to the terminals of the converter. (IA/IPC) 428-1981w

rated speed (hydraulic turbines) The value stated on the unit nameplate. (PE/EDPG) 125-1977s

rated standby power dissipation The power dissipated in a protective device while connected to an ac line that has a voltage and frequency equal to the rating of the device and that has no load current flowing and no surges applied. (SPD/PE) C62.62-2000

rated start torque A conservative value established by the manufacturer for motor torque at the locked rotor (zero speed) condition taking into account uncertainties in the manufacturing process. It can be more than 20% less than locked rotor torque. (PE/NP) 1290-1996

rated supply current (magnetic amplifier) The root-mean-square current drawn from the supply when the amplifier delivers rated output current. (MAG) 107-1964w

rated supply voltage (converters having dc input) (self-commutated converters) The supply voltage specified by the manufacturer as a basis for rating. (IA/SPC) 936-1987w

rated step voltage For each value of rated through current, the highest permissible voltage between successive tap positions. *Note:* Step voltage of resistance-type LTCs means tap to tap voltage (no bridging position). (PE/TR) C57.131-1995

rated switching current—parallel-connected capacitance The rms symmetrical value of the highest parallel-connected capacitance load current in amperes that a device is required to make and interrupt a number of times equal to its operating life expectancy. (SWG/PE) C37.30-1992s

rated switching current—single capacitance The rms symmetrical value of the highest single capacitance load current in amperes that a device is required to make and interrupt a number of times equal to its operating life expectancy. (SWG/PE) C37.30-1992s

rated symmetrical interrupting current (accelerometer) The root-mean-square value of the symmetrical component of the highest current which a device is required to interrupt under the operating duty, rated maximum voltage, and circuit constants specified. (SWG/PE) C37.60-1981r

rated system deviation The specified maximum permissible carrier frequency deviation. Nominal values for mobile communications systems are ± 15 kHz or ± 5 kHz. (VT) 184-1969w

rated system frequency The frequency expressed in hertz, of the power system alternating voltage. (IA/ID) 995-1987w

rated system voltage (A) (current-limiting reactor) The voltage to which operations and performance characteristics are referred. It corresponds to the nominal system voltage of the circuit on which the reactor is intended to be used. *See also:* reactor. **(B) (synchronous motor drives)** The rms power-frequency voltage from line to line that has been designated as the basis for the system rating. The line-side interface equipments may or may not have the same rated voltage. (PE/IA/TR/ID) C57.16-1996, 995-1987

rated thermal current (neutral grounding devices) The root-mean-square neutral current in amperes which the device is rated to carry under standard operating conditions for rated time without exceeding temperature limits. (SPD/PE) 32-1972r

rated three-second current (high-voltage switchgear) (three-second current rating) The root-mean-square (rms) total current, including the direct-current component which the device, or assembly, is required to carry for three seconds. *Note:* For practical purposes, this current is measured at the end of the first second. This rating is an index of the ability of the disconnecting device to withstand heat that may be generated under short-circuit conditions. (SWG/PE) C37.40-1981s

rated through current The current flowing through the LTC towards the external circuit, which the apparatus is capable of transferring from one tap to another at the relevant rated step voltage, and which can be carried continuously while meeting the requirements of this standard. *Note:* Concerning the relationship between rated through current and the relevant step voltage. (PE/TR) C57.131-1995

rated time (grounding device) (electric power) The time during which it will carry its rated current, or withstand its rated voltage, or both, under standard conditions without exceeding standard limitations, unless otherwise specified. *See also:* grounding device. (PE/SPD) 32-1972r

rated-time temperature rise (grounding device) The maximum temperature rise above ambient attained by the winding of a device as the result of the flow of rated thermal current (or, for certain resistors, the maintenance of rated voltage across the terminals) under standard operating conditions, for rated time and with a starting temperature equal to the steady-state temperature. It may be expressed as an average or a hot-spot winding rise. (SPD/PE) 32-1972r

rated torque *See:* rated-load torque.

rated transient average power dissipation (low voltage varistor surge arresters) Maximum average power that may be dissipated due to a group of pulses occurring within a specified isolated time period, without causing device failure. (PE) [8]

rated transient inrush frequency The highest frequency of the transient inrush current of a designated operating duty. (SWG/PE) C37.100-1992

rated values (thyristor) A specified value for the electrical, thermal, mechanical, and environmental quantities assigned by the manufacturer to define the operating conditions under which a controller is expected to give satisfactory service. The rated values may change if the operating mode is different from that specified. *Note:* For calculating or measuring the root-mean-square (rms) value, several integration intervals are possible depending upon the operation mode. The interval used should be exactly specified. (IA/IPC/SPC) 428-1981w, 936-1987w

rated voltage (1) (electric submersible pump cable) The rated voltage is expressed in terms of phase-to-phase voltage of a three-phase system. (IA/PC) 1017-1985s

(2) (power and distribution transformers) The voltage to which operating and performance characteristics of apparatus and equipment are referred. *Note:* Deviation from rated voltage may not impair operation of equipment, but specified performance characteristics are based on operation under rated conditions. However, in many cases apparatus standards specify a range of voltage within which successful performance may be expected.
(BT/PE/AV/TR) 152-1953s, C57.12.80-1978r

(3) (power cable joints) The rated voltage of a joint is the voltage at which it is designed to operate under usual service conditions. Unless otherwise specified, the voltage rating is assigned with the understanding that the joint will be applied on the three-phase circuits whose nominal phase-to-phase voltage rating does not exceed that of the joint.
(PE/IC) 404-1986s

(4) (power cable systems) For cables, either single-conductor or multiple-conductor, the rated voltage is expressed in terms of phase-to-phase voltage of a three-phase system. For single-phase systems, a rated voltage of the square root of three times the voltage to ground should be assumed.
(PE/IC) 400-1991

(5) (rotating electric machinery) The voltage specified at the terminals of a machine. (PE/EM) 11-1980r

(6) (arresters) The designated maximum permissible root-mean-square value of power-frequency voltage between its line and earth terminals at which it is designed to operate correctly. (PE) [8]

(7) (grounding device) (electric power) The root-mean-square voltage, at rated frequency, that may be impressed between its terminals under standard conditions for its rated time without exceeding standard limitations, unless otherwise specified. (SPD/PE) 32-1972r

(8) The primary voltage upon which the performance specifications of a voltage transformer are based.
(PE/TR) C57.13-1993

(9) (shunt reactors over 500 kVA) (of a shunt reactor) The voltage to which operating and performance characteristics are referred. (PE/TR) C57.21-1981s

(10) (instrument transformers) (power and distribution transformers) (of a voltage transformer) The primary voltage selected for the basis of performance specifications of a voltage transformer. (PE/TR) C57.12.80-1978r, C57.13-1978s

(11) (of equipment, of a winding) The voltage to which operating and performance characteristics are referred.
(PE/TR) C57.15-1999, C57.12.80-1978r

(12) The voltage to which operating and performance characteristics of heating cables are referred. (IA) 515-1997

rated voltage adjustment range (thyristor) The range over which the steady state load voltage can be varied.
(IA/IPC) 428-1981w

rated voltage of a step-voltage regulator The voltage for which the regulator is designed and on which performance characteristics are based. (PE/TR) C57.15-1999

rated voltage of a winding The rated voltage of a winding is the voltage to which operating and performance characteristics are referred. (PE/TR) C57.15-1999

rated voltage of the series winding of a step-voltage regulator The voltage between terminals of the series winding, with rated voltage applied to the regulator, when the regulator is in the position that results in maximum voltage change and is delivering rated output at 80% lagging power factor.
(PE/TR) C57.15-1999

rated watts input (household electric ranges) The power input in watts (or kilowatts) that is marked on the range nameplate, heating units, etc. *See also:* appliance outlet.
(IA/APP) [90]

rated withstand current (surge arresters) (surge current) The crest value of a surge, of given wave shape and polarity, to be applied under specified conditions without causing disruptive discharge on the test specimen. (PE) [8]

rated withstand voltage (insulation strength) The voltage that electric equipment is required to withstand without failure or disruptive discharge when tested under specified conditions and within the limitations of established standards. *See also:* basic impulse insulation level. (EEC/LB) [100]

rate-grown junction (semiconductor) A grown junction produced by varying the rate of crystal growth. *See also:* semiconductor device. (ED) 216-1960w

rate gyro Generally, a single-degree-of-freedom gyro having a primarily elastic restraint of the spin axis about the output axis. In this gyro, an output signal is produced by precession of the gimbal, the precession angle being proportional to the angular rate of the case about the input axis.
(AES/GYAC) 528-1994

rate-integrating gyro A single-degree-of-freedom gyro having a primarily viscous restraint of the spin axis about the output axis. In this gyro, an output signal is produced by precession of the gimbal, the precession angle being proportional to the integral of the angular rate of the case about the input axis.
(AES/GYAC) 528-1994

rate-of-change protection A form of protection in which an abnormal condition causes disconnection or inhibits connection of the protected equipment in accordance with the rate of change of current, voltage, power, frequency, pressure, etc.
(SWG/PE/PSR) C37.100-1992, C37.90-1978s

rate-of-change relay A relay that responds to the rate of change of current, voltage, power, frequency, pressure, etc.
(SWG/PE/PSR) C37.100-1992, C37.90-1978s

rate of decay (audio and electroacoustics) The time rate at which the sound pressure level (or other stated characteristic) decreases at a given point and at a given time. *Note:* Rate of decay is frequently expressed in decibels per second.
(SP) [32]

rate of punching (test, measurement, and diagnostic equipment) Number of characters, blocks, words, or frames of information placed in the form of holes distributed on cards or tape per unit time. The number of cards punched per unit time.
(MIL) [2]

rate of reading (test, measurement, and diagnostic equipment) Number of cards, characters, blocks, words, or frames sensed by a sensing device per unit time. (MIL) [2]

rate-of-rise current tripping *See:* rate-of-rise release.

rate-of-rise detector (fire protection devices) A device that will response when the temperature rises at a rate exceeding a predetermined amount. (NFPA) [16]

rate-of-rise limiters (thyristor) Devices used to control the rate of rise of current or voltage to the semiconductor device, or both. *Note:* Current rate of rise limiters may include linear or nonlinear devices. (IA/IPC) 428-1981w

rate-of-rise of reapplied forward voltage (thyristor) The average slope of the reapplied voltage measured as the slope, of a line from the intersection of the voltage waveform and the axis, to the point where the waveform achieves 63% of the maximum forward OFF-state voltage.
(IA/IPC) 428-1981w

rate-of-rise of restriking voltage (surge arresters) (transient recovery voltage rate) The rate, expressed in volts per microsecond, that is representative of the increase of the restriking voltage. *Synonym:* rrrv. (PE) [8], [84]

rate-of-rise release (trip) A release that operates when the rate of rise of the actuating quantity in the main circuit exceeds the release setting. *Synonym:* rate-of-rise trip.
(SWG/PE) C37.100-1992

rate-of-rise suppressors (semiconductor rectifiers) Devices used to control the rate of rise of current and/or voltage to the semiconductor devices in a semiconductor power converter. *See also:* semiconductor rectifier stack. (IA) [62]

rate-of-rise trip *See:* rate-of-rise release.

rate ramp (gyros) A stochastic process whose sample time functions exhibit linear time growth, and whose growth rate is a random variable. (AES/GYAC) 528-1994

rate random walk *See:* random walk.

rate servomechanism (1) In an analog computer, a servomechanism in which a mechanical shaft is translated or rotated at a rate proportional to an input signal amplitude. (C) 610.10-1994w

(2) A servomechanism in which a mechanical shaft is translated or rotated at a rate proportional to an input signal amplitude. *See also:* electronic analog computer. (C) 165-1977w

rate signal (1) A signal that is the time derivative of a specified variable. *See also:* feedback control system. (IA/ICTL/IAC) [60]

(2) A signal that is responsive to the rate of change of an input signal. (PE/EDPG) 421-1972s

rate-squared sensitivity (nongyroscopic angular sensors) (angular accelerometers) An error torque about the input axis proportional to the product of input rates on the other two axes. This is analogous to anisoinertia torque. (AES/GYAC) 528-1994

rate, sweep *See:* sweep time division.

rate test *See:* problem check.

rating (1) (rating of electric equipment) (general) The whole of the electrical and mechanical quantities assigned to the machine, apparatus, etc., by the designer, to define its working in specified conditions indicates on the rating plate. *Note:* The rating of electric apparatus in general is expressed in voltamperes, kilowatts, or other appropriate units. Resistors are generally rated in ohms, amperes, and class of service. (Std100/EI) 96-1969w, [123]

(2) (rotating machinery) The numerical values of electrical quantities (frequency, voltage, current, apparent and active power, power factor) and mechanical quantities (power, torque), with their duration and sequences, that express the capability and limitations of a machine. The rated values are usually associated with a limiting temperature rise of insulation and metallic parts. *See also:* asynchronous machine. (PE) [9]

(3) The designated limit(s) of the rated operating characteristic(s) of a device. *Note:* Such operating characteristics as current, voltage, frequency, etc., may be given in the rating. (SWG/PE/PSR) C37.40-1981s, C37.100-1992, C37.90-1978s

(4) (current-limiting reactor) The voltamperes that it can carry, together with any other characteristics, such as system voltage, current and frequency assigned to it by the manufacturer. *Note:* It is regarded as a test rating that defines an output that can be carried under prescribed conditions of test, and within the limitations of established standards. *See also:* reactor. C57.16-1958w

(5) (A) (interphase transformer) The root-mean-square current, root-mean-square voltage, and frequency at the terminals of each winding, when the rectifier unit is operating at rated load and with a designated amount of phase control. *See also:* rectifier transformer; duty. **(B) (rectifier transformer)** The kilovoltampere output, voltage, current, frequency, and number of phases at the terminals of the alternating-current winding; the voltage (based on turn ratio of the transformer), root-mean-square current, and number of phases at the terminals of the direct-current winding, to correspond to the rated load of the rectifier unit. *Notes:* 1. Because of the current wave shapes in the alternating- and direct-current windings of the rectifier transformer, these windings may have individual ratings different from each other and from those of power transformers in other types of service. The ratings are regarded as test ratings that define the output that can be taken from the transformer under prescribed conditions of test without exceeding any of the limitations of the standards. 2. For rectifier transformers covered by established standards, the root-mean-square current ratings and kilovoltampere ratings of the windings are based on values derived from rectangular rectifier circuit element currents without overlap. *See also:* rectifier transformer. **(C) (power and distribution transformers)** The rating of a transformer consists of a volt-ampere output together with any other characteristics, such as voltage, current, frequency, power factor, and temperature rise, assigned to it by the manufacturer. It is regarded as a rating associated with an output which can be taken from the transformer under prescribed conditions and limitations of established standards. (PE/TR) C57.12.80-1978

(6) A voltampere output together with any other characteristics, such as voltage, current, frequency, powerfactor, and temperature rise, assigned to it by the manufacturer. (PE/TR) C57.12.80-1978r

(7) (rotating electric machinery) The output at the shaft if a motor, or at the terminals if a generator, assigned to a machine under specified conditions of speed, voltage, temperature rise, etc. *See also:* relay rating. (PE/EM) 11-1980r

(8) The designation of an operating limit for a device. (SPD/PE) C62.11-1999, C62.62-2000

(9) (A) (in kVA of a voltage regulator) The rating that is the product of the rated load amperes and the rated "raise" or "lower" range of regulation in kilovolts (kV). If the rated raise and lower range of regulation are unequal, the larger shall be used in determining the rating in kVA. **(B)** (in kVA of a voltage regulator) The rating in kVA of a three-phase voltage regulator is the product of the rated load amperes and the rated range of regulation in kilovolts multiplied by 1.732. (PE/TR) C57.15-1999

rating, emergency *See:* emergency rating.

rating, normal *See:* normal rating.

rating of a series reactor The rating of a series reactor consists of the current that it can carry at its specified reactance together with any other defining characteristics, such as system voltage, BIL, duty and frequency. (PE/TR) C57.16-1996

rating of diesel-generator unit (A) (nuclear power generating station) Continuous rating. The electric power output capability that the diesel-generator unit can maintain in the service environment for 8760 h of operation per (common) year with only scheduled outages for maintenance. **(B) (nuclear power generating station)** Short time rating. The electric power output capability that the diesel-generator unit can maintain in the service environment for 2 h in any 24 h period, without exceeding the manufacturer's design limits and without reducing the maintenance interval established for the continuous rating. *Note:* Operation at this higher rating does not limit the use of the diesel-generator unit at its continuous rating. (PE/NP) 387-1984

rating of interphase transformer (power and distribution transformers) The root-mean-square current, root-mean-square voltage, and frequency at the terminals of each winding, when the rectifier unit is operating at rated load and with a designated amount of phase control. (PE/TR) C57.12.80-1978r

rating plate *See:* nameplate.

rating plug An interchangeable module of an electronic trip unit that, together with the sensor, sets the current rating range of the circuit breaker. For example, a 1200 A frame may contain an 800 A sensor, fixing the maximum rating that can be configured for the unit at 800 A adjustable by the following kind of settings. By installing a 600 A rating plug, the adjustable rating is correspondingly 600 A multiplied by the long-time pickup adjustment [i.e., the long-time pickup may be adjusted to "0.9" and the ampere rating or setting is $(0.9 \times 600\ \text{A}) = 540\ \text{A}$]. (IA/PSP) 1015-1997

ratio *See:* squareness ratio.

ratio control system (automatic control) A system that maintains two or more variables at a predetermined ratio. *Note:* Frequently some function of the value of an uncontrolled variable is the command to a system controlling another variable. (PE/EDPG) [3]

ratio correction factor (RCF) The ratio of the true ratio to the marked ratio. The primary current or voltage is equal to the secondary current or voltage multiplied by the marked ratio times the ratio correction factor. (PE/TR) C57.13-1993, C57.12.80-1978r

ratio meter An instrument that measures electrically the quotient or two quantities. A ratio meter generally has no mechanical control means, such as springs, but operates by the balancing of electromagnetic forces that are a function of the position of the moving element. *See also:* instrument. (EEC/PE) [119]

Rational FORTRAN An extension of FORTRAN that provides free format coding (as opposed to FORTRAN's strict column format), source file inclusion, and block structures. (C) 610.13-1993w

rationalized system of equations A rationalized system of electrical equations is one in which the proportionality factors in the equations that relate (A) the surface integral of electric flux density to the enclosed charge, and (B) the line integral of magnetizing force to the linked current, are each unity. *Notes:* 1. By these choices, some formulas applicable to configuration having spherical or circular symmetry contain an explicit factor of 4π or 2π; for example, Coulomb's law is $f = q_1q_2/(4\pi\ \epsilon_0 r^2)$. 2. The differences between the equations of a rationalized system and those of an unrationalized system may be considered to result from either (a) the use of a different set of units to measure the same quantities or (b) the use of the same set of units to measure quantities that are quantitatively different (though of the same physical nature) in the two systems. The latter consideration, which represents a changed relation between certain mathematicophysical quantities and the associated physical quantities, is sometimes called total rationalization. (Std100) 270-1966w

rational number (data management) A real number that can be expressed as a fraction x/y where x and y are integers and y is not equal to zero. *Contrast:* irrational number. (C) 610.5-1990w

ratio set (valve actuators) A set of performance parameter values described by a range of numerical values whoseboundaries have been established by doubling and halving the numerical mean value of a selected physical performance parameter. (PE/NP) 382-1985

ratio-type telemeter A telemeter that employs the relative phase position between, or the magnitude relation between, two or more electrical quantities as the translating means. *Note:* Examples of ratio-type telemeters include ac or dc position matching systems. *Synonym:* position-type telemeter. (SWG/PE/SUB) C37.100-1992, C37.1-1994

ratproof electric installing Apparatus and wiring designed and arranged to eliminate harborage and runways for rats. *See also:* marine electric apparatus. (EEC/PE) [119]

raw data Data that has not been processed or reduced from its original form. (C) 610.5-1990w

raw requirement An environmental or customer requirement that has not been analyzed and formulated as a well-formed requirement. (C/SE) 1233-1998

ray The path of a wave packet or energy flow in a homogeneous or a slowly varying medium. *Notes:* 1. Energy transport (per unit area) is generally associated with bundles of rays. 2. In isotropic but slowly varying media, the ray path is identical to the path of the wave normal, but this may not be the case in anisotropic media. (AP/PROP) 211-1997

Ray Dist (navigation aid terms) A radio navigation system used in hydrographic and geophysical surveying. (AES/GCS) 172-1983w

Rayleigh criterion A criterion that characterizes the roughness of a surface with respect to the reflection of an electromagnetic wave. The degree of roughness is expressed in terms of the quantity:

$$\frac{h\cos\theta}{\lambda}$$

where
h = the rms height of the surface irregularities
θ = the angle of incidence with respect to the mean surface
λ = the wavelength

The surface is considered specular (smooth) if:

$$\frac{h\cos\theta}{\lambda} < \frac{1}{100}$$

The surface is considered rough if:

$$\frac{h\cos\theta}{\lambda} > \frac{1}{10}$$

(AP/PROP) 211-1997

Rayleigh density function (radar) A probability density function describing the behavior of some variable, given by

$$f(X) = \frac{1}{\sigma_{AVG}} \exp - \left(\frac{X}{\sigma_{AVG}}\right)$$

Often used to describe the signal statistics after envelope detection. (AES/RS) 686-1982s

Rayleigh disk A special form of acoustic radiometer that is used for the fundamental measurement of particle velocity. (SP) [32]

Rayleigh distribution A probability distribution characterized by the probability density function:

$$f(x) = \frac{x}{\sigma^2} \exp\left(-\frac{x^2}{2\sigma^2}\right), x \geq 0$$
$$= 0, \qquad x < 0$$

where
x = the random variable
σ^2 = the average value of x^2

Notes: 1. Named after Lord Rayleigh. 2. This function is often used to model the statistics of the amplitude of noise at intermediate frequency (IF) or at video after linear envelope detection. 3. The Rayleigh distribution function also describes the distribution of the signal voltage of fluctuating signals consisting of four or more components having similar amplitudes and random phases. (AES) 686-1997

Rayleigh fading Signal level variations when the received wave is composed of numerous scattered waves with uniform relative phase distribution. (AP/PROP) 211-1997

Rayleigh hypothesis The Rayleigh hypothesis is an assumption that only outgoing waves exist everywhere above a rough interface, including the trough regions. (AP/PROP) 211-1997

Rayleigh scattering (1) (fiber optics) Light scattering by refractive index fluctuations (inhomogeneities in material density or composition) that are small with respect to wavelength. The scattered field is inversely proportional to the fourth power of the wavelength. *See also:* waveguide scattering; material scattering; scattering. (Std100) 812-1984w
(2) (laser maser) Scattering of radiation in the course of its passage through a medium containing particles, the sizes of which are small compared with the wavelength of the radiation. (LEO) 586-1980w
(3) Scattering by dielectric particles much smaller than a wavelength. For the special case of spherical particles in the Rayleigh scattering limit, the scattering cross-section is inversely proportional to the fourth power of the wavelength and directly proportional to the sixth power of the particle diameter. (AP/PROP) 211-1997

ray tracing A technique for displaying a three-dimensional object with shading and shadows, by tracing light rays backward from the viewing position to the light source, on a two-dimensional display surface. (C) 610.6-1991w

RBOC *See:* regional Bell operating company.

RCF *See:* ratio correction factor.

RCL *See:* Rule and Constraint Language.

RC integrator A low-pass electrical filter section consisting of a resistor in series with the signal path followed by a capacitor across it. (NPS) 325-1996

RDA *See:* reflective dot array.

RCS *See:* radar cross section.

RDF *See:* radio direction-finder.

RDL *See:* Resource Description Language.

R-display (1) (navigation aid terms) A type of radar display format. *See also:* display; display; display. (AES/GCS) 172-1983w

(2) An A-display with a segment of the time base expanded near the blip for greater precision in range measurement and visibility of pulse shape. *Note:* Usually regarded as an optional feature of an A-display rather than being identified by the term "R-display." (AES) 686-1997

reach (1) (protective relaying) The maximum distance from the relay location to a fault for which a particular relay will operate. The reach may be stated in terms of miles, primary ohms, or secondary ohms. (PE/PSR) C37.95-1973s

(2) (of a relay) The extent of the protection afforded by a relay in terms of the impedance or circuit length as measured from the relay location. *Note:* The measurement is usually to a point of fault, but excessive loading or system swings may also come within reach or operating range of the relay. (SWG/PE) C37.100-1992

reactance (1) (general) The imaginary part of impedance. *See also:* reactor. (IM/HFIM) 270-1966w, [40]

(2) (of a series reactor) The product of the inductance in Henries and the angular frequency of the system. (PE/TR) C57.16-1996

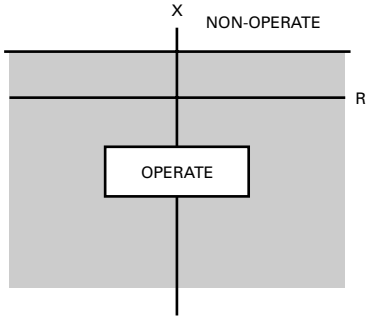
(3) The imaginary component ($\pm$ j, or $\pm$ 90° phase angle) of impedence, where resistance is the real component with a zero phase angle. Reactance appears in two forms, one as a capacitive reactance (Xc) for a capacitor (C), and the other as inductive reactance (X_l) for an inductor (L). The former has the negative 90° phase angle, and the latter a positive 90° angle. Their values can be expressed in the following relationships:

$$Xc = -j\frac{1}{2\pi fC}, \text{ and } X_{\mathbf{1}} = j2\pi fL,$$

where f is the excitation frequency. (IA/MT) 45-1998

reactance amplifier *See:* parametric amplifier.

reactance characteristic A nondirectional distance relay characteristic in which the threshold of operation for the basic form plots as a straight line on an *R-X* diagram, with the reach a constant reactance for all values of resistance. See figure below. *Note:* A small variation in the reactance reach for different values of resistance, as required in some applications, may also be referred to as a reactance characteristic.



reactance characteristic

(SWG/PE) C37.100-1992

reactance drop (1) (power and distribution transformers) The component of the impedance voltage drop in quadrature with the current. (PE/TR) C57.12.80-1978r

(2) (general) The voltage drop in quadrature with the current. (PE/TR) C57.15-1968s

reactance, effective synchronous *See:* effective synchronous reactance.

reactance frequency multiplier A frequency multiplier whose essential element is a nonlinear reactor. *Note:* The nonlinearity of the reactor is utilized to generate harmonics of a sinusoidal source. *See also:* parametric device. (ED) 254-1963w, [46]

reactance function (1) (linear passive networks) The driving-point impedance of a lossless network. *Note:* This is an odd function of the complex frequency. (CAS) 156-1960w

(2) A function that is realizable as a driving-point impedance with ideal inductors and capacitors. It must meet the conditions described in Foster's reactance theorem. (CAS) [13]

reactance grounded (power and distribution transformers) Grounded through impedance, the principal element of which is reactance. *Note:* The reactance may be inserted either directly, in the connection to ground, or indirectly, by increasing the reactance of the ground return circuit. The latter may be done by intentionally increasing the zero-sequence reactance of apparatus connected to ground, or by omitting some of the possible connections from apparatus neutrals to ground. (SPD/PE/TR) 32-1972r, C57.12.80-1978r

reactance modulator A device, used for the purpose of modulation, whose reactance may be varied in accordance with the instantaneous amplitude of the modulating electromotive force applied thereto. *Note:* Such a device is normally an electron-tube circuit and is commonly used to effect phase or frequency modulation. *See also:* phase modulation; frequency modulation; modulation. (AP/BT/ANT) 145-1983s, 182A-1964w

reactance relay A linear-impedance form of distance relay for which the operating characteristic of the distance unit on an *R-X* diagram is a straight line on constant reactance. *Note:* The operating characteristic may be described by either equation $X = K$, or $Z\sin\theta = K$, where K is a constant, and θ is the angle by which the input voltage leads the input current. (SWG/PE) C37.100-1992

reactance voltage drop (1) The component of voltage drop in quadrature with the current. (PE/TR) C57.16-1996

(2) The component of the impedance voltage in quadrature with the current. (PE/TR) C57.15-1999

reaction curve (process control) The plot of a time response. (PE/EDPG) [3]

reaction frequency meter *See:* absorption frequency meter.

reaction time (illuminating engineering) The interval between the beginning of a stimulus and the beginning of the response of an observer. (EEC/IE) [126]

reaction torque A torque (or force) exerted on a gimbal, gyro rotor, or accelerometer proof mass, usually as a result of applied electrical excitations exclusive of torquer (or forcer) command signals. (AES/GYAC) 528-1994

reaction turbine A turbine that uses the velocity and pressure of the water flowing through the runner to develop power. (PE/EDPG) 1020-1988r

reaction wheels (communication satellite) A set of gyro wheels used for controlling the attitude of a satellite. (COM) [19]

reactivation date (electric generating unit reliability, availability, and productivity) The date a unit was returned to the active state from the deactivated shutdown state. (PE/PSE) 762-1987w

reactive Process by which a material undergoes a chemical or physical change. (PE/IC) 848-1996

reactive attenuator (waveguide) An attenuator that absorbs no energy. *See also:* waveguide. (AP/ANT) [35], [84]

reactive current (rotating machinery) The component of a current in quadrature with the voltage. *See also:* asynchronous machine. (PE) [9], [84]

reactive-current compensator (rotating machinery) A compensator that acts to modify the functioning of a voltage regulator in accordance with reactive current. (PE) [9]

reactive factor The ratio of the reactive power to the apparent power. The reactive factor is expressed by the equation

$$F_q = \frac{Q}{U}$$

where
F_q = reactive factor
Q = reactive power
U = apparent power

If the voltages have the same waveform as the corresponding currents, reactive factor becomes the same as phasor reactive factor. If the voltages and currents are sinusoidal and for polyphase circuits form symmetrical sets

$$F_q = \sin(\alpha - \beta)$$

See also: network analysis. (Std100) 270-1966w

reactive-factor meter An instrument for measuring reactive factor. It is provided with a scale graduated in reactive factor. *See also:* instrument. (EEC/PE) [119]

reactive field (of an antenna) Electric and magnetic fields surrounding an antenna and resulting in the storage of electromagnetic energy rather than in the radiation of electromagnetic energy. (AP/ANT) 145-1993

reactive ignition cable High-tension ignition cable, the core of which is so constructed to give a high reactive impedance at radio frequencies. *See also:* electromagnetic compatibility. (EMC/INT) [53], [70]

reactive near-field region That portion of the near-field region immediately surrounding the antenna, wherein the reactive field predominates. *Note:* For a very short dipole, or equivalent radiator, the outer boundary is commonly taken to exist at a distance $\lambda/2\pi$ from the antenna surface, where λ is the wavelength. (AP/ANT) 145-1983s

reactive power (1) (metering) For sinusoidal quantities in a two-wire circuit, reactive power is the product of the voltage, the current, and the sine of the phase angle between them. For nonsinusoidal quantities, it is the sum of all harmonic components, each determined as above. In a polyphase circuit, it is the sum of the reactive powers of the individual phases. *See also:* magner. (ELM) C12.1-1982s

(2) The product of voltage and out-of-phase component of alternating current. In a passive network, reactive power represents the alternating exchange of stored energy (inductive or capacitive) between two areas. *See also:* magner. (PE) [9]

(3) (control of small hydroelectric plants) Power that is in quadrature with real power, such as used by capacitive or inductive loads, expressed in kvar. (PE/EDPG) 1020-1988r

(4) (electrical measurements in power circuits) The square root of the square of the apparent power S minus the square of the active power P.

$$Q = (S^2 - P^2)^{1/2}$$

Reactive power is developed when there are inductive, capacitive, or nonlinear elements in the system. It does not represent useful energy that can be extracted from the system but it can cause increased losses and excessive voltage peaks. (PE/PSIM) 120-1989r

(5) The vector difference between apparent and real power:

$$Q = \sqrt{S^2 - p^2}$$

(PEL) 1515-2000

reactive power relay A power relay that responds to reactive power. (SWG/PE) C37.100-1992

reactive reflector antenna *See:* reflective array antenna.

reactive voltampere-hour meter *See:* varhour meter.

reactive voltampere meter *See:* varmeter.

reactivity (power operations) A measure of the departure of a nuclear reactor from criticality. Mathematically,

$$\rho = (k_{\text{eff}} - 1) + K_{\text{eff}}$$

If ρ is positive (excess reactivity), the reactor is supercritical and its power level is increasing. If ρ is negative (negative reactivity), the power level of the reactor decreases. For a reactor at criticality, for instance, constant power level, the reactivity is zero. *Note:* Other measures are also used to express reactivity. *See also:* excess reactivity. (PE/PSE) 858-1987s

reactor (1) (power and distribution transformers) An electromagnetic device, the primary purpose of which is to introduce inductive reactance into a circuit. (PE/TR) C57.12.80-1978r

(2) (radiological monitoring instrumentation) A nuclear reactor designed for and capable of operation at a steady state reactor power level of $\geq$ R $1MW_{th}$. (NI) N320-1979r

(3) (shunt reactors over 500 kVA) A device used for introducing impedance into an electric circuit, the principal element of which is inductive reactance. (PE/TR) C57.21-1981s

(4) A device with the primary purpose of introducing reactance into an electric circuit for purposes such as motor starting, paralleling transformers, and control of current. (IA/MT) 45-1998

reactor, ac *See:* ac reactor.

reactor, amplistat *See:* amplistat reactor.

reactor, bus *See:* bus reactor.

reactor, current-balancing *See:* current-balancing reactor.

reactor, current-limiting *See:* current-limiting reactor.

reactor, dc *See:* direct-current reactor.

reactor, diode-current-balancing *See:* diode-current-balancing reactor.

reactor facility (radiological monitoring instrumentation) The structures, systems and components used for the operation of a nuclear reactor. If a site contains more than one nuclear reactor, reactor facility means all structures, systems and components used for operation of the nuclear reactors at the site. (NI) N320-1979r

reactor, feeder *See:* feeder reactor.

reactor, filter *See:* filter reactor.

reactor, paralleling *See:* paralleling reactor.

reactor starting (rotating machinery) The process of starting a motor at reduced voltage by connecting it initially in series with a reactor (inductor) which is short-circuited for the running condition. (PE) [9]

reactor, starting *See:* starting reactor.

reactor-start motor A single-phase induction motor of the split-phase type with a main winding connected in series with a reactor for starting operation and an auxiliary winding with no added impedance external to it. For running operation, the reactor is short-circuited or otherwise made ineffective, and the auxiliary winding circuit is opened. *See also:* asynchronous machine. (PE) [9]

reactor, synchronizing *See:* synchronizing reactor.

read (1) (electronic computation) To acquire information usually from some form of storage. *See also:* write; destructive read. (ED/C/MIL) 161-1971w, [85], 162-1963w, [20], [2]

(2) The process of an access unit (AU) copying bits of a data stream as they pass on the bus. (LM/C) 8802-6-1994

(3) (software) (data management) To access data from a storage device or data medium. *Contrast:* write. *See also:* update; destructive read; delete; dirty read; retrieve. (C) 610.5-1990w, 610.12-1990

(4) To obtain data from a storage device, from a data medium, or another source. *See also:* scatter read; delete; nondestructive read; destructive read; write; backward read; read cycle; read/write. (C) 610.10-1994w

readability The ease with which words and text can be read. Refers specifically to the functional relationships that exist between the properties of words and text and the observer's accuracy and speed of understanding words or text. (PE/NP) 1289-1998

read-around number (storage tubes) The number of times reading operations are performed on storage elements

adjacent to any given storage element without more than a specified loss of information from that element. *Note:* The sequence of operations (including priming, writing, or erasing), and the storage elements on which the operations are performed, should be specified. *See also:* storage tube. (ED) 158-1962w, 161-1971w

read-around ratio* **(1) (FASTBUS acquisition and control)** A cycle in which the direction of data flow is from slave(s) toward a master. *Synonym:* read. (NID) 960-1986s
(2) (VMEbus) A data transfer bus (DTB) cycle that is used to transfer 1, 2, 3, or 4 bytes from a slave to a master. The cycle begins when the master broadcasts an address and an address modifier. Each slave captures the address and the address modifier, and verifies if it will respond to the cycle. If it is intended to respond, it retrieves the data from its internal storage, places it on the data bus and acknowledges the transfer. The master then terminates the cycle. (BA/C) 1014-1987
(3) *See also:* read-around number.
* Deprecated.

read-back check *See:* echo check.

read circuitry That part of the memory that is used in transferring the stored data from the memory section to external circuitry. (ED) 1005-1998

read cycle (1) A data transfer bus (DTB) cycle that is used to transfer 1, 2, 3, or 4 bytes from a slave to a master. The cycle begins when the master broadcasts an address and an address modifier. Each slave captures the address and the address modifier, and verifies if it will respond to the cycle. If it is intended to respond, it retrieves the data from its internal storage, places it on the data bus, and acknowledges the transfer. The master then terminates the cycle. (C/BA) 1014-1987
(2) (read) A cycle in which the direction of data flow is from slave(s) toward a master. (NID) 960-1993
(3) A cycle in which data are transferred from some storage location to the device that requested the read. *Contrast:* write cycle. (C) 610.10-1994w

read cycle time The minimum time interval between the starts of successive read cycles in a storage device that has separate read and write cycles. *Contrast:* write cycle time. (C) 610.10-1994w

read data transfer One or more data transfers from a replying agent to a bus owner, with uninterrupted bus ownership. (C/MM) 1296-1987s

read delay trd (metal-nitride-oxide field-effect transistor) Time period between the end of the writing pulse and the start of the read condition. (ED) 581-1978w

read disturb (1) (metal-nitride-oxide field-effect transistor) A change in the instantaneous threshold voltage of a metal-nitride-oxide-semiconductor (MNOS) transistor due to the very act of measuring it. (ED) 581-1978w
(2) The corruption of data that is caused by reading the memory. (ED) 1005-1998

read disturb cycles The number of consecutive read cycles that occur before a memory state becomes indistinguishable, due solely to reading. (ED) 641-1987w

reader (1) (A) An input device that is capable of sensing stored information, and of conveying that information into on-line storage. **(B)** Any device which can sense, detect, or convert data from one medium to another. *See also:* character reader; paper tape reader; optical mark reader; badge reader; card reader. (C) 610.10-1994
(2) A component of a roadside beacon that provides the capabilities for radio wave communications with a transponder. (SCC32) 1455-1999

reader note A comment made by a reader about an diagram and placed on the diagram page. A reader note is not part of the diagram itself, but rather is used for communication about a diagram during model development. (C/SE) 1320.1-1998

read frame The transfer of data from a Smart Transducer Interface Module to a Network Capable Application Processor. (IM/ST) 1451.2-1997

read head (1) (test, measurement, and diagnostic equipment) A sensor that converts information stored on punched tape, magnetic tape, magnetic drum, and so forth into electrical signals. (MIL) [2]
(2) A head capable only of reading information from the storage medium. *Synonym:* playback head. *Contrast:* write head; read/write head. *See also:* pre-read head. (C) 610.10-1994w

readily accessible (packaging machinery) (power and distribution transformers) Capable of being reached quickly for operation, renewal, or inspections, without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. (NEC/NESC/IA/PE/PKG/TR) 333-1980w, C57.12.80-1978r, [86]

readily climbable Having sufficient handholds and footholds to permit an average person to climb easily without using a ladder or other special equipment. (NESC) C2-1997

readiness test (test, measurement, and diagnostic equipment) A test specifically designed to determine whether an equipment or system is operationally suitable for a mission. (MIL) [2]

reading (1) (recording instrument) The value indicated by the position of the index that moves over the indicating scale. *See also:* accuracy rating. (EEC/PE) [119]
(2) (radiation instrumentation) The indicated value of the readout. (NI) N42.17B-1989r

reading rate (storage tubes) The rate of reading successive storage elements. *See also:* storage tube. (ED) 158-1962w

reading speed (storage tubes) *See also:* storage tube; data processing. (ED) 158-1962w, 161-1971w

reading speed, minimum usable *See:* minimum usable reading speed.

reading time (storage tubes) The time during which stored information is being read. *See also:* storage tube. (ED) 158-1962w

reading time, maximum usable *See:* maximum usable reading time.

read-in lag (diode-type camera tube) The fraction of the steady-state ON signal that is read out in any field after initiation of irradiance. (ED) 503-1978w

read-modify-write cycle A data transfer bus (DTB) cycle that is used to both read from, and write to, a slave location without permitting any other master to access that location. This cycle is most useful in multiprocessing systems where certain memory locations are used to provide semaphore functions. (C/BA) 1014-1987

read-modify-write (RMW) cycle A cycle in which an item is read, its contents are modified, and then is written back to storage in a single operation. *See also:* write cycle; read cycle. (C) 610.10-1994w

read-mostly devices (metal-nitride-oxide field-effect transistor) Metal-nitride-oxide semiconductor (MNOS) memory transistors whose retention under constant read condition is in excess of one year. This makes these devices applicable in electrically-alterable read-only memories (EAROMs). A typical writing pulse width is one ms. (ED) 581-1978w

read number, maximum usable *See:* maximum usable read number.

read-only (1) Pertaining to a storage medium which can only be read from. *Contrast:* write-once/read-many; read/write. (C) 610.10-1994w
(2) A property that causes no state changes, i.e., it does no updates. (C/SE) 1320.2-1998

read-only access A type of access to data in which the data may be read but not changed or deleted. *Synonym:* fixed. *Contrast:* read/write access. *See also:* update access; delete access; write access. (C) 610.5-1990w

read-only file system A file system that has implementation-defined characteristics restricting modifications. (C/PA) 9945-1-1996, 9945-2-1993, 1003.5-1999

read-only memory (ROM) (1) The memory on a node that provides storage locations for normally read-only data or code. The ROM data are maintained across losses of primary and secondary power. In some implementations ROM may be writable, using (normally disabled) vendor-specific protocols. (C/MM) 1596-1992

(2) A form of nonvolatile memory whose contents are generally supplied during manufacture and cannot be altered. (C/BA) 14536-1995

(3) Memory that can only be read from. (C) 610.10-1994w

(4) A memory in which the contents are intended to be read only and not altered during normal operation. (ED) 1005-1998

(5) A type of permanent data storage (memory) that can be read but not altered by the system. Data stored in read-only memory is not affected by power loss to the system. (PE/SUB) 1379-1997

read-only storage A type of storage which can be read, but not modified except by a particular user, or when operating under particular conditions; for example, punched paper tape, or a storage device in which writing is prevented by a lock-out. *Synonym:* nonerasable storage. *See also:* fixed-program read-only storage; control read-only memory; fixed storage; protected storage. (C) 610.10-1994w

readout (radiation instrumentation) The device that conveys visual information regarding the measurement to the user. (NI) N42.17B-1989r, N323-1978r, N320-1979r, N317-1980r

(2) (A) (test, measurement, and diagnostic equipment) The device used to present output information to the operator, either in real time or as an output of a storage medium. **(B) (test, measurement, and diagnostic equipment)** The act of reading, transmitting, displaying information either in real time or from an internal storage medium of an operator or an external storage medium or peripheral equipment. (MIL) [2]

readout, command *See:* command readout.

readout device *See:* character display device.

read-out lag (diode-type camera tube) The fraction of the initial signal which is read out in any field after the image illumination is interrupted. (ED) 503-1978w

readout, position *See:* position readout.

read path In a reader, a path that has a read station. (C) 610.10-1994w

read pulse A pulse that causes information to be acquired from a magnetic cell or cells. *See also:* ONE state. (Std100) 163-1959w

read ready violation A word-serial protocol error that occurs when data is read from a servant while its read ready bit is zero (0). (C/MM) 1155-1992

read station The location in a reader where the data on a medium are read. *Synonym:* sensing station. (C) 610.10-1994w

read transaction A transaction that passes an address and size parameter from the requester to the responder and returns data values from the responder to the requester. The size parameter specifies the number of bytes that are transferred. (C/MM) 1212-1991s

read/write Pertaining to an operation, process, or object that is involved in both reading and writing. For example, a read/write head is a head that can perform both read and write operations. *Contrast:* write-once/read-many; read-only. *See also:* write; read. (C) 610.10-1994w

read/write access A type of access to data in which the data may be both retrieved, changed, and stored. *Contrast:* read-only access. *See also:* update access; delete access; write access. (C) 610.5-1990w

read/write cycle A cycle in which one read operation and one write (or rewrite) operation are performed. (C) 610.10-1994w

read/write head A head capable of both reading from or writing on the medium. *Synonyms:* record head; combined head. *Contrast:* write head; read head. (C) 610.10-1994w

read/write memory (RWM) Memory into which information may be stored (or written) and from which information may be retrieved (or read) for example, digital tape recorders and random-access memory. *Contrast:* read-only memory. (C) 610.10-1994w

read/write opening *See:* read/write slot.

read/write slot An opening in the jacket of a floppy disk allowing access to the storage medium by the read/write heads. *Synonym:* read/write opening. (C) 610.10-1994w

ready/busy An end-of-write indicator. (ED) 1005-1998

ready light An indicator light on a system or system component that indicates that the system is on and ready for operation. (C) 610.10-1994w

ready task A task that is not blocked. The ready tasks include those that are running as well as those that are waiting for a processor. *See also:* blocked task. (C) 1003.5-1999

ready-to-receive signal (facsimile) A signal sent back to the facsimile transmitter indicating that a facsimilee receiver is ready to accept the transmission. *See also:* facsimile signal. (COM) 168-1956w

reagent blank A volume of demineralized water for liquid samples carried through the entire analytical procedure. The volume or weight of the blank shall be approximately equal to the volume or weight of the sample processed. (NI) N42.23-1995

real address (1) The address of a storage location in the main storage part of a virtual storage system. *Contrast:* virtual address. (C) 610.12-1990

(2) The address of a storage location in real storage. *See also:* address translator. (C) 610.10-1994w

real data Data used to represent real numbers. *See also:* binary coded decimal real data; floating-point real data. (C) 610.5-1990w

real estate *See:* footprint.

real fixed binary data *See:* fixed-point binary data.

real fixed decimal data *See:* fixed-point real data.

real float binary data *See:* floating-point data.

real float decimal data *See:* floating-point data.

real group ID The attribute of a process that, at the time of process creation, identifies the group of the user who created the process. This value is subject to change during the process lifetime. *See also:* group ID. (C/PA) 9945-1-1996, 9945-2-1993, 1003.5-1999

realizable function (linear passive networks) A response function that can be realized by a network containing only positive resistance, inductance, capacitance, and ideal transformers. *Note:* This is the sense of realizability in the theory of linear, passive, reciprocal, time-invariant networks. (CAS) 156-1960w

realization The representation of interface responsibilities through specified algorithms and any needed representation properties. The realization states "how" a responsibility is met; it is the statement of the responsibility's method. Realization consists of any necessary representation properties together with the algorithm (if any). A realization may involve representation properties or an algorithm, or both. For example, an attribute typically has only a representation and no algorithm. An algorithm that is a "pure algorithm" (i.e., without any representation properties) uses only literals; it does not "get" any values as its inputs. Finally, a derived attribute or operation typically has both an algorithm and representation properties. (C/SE) 1320.2-1998

realized gain The gain of an antenna reduced by the losses due to the mismatch of the antenna input impedance to a specified impedance. *Note:* The realized gain does not include losses due to polarization mismatch between two antennas in a complete system. (AP/ANT) 145-1993

realized gain, partial *See:* partial realized gain.

realm *See:* area.

real number A member of the set of all positive and negative numbers, including integers, zero, mixed, fractional, rational, and irrational numbers. (C) 610.5-1990w, 1084-1986w

real storage (1) The main storage portion of a virtual storage system. *Contrast:* virtual storage. (C) 610.12-1990

(2) The main storage in a virtual storage system. *Note:* Although real storage and main storage are physically identical, conceptually real storage represents only parts of the range of addresses available to the user of a virtual storage system, whereas, the main storage includes the total range of addresses available to the user. (C) 610.10-1994w

real time (1) (processing) (emergency and standby power) Pertaining to the actual time during which a physical process transpires or pertaining to the performance of a computation during the actual time of related physical processing in order that results of the computation can be used in guiding the physical process. (IA/PSE) 446-1987s

(2) The actual time in the real world during which an event takes place. *Synonyms:* true time; actual time. (C) 610.10-1994w

(3) (analog computer) Using an ordinary clock as a time standard, the number of seconds measured between two events occurring in a physical system. By contrast, computer time is the number of seconds measured, with the same clock, between corresponding events in the simulated system. The ratio of the time interval between two events in a simulated system to the time interval between the corresponding events in the physical system is the time scale. Computer time is equal to the product of real time and the time scale. Real-time computation is computer operation in which the time scale is unity. Machine time is synonymous with computer time. *See also:* scale factor. (C) 165-1977w

(4) (software) Pertaining to a system or mode of operation in which computation is performed during the actual time that an external process occurs, in order that the computation results can be used to control, monitor, or respond in a timely manner to the external process. *Contrast:* batch. *See also:* conversational; interactive; online; interrupt. (C) 610.12-1990, 610.10-1994w

(5) (modeling and simulation) In modeling and simulation, simulated time with the property that a given period of actual time represents the same period of time in the system being modeled; for example, in a simulation of a radar system, running the simulation for one second may result in the model advancing time by one second; that is, simulated time advances at the same rate as actual time. *Contrast:* slow time; fast time. (C) 610.3-1989w

(6) An event or data transfer in which, unlessaccomplished within an allotted amount of time, the accomplishment of the action has either no value or diminishing value. (DIS/C) 1278.2-1995

(7) The real time, in seconds and fraction thereof, of acquisition of the spectrum. It is expressed as 14 characters including decimal point with leading zeros interpreted as zeros. (NPS/NID) 1214-1992r

real-time clock (RTC) (1) A device that signals the computer at regular intervals in order that it may keep up with some external event. *See also:* time-of-day clock. (C) 610.10-1994w

(2) A hardware system element that provides the system with a reference to real-world time. A common implementation would be a circuit containing a set of registers holding the current month, day, year, day-of-week number, and other time-related values, along with a circuit that continuously updates these register values. The circuit is normally provided with an alternate power source, such as a battery, which allows the RTC to continue to function when main system power is not available. (C/PA) 2000.2-1999

real-time environment profile A profile designed to support applications requiring bounded response. (C/PA) 1003.13-1998

real-time printout (sequential events recording systems) The recording of actual time that an input signal was received as correlated to a time standard. (PE/EDPG) [5], [1]

real-time service A service that satisfies timing constraints imposed by the service user. The timing constraints are user specific and should be such that the user will not be adversely affected by delays within the constraints. (DIS/C) 1278.2-1995

real-time system A system in which the correctness of a computation depends not only upon the results of the computations but also upon the time at which the outputs are generated. (C/BA) 896.3-1993w

real-time testing (test, measurement, and diagnostic equipment) The testing of a system or its components at its normal operating frequency or timing. (MIL) [2]

real type A data type whose members can assume real numbers as values and can be operated on by real number arithmetic operations, such as addition, subtraction, multiplication, division, and square root. *Contrast:* integer type; logical type; character type; enumeration type. (C) 610.12-1990

real user ID (1) The attribute of a process that, at the time of process creation, identifies the user who created the process. This value is subject to change during the process lifetime. *See also:* user ID. (C/PA) 9945-1-1996, 9945-2-1993

(2) The attribute of a process that, at the time of process creation, identifies the user who created the process. This value is subject to change during the process lifetime. *See also:* user ID. (C) 1003.5-1999

real variable A variable that may assume only real-number values. (C) 1084-1986w

real-world time The actual time in the real world, expressed as Universal Coordinated Time (UTC). (DIS/C) 1278.1-1995

reasoning system In the context of AI-ESTATE, a system that can combine elements of knowledge to draw conclusions. (ATLAS) 1232-1995

reassembly The function in the DQDB layer that provides for the reconstruction of an initial MAC protocol data unit (IMPDU). Reassembly is performed by concatenating the segmentation units received in derived MAC protocol data units (DMPDUs). This is the inverse process to segmentation. (LM/C) 8802-6-1994

reassociation The service that enables an established association [between access point (AP) and station (STA)] to be transferred from one AP to another (or the same) AP. (C/LM) 8802-11-1999

reboot fileset A fileset which, if installed, requires reboot of the operating system to complete its installation, and denoted by having the value of its *is_reboot* attribute set to `true`. (C/PA) 1387.2-1995

rebooting An implementation-defined procedure generally used to terminate and then restart operations on the target system. (C/PA) 1387.2-1995

recalescent point The temperature at which there is a sudden liberation of heat when metals are lowered in temperature. *See also:* coupling; induction heating. (IA/MET) 54-1955w, 169-1955w

receipt of a CCS message *See:* receipt of a CCS signal.

receipt of a CCS signal Occurs when the signal or complete message becomes available for acceptance by the processor (that is, stored in the input buffer). *Synonym:* receipt of a CCS message. (COM/TA) 973-1990w

receipt of a per-trunk-signaling supervisory signal Occurs when the state transition that begins the signal is received (that is, E-lead signal or loop open or closure). All times noted are exclusive of hit timing. (COM/TA) 973-1990w

receive (1) The acoustic output of a telephone set due to an electrical input to the telephone set or connecting test circuit. (COM/TA) 269-1992

(2) The acoustic output of a handset or headset due to an electrical input to the device or connecting test circuit. (COM/TA) 1206-1994

(3) The acoustic output of a handsfree telephone due to an electrical input. (COM/TA) 1329-1999

receive attenuation during double talk (A_{RDT}) Attenuation in the receive path, seen at the 50 cm test point (50TP), inserted during double talk. The send talker initiates the double talk. (COM/TA) 1329-1999

receive channel A channel used within a data circuit to receive data. *Contrast:* transmit channel. (C) 610.10-1994w

receive characteristic (telephony) The acoustic output level of a telephone set as a function of the electrical input level. The output is measured in an artificial ear, and the input signal is obtained from an available constant-power source of specified impedance. (IA) 169-1955w, [123]

received power (mobile communication) The root-mean-square value of radio-frequency power that is delivered to a load that correctly terminates an isotropic reference antenna. The reference antenna most commonly used is the half-wave dipole. *See also:* mobile communication system. (VT) [37]

receive electrical test point (RETP) The point in a battery feed circuit, reference codec, or wireless reference base station at which signals are applied to the handsfree telephone in the receive direction. (COM/TA) 1329-1999

receive loudness rating directionality (RLRD) Receive loudness rating versus angle around the handsfree telephone (HFT), normalized to the loudness rating at the 50 cm test point (50TP). (COM/TA) 1329-1999

receive-only equipment Data communication equipment capable of receiving signals, but not arranged to transmit signals. (COM) [49]

receiver (1) (facsimile) The apparatus employed to translate the signal from the communications channel into a facsimile record of the subject copy. *See also:* facsimile. (COM) 168-1956w

(2) (telephone switching systems) A part of an automatic switching system that receives signals from a calling device or other source for interpretation and action. (COM) 312-1977w

(3) (MULTIBUS) An agent that is the recipient of the data during a solicited message. *See also:* solicited messages. (C/MM) 1296-1987s

(4) A pin of a cell instance that is receiving or can receive a signal from an interconnect structure. (C/DA) 1481-1999

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receiver common-mode voltage The combination of three components: the driver-receiver ground potential difference (V_{gpd}); the longitudinally coupled peak noise voltage measured between the receiver circuit ground and the signal transmission media with the driver end shorted to ground (V_{noise}); 3 the driver offset voltage. (C/MM) 1596.3-1996

receiver differential noise margin high The tolerable signal voltage variation from any source that still results in the receiver producing a logic high output state when the driver is stimulated by a logic high input. Differential noise margin high is calculated by subtracting the receiver's minimum differential high input voltage from the driver's minimum high differential output voltage;

$V_{odh}(\min) - V_{idh}(\min)$.

(C/MM) 1596.3-1996

receiver differential noise margin low Tolerable voltage variation to guarantee that the receiver produces a logic low output when the driver is stimulated by a logic low input;

$V_{idl}(\max) - V_{odl}(\max)$.

(C/MM) 1596.3-1996

receiver gating The application of enabling or inhibiting pulses to one or more stages of a receiver only during the part of a cycle of operation when reception is either desired or undesired, respectively. *See also:* gating. (AES) 686-1997

receiver ground (signal-transmission system) The potential reference at the physical location of the signal receiver. *See also:* signal. (IE) [43]

receiver linear dynamic range (electromagnetic site survey) The interval between the minimum detectable signal and the 1 dB gain compression point within which the receiver gain deviates from a constant value by less than 1 dB. (EMC) 473-1985r

receiver-off-hook tone (telephone switching systems) A tone on a line to indicate an abnormal off-hook condition. (COM) 312-1977w

receiver 1 dB gain compression point (electromagnetic site survey) The input signal level to an otherwise linear receiver for which the gain has been decreased 1 dB (decibel) below the value measured for the mimimum detectable input signal (within the linear response range). (EMC) 473-1985r

receiver operating characteristic curves Plots of probability of detection versus probability of false alarm for various input signal-to-noise power ratios and detection threshold settings. (AES) 686-1997

receiver primaries *See:* display primaries.

receiver relay An auxiliary relay whose function is to respond to the output of a communications set such as an audio, carrier, radio, or microwave receiver. (SWG/PE/PSR) C37.100-1992, C37.90-1978s

receiver, telephone *See:* telephone receiver.

receiver training A startup routine in 100BASE-T2 used to acquire receiver parameters and synchronize the scramblers of two connected Physical Layers (PHYs). (C/LM) 802.3-1998

receive speech front end clipping during double talk (T_{RFDT}) The length of time that speech undergoes syllabic clipping, as seen at the 50 cm test point (50TP), just after the onset of double talk. The receive talker initiates the double talk. (COM/TA) 1329-1999

receiving (1) (nuclear power quality assurance) Taking delivery of an item at a designated location. (PE/NP) [124]

(2) (transmission performance of telephone sets) The acoustic output level of a telephone set due to an electric input to the telephone set or connecting test circuit. The electric input may be varied either in frequency or level. The output is measured in an artificial ear and the input is measured as the open-circuit voltage from a source of constant available power. (COM/TA) 269-1983s

receiving converter, facsimile *See:* facsimilie receiving converter.

receiving-end crossfire (telegraph channel) The crossfire from one or more adjacent telegraph channels at the end remote from the transmitting end. *See also:* telegraphy. (EEC/PE) [119]

receiving loop loss That part of the repetition equivalent assignable to the station set, subscriber line, and battery supply circuit that are on the receiving end. *See also:* transmission loss. (EEC/PE) [119]

receiving objective loudness rating (loudness ratings of telephone connections)

$$\mathrm{ROLR} = -20\log_{10}\frac{S_E}{1/2\ V_W}$$

where

V_W = open-circuit voltage of the electric source (in millivolts)

S_E = sound pressure at the ear reference point (in pascals)

Note: Normally occurring ROLRs will be in the 40 to 55 decibel (dB) range. These numbers are a result of the units chosen and have no physical significance. (COM/TA) 661-1979r

receiving polarization (of an antenna) The polarization of a plane wave, incident from a given direction and having a given power flux density, that results in maximum available power at the antenna terminals. *Notes:* 1. The receiving polarization of an antenna is related to the antenna's polarization on transmit (see definition above) in the following way. In the same plane of polarization, the polarization ellipses have the same axial ratio, the same sense of polarization, and the

same spatial orientation. Since their senses of polarization and spatial orientation are specified by viewing their polarization ellipses in the respective directions into which they are propagating, one should note that (a) although their senses of polarization are the same, they would appear to be opposite if both waves were viewed in the same direction; and (b) their tilt angles are such that they are the negative of one another with respect to a common reference. 2. The receiving polarization may be used to specify the polarization characteristic of a non-reciprocal antenna that may transmit and receive arbitrarily different polarizations. (AP/ANT) 145-1993

receiving voltage sensitivity *See:* free-field voltage response.

receptacle (1) A receptacle is a contact device installed at the outlet for the connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles. (NESC/NEC) [86]

(2) An outlet that is intended to be equipped electrically and mechanically to receive the plug. (RL) C136.10-1996

(3) A device installed in a receptacle outlet to accommodate an attachment plug. (IA/MT) 45-1998

receptacle circuit A branch circuit to which only receptacle outlets are connected. *See also:* branch circuit. (EEC/PE) [119]

receptacle circuit tester A device that, by a pattern of lights, is intended to indicate wiring errors in receptacles. Receptacle circuit testers have some limitations. They may indicate incorrect wiring, but cannot be relied upon to indicate correct wiring. (IA/PSE) 1100-1992s

receptacle outlet An outlet where one or more receptacles is installed. (IA/MT) 45-1998

reception diversity (data transmission) That method of radio reception whereby, in order to minimize the effects of fading, a resultant signal is obtained by combination or selection, or both, of two or more sources of received-signal energy that carry the same modulation or intelligence, but that may differ in strength or signal-to-noise ratio at any given instant. (PE) 599-1985w

receptive field (medical electronics) The region in which activity is observed by means of the pickup electrode. (EMB) [47]

receptor The body that is at rest in an ESD event. The receptor is usually but not necessarily at the same potential as its surroundings. It is always at a potential different from that of the intruder. (SPD/PE) C62.47-1992r

receptor electrode geometry The size and shape of that surface of the receptor, termed the receptor electrode, at which the ESD takes place. (SPD/PE) C62.47-1992r

reciprocal bearing (navigation aid terms) The opposite direction to a bearing. (AES/GCS) 172-1983w

reciprocal color temperature (illuminating engineering) Color temperature T_c expressed on a reciprocal scale ($1/T_c$). An important use stems from the fact that a given small increment in reciprocal color temperature is approximately equally perceptible regardless of color temperature. Also, color temperature conversion filters for sources approximating graybody sources change the reciprocal color temperature by nearly the same amount anywhere on the color temperature scale. *Note:* The unit is the reciprocal megakelvin (MK^{-1}). The reciprocal color temperature expressed in this unit has the numerical value $10^6/T_c$ when T_c is expressed in kelvins. The acronym "mirek" (for micro-reciprocal-kelvin) occasionally has been used in the literature. The acronym "mired" (for micro-reciprocal-degree) is now considered obsolete. (EEC/IE) [126]

reciprocal transducer A transducer in which the principle of reciprocity is satisfied. *Note:* The use of the term reversible transducer as a synonym for reciprocal transducer is deprecated. *See also:* transducer. (Std100) 270-1966w

reciprocating mechanism (high voltage air switches, insulators, and bus supports) An operating mechanism which produces longitudinal motion of the operating means to open or close the switching device. (SWG/PE) C37.30-1971s

reciprocity In wave propagation, the invariance of the complex amplitudes of the received signals to the interchange in location of transmitter and receiver, but not the antennas. *Note:* Reciprocity applies provided that the transmission medium is isotropic and that the antennas remain in place with only their transmit and receive functions interchanged. Reciprocity may not hold when the antennas are in different media. (AP/PROP) 211-1997

reciprocity theorem States that if an electromagnetic force E at one point in a network produces a current I at a second point in the network, then the same voltage E acting at the second point will produce the same current I at the first point. (EEC/PE) [119]

recirculated air (electric power systems in commercial buildings) Return air passed through the air conditioner before being supplied again to the conditioned space. (IA/PSE) 241-1990r

reclamation (insulating oil) The restoration to usefulness by the removal of contaminants and products of degradation such as polar, acidic, or colloidal materials from used electrical insulating liquids by chemical or adsorbent means. *Note:* The methods listed under reconditioning are usually performed in conjunction with reclaiming. Reclaiming typically includes treatment with clay or other absorbents. (PE/TR) 637-1985r

reclamation of oil The removal of harmful chemical contaminants. This is usually done with absorptive agents or alkali salts. (PE/TR) C57.106-1991w

reclosing device (power operations) A control device which initiates the reclosing of a circuit after it has been opened by a protective relay. (PE/PSE) 858-1987s

reclosing fuse A combination of two or more fuseholders, fuse units, or fuse links mounted on a fuse support or supports, mechanically or electrically interlocked, so that one fuse at a time can be connected into the circuit and the functioning of that fuse automatically connects the next fuse into the circuit, with or without intentionally added time delay, thereby permitting one or more service restorations without replacement of fuse links, refill units, or fuse units. (SWG/PE) C37.40-1993, C37.100-1992

reclosing interval (of an automatic circuit recloser) The open-circuit time between an automatic opening and the succeeding automatic reclosure. (SWG/PE) C37.100-1992

reclosing relay A programming relay whose function is to initiate the automatic reclosing of a circuit breaker. (SWG/PE/PSR) C37.100-1992, C37.90-1978s

reclosing time (of a circuit breaker) The interval between the time when the actuating quantity of the release (trip) circuit reaches the operating value (the breaker being in the closed position) and the reestablishment of the circuit on the primary arcing contacts on the reclosing stroke. (SWG/PE) C37.100-1992

reclosure (relay) The automatic closing of a circuit-interrupting device following automatic tripping. Reclosing may be programmed for any combination of instantaneous, time-delay, single-shot, multiple-shot, synchronism-check, dead-line-live-bus, or dead-bus-live-line operation. (PE/PSR) C37.95-1973s

recognition *See:* magnetic ink character recognition; pattern recognition; optical character recognition; character recognition.

recognition time The time elapsed between the change of the value of a digital input signal and its recognition by the digital input unit. (C) 610.10-1994w

recombinant Pseudonym for oxygen recombination. (SB) 1187-1996

recombination (overhead power lines) The process by which positive and negative ions recombine to neutralize each other. (T&D/PE) 539-1990

recombination center (solar cells) A defect having electrical properties so as to facilitate the recombination of mobile charge carriers (electrons or holes) with one each of the opposite polarity. (MAG) 306-1969w

recombination rate (1) (volume) The time rate at which free electrons and holes recombine within the volume of a semiconductor. *See also:* semiconductor device. (AES/SS) 307-1969w

(2) (overhead power lines) The rate at which positive and negative ions recombine in a given gas or liquid. (T&D/PE) 539-1990

recombination velocity (semiconductor surface) The quotient of the normal component of the electron (hole) current density at surface by the excess electron (hole) charge density at the surface. *See also:* semiconductor device. (ED) 216-1960w

recommended test position (RTP) An acoustic test point, other than the 50 cm test point (50TP), that corresponds to the most appropriate user position for nonstandard desktop and nondesktop applications. This may be specified by the handsfree telephone (HFT) manufacturer. (COM/TA) 1329-1999

recommended wearing position (RWP) A test position (corresponding to the manufacturer's instructions) for the transmitter of a headset that does not have a fixed spatial relationship between the location of its transmitter and receiver sound ports. (COM/TA) 1206-1994

recompeting master (multiprocessor architecture) The module that is in control of the bus and has initiated a control acquisition procedure in order to unlock slave interfaces. (C/MM) 896.1-1987s

recomplementation (mathematics of computing) The process of taking the complement of a complement. *Note:* The complement of a complement is the original numeral. (C) 1084-1986w

Reconciliation Sublayer (RS) A 100BASE-T mapping function that reconciles the signals at the Media Independent Interface (MII) to the Media Access Control (MAC)-Physical Signaling Sublayer (PLS) service definitions. (C/LM) 802.3-1998

reconditioned carrier reception (exalted-carrier reception) The method of reception in which the carrier is separated from the sidebands for the purpose of eliminating amplitude variations and noise, and then added at increased level to the sideband for the purpose of obtaining a relatively undistorted output. This method is frequently employed, for example, when a reduced-carrier single-sideband transmitter is used. *See also:* radio receiver. (EEC/PE) [119]

reconditioning (1) (insulating oil) The removal of insoluble contaminants, moisture, and dissolved gases from used, electrical insulating liquids by mechanical means. *Note:* The typical means employed are settling, filtering, centrifuging, and vacuum drying or degassing. (PE/TR) 637-1985r

(2) A general term covering the process of maintaining existing power switchgear equipment in operating condition as recommended by the manufacturer's instructions, using only the original manufacturer's recommended replacement parts, without altering the original design. (SWG/PE) C37.100-1992

(3) The process of maintaining existing power switchgear equipment in operating condition as recommended by the manufacturer's instructions, using only the original manufacturers' designed parts. *Note:* Reverse engineered parts (designs copied from existing parts by other manufacturers) are not considered to be the original manufacturer's design or recommended replacement parts. (SWG/PE) C37.59-1996

reconditioning of oil The mechanical removal of moisture and insoluble contaminants. (PE/TR) C57.106-1991w

reconfiguration (1) (dual ring operation with wrapback reconfiguration) A change of the path around which the token that is used for normal data transfer circulates. (LM/C) 802.5c-1991r

(2) (DQDB subnetwork of a metropolitan area network) The process by which the configuration control function activates and deactivates resources of a DQDB subnetwork to take account of a change in the operational status of a cluster, node, or transmission link in the subnetwork. (LM/C) 8802-6-1994

(3) A strategy for repairing components in which failing components are switched out of operation and replaced by failure-free components. (C) 610.10-1994w

reconfiguration management The management functions responsible for reconfiguration. This includes both dual ring management and any other management required for reconfiguration. (LM/C) 802.5c-1991r

reconstituted mica *See:* mica paper.

reconstruction (1) Replacement of any portion of an existing installation by new equipment or construction. Does not include ordinary maintenance replacements. (NESC) C2-1977s

(2) (image processing and pattern recognition) *See also:* image reconstruction. (C) 610.4-1990w

record (1) (data management) (software) A set of data items, called fields, treated as a unit. For example, in stock control, the data for each invoice could constitute one record. *Synonym:* data record. *See also:* entity; database record. (C) 610.5-1990w, 610.12-1990

(2) The language-independent syntax for a family of datatypes constructed from a sequence of base datatypes, each associated with a name. A value of record datatype contains, for each name, a value of the corresponding base datatypes. (C/PA) 1351-1994w

(3) A set of related data items treated as a unit. For example, in stock control, the data for each invoice could constitute one record. (C) 610.7-1995

(4) To put data into a storage device. (C) 610.10-1994w

(5) A datatype constructed from a sequence of base datatypes, each associated with a name. A record value contains, for each name, a value of the corresponding base datatype. (C/PA) 1224.1-1993w

(6) A collection of related data or words treated as a unit and saved in a position-dependent fashion within a file of other such units. (C/MM) 855-1990

(7) A collection of related data units or words that itself is treated as a unit. (C) 1003.5-1999

record condition (data management) A conjunction of two or more item conditions such that the name of the data item in each condition is distinct. For example, "LASTNAME = 'JONES' and SEX = 'FEMALE.'" (C) 610.5-1990w

recorded announcement (telephone switching systems) A prerecorded oral message received on a call. (COM) 312-1977w

recorded spot, X dimension (facsimile) The effective recorded-spot dimension measured in the direction of the recorded line. *Notes:* 1. By effective dimension is meant the largest center-to-center spacing between recorded spots which gives minimum peak-to-peak variation of density of the recorded line. 2. This term applies to that type of equipment which responds to a constant density in the subject copy by a succession of discrete recorded spots. *See also:* recording. (COM) 168-1956w

recorded spot, *Y* dimension (facsimile) The effective recorded-spot dimension measured perpendicularly to the recorded line. *Note:* By effective dimension is meant the largest center-to-center distance between recorded lines which gives minimum peak-to-peak variation of density across the recorded lines. *See also:* recording. (COM) 168-1956w

recorded value The value recorded by the marking device on the chart, with reference to the division lines marked on the chart. *See also:* accuracy rating. (EEC/PE) [119]

recorder (1) (analog computer) A device that makes a permanent record, usually graphic, of varying signals. *Synonym:* strip-chart recorder. (C) 165-1977w, 610.10-1994w

(2) (facsimile) That part of the facsimile receiver which performs the final conversion of electric picture signal to an

image of the subject copy on the record medium. *See also:* recording; facsimile. (COM) 168-1956w

recorder, strip-chart *See:* strip-chart recorder.

recorder-warning tone (telephone switching systems) A tone that indicates periodically that the conversion is being electrically recorded. (COM) 312-1977w

record gap (1) (computers) (storage medium) An area used to indicate the end of a record. (C) [20], [85]

(2) (test, measurement, and diagnostic equipment) An interval of space or time associated with a record to indicate or signal the end of the record. (MIL) [2]

(3) *See also:* interblock gap. (C) 610.5-1990w

(4) *See also:* interblock gap. (C) 610.10-1994w

record head *See:* read/write head.

recording (1) (facsimile) The process of converting the electrical signal to an image on the record medium. *See also:* electromechanical recording; electrothermal recording; photosensitive recording; magnetic recording; electrochemical recording; electrolytic recording; electrostatic recording. (COM) 168-1956w

(2) The process of storing information on some storage medium for later retrieval. *See also:* magnetic recording; optical recording. (C) 610.10-1994w

recording area (1) In micrographics, the maximum useful area of a microfilm or other medium that can record information, including the image as well as the document marks. (C) 610.2-1987

(2) The area on a disk or storage medium on which information can be recorded. *Synonym:* recording zone. *Contrast:* handling zone. (C) 610.10-1994w

recording channel (electroacoustics) The term refers to one of a number of independent recorders in a recording system or to independent recording tracks on a recording medium. *Note:* One or more channels may be used at the same time for covering different ranges of the transmitted frequency band, for multichannel recording, or for control purposes. *See also:* phonograph pickup. (SP) [32]

recording-completing trunk (telephone switching systems) A one-way trunk for operator recording, extending, and automatic completing of toll calls. (COM) 312-1977w

recording demand meter A demand meter that records on a chart the demand for each demand interval. *See also:* electricity meter. (EEC/PE) [119]

recording density The number of bits in a single linear track, measured in bits per unit of length or area of the recording medium. *Synonyms:* packing density; surface density; bit density. *See also:* track density. (C) 610.10-1994w

recording, instantaneous *See:* instantaneous recording.

recording instrument (electrical heating applications to melting furnaces and forehearths in the glass industry) An instrument that makes a graphic record of the value of one or more quantities as a function of another variable, usually time. (IA) 668-1987w

recording loss (mechanical recording) The loss in recorded level whereby the amplitude of the wave in the recording medium differs from the amplitude executed by the recording stylus. *See also:* phonograph pickup. (SP) [32]

recording medium The material on which program instructions and text are recorded; for example, magnetic tape. (C) 610.10-1994w

recording spot (facsimile) The image area found at the record medium by the facsimile recorder. *See also:* recording. (COM) 168-1956w

recording stylus (mechanical recording) A total that inscribes the groove into the recording medium. *See also:* phonograph pickup. (SP) [32]

recording trunk A trunk extending from a local central office or private branch exchange to a toll office, that is used only for communication with toll operators and not for completing toll connections. (COM/PE/EEC) [119]

recording zone *See:* recording area.

record layout (data management) The arrangement and structure of data in a record. (C) 610.5-1990w

record length (data management) The number of words or characters in a record. (C) 610.5-1990w

record length type (data management) The category to which a record belongs by virtue of having fixed or variable length. (C) 610.5-1990w

record-locking *See:* lock.

record medium (facsimile) A physical medium on which the facsimile recorder forms an image of the subject copy. *See also:* recording. (COM) 168-1956w

record of data A sequential collection of samples acquired by the waveform recorder. (IM/WM&A) 1057-1994w

record segmentation (data management) The allocation of individual data items in a record to separate physical storage areas or to different physical devices. (C) 610.5-1990w

record sheet (facsimile) The medium which is used to produce a visible image of the subject copy in record form. The record medium and the record sheet may be identical. *See also:* recording. (COM) 168-1956w

record spot (facsimile) The image of the recording spot on the record sheet. *See also:* recording. (COM) 168-1956w

records processing The process of manipulating, storing, and retrieving records in electronic form. *See also:* office automation. (C) 610.2-1987

record type (data management) The category to which a record belongs by virtue its format, content, or characteristics. (C) 610.5-1990w

recoverable light loss factors (illuminating engineering) Factors that give the fractional light loss that can be recovered by cleaning or lamp replacement. (EEC/IE) [126]

recovered charge (semiconductor) The charge recovered from a semiconductor device after switching from a forward current condition to a reverse condition. (IA) [12]

recovery (1) (data management) The restoration of a system, program, database, or other system resource to a prior state following a failure or externally caused disaster; for example, the restoration of a database to a point at which processing can be resumed following a system failure. (C) 610.5-1990w

(2) (software) The restoration of a system, program, database, or other system resource to a state in which it can perform required functions. (C) 610.12-1990

(3) The ability of the `swinstall` utility, for a failed software installe, to return the system to the state that it was in before the failure, including restoring the files. (C/PA) 1387.2-1995

(4) A set of interactions intended to restore failed equipment or to find alternatives to achieve its function. (PE/NP) 1082-1997

(5) The process of restoring the ring to normal operation. When the ring is beaconing, claiming, or purging, the ring is in a state of recovery. (C/LM) 8802-5-1998

recovery current (semiconductor rectifiers) The transient component of reverse current associated with a change from forward conduction to reverse voltage. *See also:* rectification. (IA) [12]

recovery cycle (electrobiology) The sequence of states of varying excitability following a conditioning stimulus. The sequence may include periods such as absolute refractoriness, relative refractoriness, supernormality, and subnormality. *See also:* excitability. (EMB) [47]

recovery, error *See:* error recovery.

recovery-of-frame alignment (telecommunications) The establishment of proper frame alignment of the receiver after an out-of-frame condition. (COM/TA) 1007-1991r

recovery phase (MULTIBUS II) The final phase of an exception operation in which the parallel system bus is allowed to

sit idle for a defined amount of time. *See also:* exception operation. (C/MM) 1296-1987s

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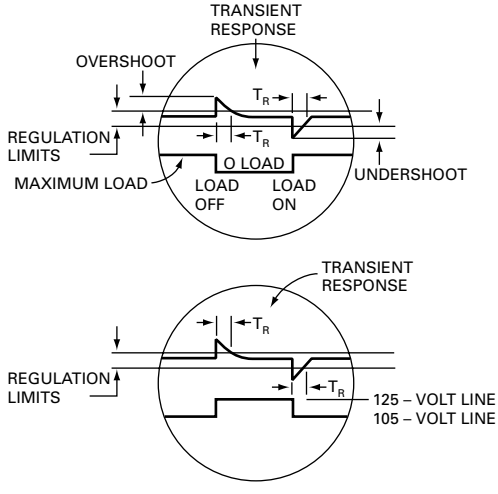
recovery/removal timing check A timing check that establishes an interval with respect to a reference signal transition, during which an asynchronous control signal may not change from the active to inactive state. This timing check is frequently applied to flip-flops and latches to establish a stable interval for the set and reset inputs with respect to the active edge of the clock or the active-to-inactive transition of the gate. Two limit values are necessary to define the stable interval. The recovery time is the time before the reference signal transition when the stable interval begins. The removal time is the time after the reference signal transition when the stable interval ends. If the asynchronous control signal goes inactive during the stable interval, it is unknown whether the flip-flop or latch takes on the state of the data input, remains set, or is reset. (C/DA) 1481-1999

recovery timing check A timing check that establishes only the beginning of the stable interval for a recovery/removal timing check. If no removal timing check is provided for the same arc, transitions, and state, the stable interval is assumed to end at the reference signal transition, and a negative value for the recovery time is not meaningful. *See also:* recovery/removal timing check. (C/DA) 1481-1999

recovery time (1) (power supplies) Specifies the time needed for the output voltage or current to return to a value within the regulation specification after a step load or line change. *Notes:* 1. Recovery time, rather than response time, is the more meaningful and therefore preferred way of specifying power-supply performance, since it relates to the regulation specification. 2. For load change, current will recover at a rate governed by the rate-of-change of the compliance voltage across the load. This is governed by the resistance-capacitance time constant of the output filter capacitance, internal source resistance, and load resistance. *See also:* programming speed; radar.



Recovery time. Oscilloscope views showing (top) the effects of a step load change, and (bottom) the effects of a step line change. T_R = recovery time.

recovery time

(AES/IA/PSE) [41], 1100-1999

(2) (A) (anti-transmit-receive tube) The time required for a fired tube to deionize to such a level that the normalized conductance and susceptance of the tube in its mount are within specified ranges. *Note:* Normalization is with respect to the characteristic admittance of the transmission line at its junction with the tube mount. *See also:* radar; gas tube. **(B) (gas tube)** The time required for the control electrode to regain control after anode current interruption. *Note:* To be exact, the deionization and recovery time of a gas tube should be presented as families of curves relating such factors as condensed-mercury temperature, anode current, anode and control electrode voltages, and control-circuit impedance. *See also:* radar. **(C) (TR and pre-TR tubes)** The time required for a fired tube to deionize to such a level that the attenuation of a low-level radio-frequency signal transmitted through the tube is decreased to a specified value. *See also:* relay recovery time. (ED) 161-1971

(3) (gas turbines) The interval between two conditions of speed occurring with a specified sudden change in the steady-state electric load on the gas-turbine-generator unit. It is the time in seconds from the instant of change from the initial load condition to the instant when the decreasing oscillation of speed finally enters a specified speed band. *Note:* The specified speed band is taken with respect to the midspeed of the steady-state speed band occurring at the subsequent steady-state load condition. The recovery time for a specified load increase and the same specified load decrease may not be identical and will vary with the magnitude of the load change. (PE/EDPG) [5]

(4) (A) When sending or receiving pulses, the time required between the end of a pulse and the beginning of the next pulse. **(B)** The time required by some peripheral devices between one access and another. (C) 610.10-1994

(5) The minimum time from the start of a counted pulse to the instant a succeeding pulse can attain a specified percentage of the maximum amplitude of the counted pulse. *See also:* half-amplitude recovery time. (NI/NPS) 309-1999

(6) (reverse-blocking thyristor or semiconductor diode) *See also:* reverse recovery time.

(7) *See also:* recovery/removal timing check. (C/DA) 1481-1999

recovery voltage (1) The voltage that occurs across the terminals of a pole of a circuit-interrupting device upon interruption of the current. (SWG/PE/IA/SPD/PSE) C37.40-1993, C37.100-1992, 1100-1992s, C62.1-1981s, C62.62-2000

(2) The power frequency voltage that appears across each set of main switching, transition, or transfer contacts of the arcing switch or arcing tap switch after these contacts have broken the switched current. (PE/TR) C57.131-1995

recreational vehicle A vehicular type unit primarily designed as temporary living quarters for recreational, camping, or travel use, which either has its own motive power or is mounted on or drawn by another vehicle, The basic entities are: travel trailer, camping trailer, truck camper and motor home. (NESC/NEC) [86]

recreational vehicle park A plot of land upon which two or more recreational vehicle sites are located, established or maintained for occupancy by recreational vehicles of the general public as temporary living quarters for recreation or vacation purposes. (NESC/NEC) [86]

recreational vehicle site A plot of ground within a recreational vehicle park intended for the accommodation of either a recreational vehicle, tent, or other individual camping unit on a temporary basis. (NESC/NEC) [86]

recreational vehicle site feeder circuit conductors The conductors from the park service equipment to the recreational vehicle site supply equipment. (NESC/NEC) [86]

recreational vehicle site supply equipment The necessary equipment, usually a power outlet, consisting of a circuit breaker or switch and fuse and their accessories, located near the point of entrance of supply conductors to a recreational vehicle site and intended to constitute the disconnecting means for the supply to that site. (NESC/NEC) [86]

recreational vehicle stand That area of a recreational vehicle site intended for the placement of a recreational vehicle. (NESC/NEC) [86]

rectangular array *See:* rectangular grid array.

rectangular grid array A regular arrangement of array elements, in a plane, such that lines connecting corresponding points of adjacent elements form rectangles. (AP/ANT) 145-1993

rectangular impulse (surge arresters) An impulse that rises rapidly to a maximum value, remains substantially constant for a specified period, and then falls rapidly to zero. The parameters that define a rectangular impulse wave are polarity, peak value, duration of the peak, total duration. (PE) [8]

rectangular mode *See:* resolver.

rectangular-shape logic symbol A logic symbol in which the logic function is indicated by a qualifying symbol in its interior. (GSD) 91-1973s

rectangular wave (data transmission) A periodic wave which alternately assumes one of two fixed values, the time of transition being negligible in comparison with the duration of each fixed value. (PE) 599-1985w

rectification The term used to designate the process by which electric energy is transferred from an alternating-current circuit to a direct-current circuit. (IA) 59-1962w, [12]

rectification error (accelerometer) A steady-state error in the output while vibratory disturbances are acting on an accelerometer. Anisoelasticity, for example, is one source of rectification error. (AES/GYAC) 528-1994

rectification factor The quotient of the change in average current of an electrode by the change in amplitude of the alternating sinusoidal voltage applied to the same electrode, the direct voltages of this and other electrodes being maintained constant. *See also:* transrectification factor; conductance for rectification. (ED) 161-1971w

rectification failure (power system device function numbers) A device that functions if one or more anodes of a power rectifier fail to fire, or to detect an arc bac, or on failure of a diode to conduct or block properly. (SUB/PE) C37.2-1979s

rectification of an alternating current Process of converting an alternating current to a unidirectional current. *See also:* semiconductor device; electronic rectifier; inverse voltage. (ED) [45], [84]

rectified unbalance *See:* gimbal-unbalance torque.

rectified value (alternating quantity) The average of all the positive values of the quantity during an integral number of periods. Since the positive values of a quantity y are represented by the expression

$$\frac{1}{2}[y + |y|],$$

$$y_r = \frac{1}{T}\int_0^T \frac{1}{2}[y + |y|]dt$$

Note: The word positive and the sign + may be replaced by the word negative and the sign −. (Std100) 270-1966w

rectifier (1) (self-commutated converters) A converter for conversion from alternating current (ac) to direct current (dc). (IA/PEL/C/SPC/ET) 936-1987w, 388-1992r, 610.10-1994w
(2) (generating stations electric power system) A device for converting ac to dc. (PE/EDPG) 505-1977r
(3) (ac adjustable-speed drives) A converter for conversion from ac to dc. (IA/ID) 995-1987w
(4) A component for converting ac to dc by inversion or suppression of alternate half cycles. (IA/MT) 45-1998

rectifier anode An electrode of the rectifier from which the current flows into the arc. *Note:* The direction of current flow is considered in the conventional sense from positive to negative. The cathode is the positive direct-current terminal of the apparatus and is usually a pool of mercury. The neutral of the transformer secondary system is the negative direct-current terminal of the rectifier unit. *See also:* rectification. (EEC/PE) [119]

rectifier assembly A complete unit containing rectifying components, wiring, and mounting structure capable of converting alternating-current power to direct-current power. *See also:* converter. (PE) [9]

rectifier cathode The electrode of the rectifier into which the current flows from the arc. *Note:* The direction of current flow is considered in the conventional sense from positive to negative. The cathode is the positive direct-current terminal of the rectifier unit and is usually a pool of mercury. The neutral of the transformer secondary system is the negative direct-current terminal of the rectifier unit. *See also:* rectification. (EEC/PE) [119]

rectifier circuit element A circuit element bounded by two circuit terminals that has the characteristic of conducting current substantially in one direction only. *Note:* The rectifier circuit element may consist of more than one semiconductor rectifier cell, rectifier diode, or rectifier stack connected in series or parallel or both, to operate as a unit. (IA) [12]

rectifier electric locomotive An electric locomotive that collects propulsion power from an alternating-current distribution system and converts this to direct current for application to direct-current traction motors by means of rectifying equipment carried by the locomotive. *Note:* A rectifier electric locomotive may be defined by the type of rectifier used on the locomotive, such as ignitron electric locomotive. *See also:* electric locomotive. (EEC/PE) [119]

rectifier electric motor car An electric motor car that collects propulsion power from an alternating-current distribution system and converts this to direct current for application to direct-current traction motors by means of rectifying equipment carried by the motor car. *Note:* A rectifier electric motor car may be defined by the type of rectifier used on the motor car, such as ignitron electric motor car. *See also:* electric motor car. (EEC/PE) [119]

rectifier instrument The combination of an instrument sensitive to direct current and a rectifying device whereby alternating currents or voltages may be measured. *See also:* instrument. (EEC/PE) [119]

rectifier junction (semiconductor rectifier cell or diode) The junction in a semiconductor rectifier cell that exhibits asymmetrical conductivity. *See also:* semiconductor rectifier stack; semiconductor. (IA) [12]

rectifier stack (semiconductor) An integral assembly of one or more rectifier diodes, including its associated mounting and cooling attachments if integral with it. *See also:* semiconductor rectifier stack. (IA) [12]

rectifier transformer (power and distribution transformers) A transformer that operates at the fundamental frequency of an alternating-current system and designated to have one or more output windings conductively connected to the main electrodes of a rectifier. *See also:* alternating-current winding; interphase transformer; rating of interphase transformer; anode paralleling reactor; power rectifier transformer; commutating reactor; direct-current winding. (PE/TR) C57.12.80-1978r

rectifier tube An electronic tube or valve designed to rectify alternating current. (ED) [45]

rectifier unit An operative assembly consisting of the rectifier, or rectifiers, together with the rectifier auxiliaries, the rectifier transformer equipment, and the essential switchgear. *See also:* rectification; rectifier transformer. (IA) [62]

rectifier valve *See:* rectifier tube.

rectifying device An elementary device, consisting of one anode and its cathode, that has the characteristic of conducting current effectively in only one direction. *See also:* rectification. (EEC/PE) [119]

rectifying element A circuit element that has the property of conducting current effectively in only one direction. *Note:* When a group of rectifying devices is connected, either in parallel or series arrangement, to operate as one circuit element, the group of rectifying devices should be considered as a rectifying element. *See also:* rectifying device; rectifier circuit element; rectification; rectifying junction. (EEC/PE) [119]

rectifying junction (1) (barrier layer) (blocking layer) The region in a metallic rectifier cell that exhibits the asymmetrical conductivity. *See also:* rectification. (EEC/PE) [119]

(2) A region between two materials, typically n-type or p-type semiconductors, or between a metal and a semiconductor, arranged to provide a very low resistance to current flow in one direction and a very high resistance to current flow in the opposite direction. (NPS) 325-1996

rectilinear scanning (television) The process of scanning an area in a predetermined sequence of straight parallel scanning lines. (BT/AV) 201-1979w

rector, shunt *See:* shunt reactor.

recurrence rate *See:* pulse-repetition frequency.

recurrent sweep A sweep that repeats or recurs regularly. It may be free-running or synchronized. *See also:* oscillograph. (IM/HFIM) [40]

recursion (A) (data management) A process in which a software module calls itself. *See also:* simultaneous recursion. **(B) (data management)** The process of defining or generating a process or data structure in terms of itself. (C) 610.12-1990

recursive (1) (A) (software) Pertaining to a software module that calls itself. **(B) (software)** Pertaining to a process or data structure that is defined or generated in terms of itself. (C) 610.12-1990

(2) (scheme programming language) Self-referential. In common usage, a recursive procedure is one that calls itself; similarly a recursion is a call by a procedure to itself. A set of procedures is mutually recursive if they refer to one another. (C/MM) 1178-1990r

recursive data structure (data management) A data structure that is defined in terms of itself. (C) 610.5-1990w

recursively defined sequence (data management) A sequence in which each item after the first is determined using a given operation for which one or more of the operands include one or more of the preceding items. (C) 610.5-1990w

recursive routine (software) A routine that may be used as a subroutine of itself, calling itself directly or being called by another subroutine, one that it itself has called. The use of a recursive routine usually requires the keeping of records of the status of its unfinished uses in, for example, a pushdown list. *See also:* subroutine; list; routine. (C/SE) 729-1983s

red Pertains to the parts of a computer or communications system in which data being transmitted or manipulated is not encrypted. *Contrast:* black. (C) 610.7-1995

red alarm A locally detected failure in a sink device; e.g., a primary multiplex equipment. Examples of locally detected failures could be loss of synchronization, incoming signal failure, a blown fuse, etc. (COM/TA) 1007-1991r

redefinition (A) (data management) The process of changing a database schema by adding, removing, or renaming attributes or relations. **(B) (data management)** In a relation, the process of changing the data type or size of an attribute, or altering the characteristics of a domain. (C) 610.5-1990

red, green, blue display device A color display device characterized by its ability to provide three different color responses independently to the screen lined with multi-colored phosphor. (C) 610.10-1994w

red head *See:* personal ground.

redirecting surfaces or media (illuminating engineering) Those which change the direction of the flux without scattering the redirected flux. (EEC/IE) [126]

redirection In the shell command language, a method of associating files with the input/output of commands. (C/PA) 9945-2-1993

redirection operator In the shell command language, a token that performs a redirection function; it is one of the following symbols:

< > >| << >> <& >& <<− <>

(C/PA) 9945-2-1993

redistribution (storage or camera tubes) The alteration of the charge pattern on an area of a storage surface by secondary electrons from any other part of the storage surface. *See also:* charge-storage tube. (ED) 158-1962w, 161-1971w

REDUCE A list processing language written in LISP, used primarily for performing symbolic operations and simplification of arrays and matrices. (C) 610.13-1993w

reduced full-wave test (power and distribution transformers) A wave similar in shape and duration to that involved in a "full-wave lightning impulse test," but reduced in magnitude. *Note:* The reduced full wave normally has a crest value between 50% and 70% of the full-wave value involved, and is used for comparison of oscillograms in failure detection. (PE/TR) C57.12.80-1978r

reduced generator efficiency (thermoelectric device) The ratio of a specified generator efficiency to the corresponding Carnot efficiency. *See also:* thermoelectric device. (ED) [46]

reduced instruction set computer (RISC) A computer characterized by a small instruction set and large collection of registers. *Note:* All or most instructions can be executed in a single clock cycle. *Synonym:* load-store computer. (C) 610.10-1994w

reduced kilovoltampere tap (power and distribution transformers) (in a transformer) A tap through which the transformer can deliver only an output less than rated kVA without exceeding the specified temperature rise. The current is usually that of the rated kVA tap. (PE/TR) C57.12.80-1978r

reduced-voltage starter A starter, the operation of which is based on the application of a reduced voltage to the motor. *See also:* starter. (IA/ICTL/IAC) [60], [84]

reducing joint A joint between two lengths of cable the conductors of which are not the same size. *See also:* branch joint; straight joint; cable joint. (T&D/PE) [10]

redundance The introduction of auxiliary elements and components into a circuit, module, or system unit to perform the same functions as similar elements in such units for the purpose of improving their overall reliability in performance and safety. Active redundance is that redundance wherein all redundant items are operating simultaneously, rather than being switched on when needed. Standby redundance is that redundance wherein the alternative means of performing the function is inoperative until needed and is switched in upon failure of the primary means of performing the function. (C) 610.10-1994w

redundancy (1) The provision of extra memory cells, usually rows or columns, that can be mapped into the memory array to replace defective cells. *Note:* In nonvolatile memory, the mapping may be controlled through EEPROM or other fuse techniques. (ED) 1005-1998

(2) The existence in a system of more than one means of accomplishing a given function. (VT/RT) 1475-1999, 1474.1-1999

redundancy, active *See:* active redundancy.

redundancy check *See:* redundant check.

redundancy factor The ratio of the total number of series thyristor-levels in the valve, Nt, to the same number minus the total number of redundant series thyristor-levels in the valve, Nr. The redundancy factor, f_r, is defined by:

$$fr = \frac{Nt}{Nt - Nr}$$

(SUB/PE) 857-1996

redundancy, standby *See:* standby redundancy.

redundant (1) Pertaining to characters that do not contribute to the information content. Redundant characters are often used for checking purposes or to improve reliability. *See also:* check digit; self-checking code; error-detecting code; parity. (C) 162-1963w

(2) (cable systems in power generating stations) Applied to two or more systems serving the same objective, where they are also either:

a) Systems where personnel or public safety is involved, such as fire pumps; or
b) Systems provided with redundancy because of the severity of economic consequences of equipment damage. (Tur-

bine-generator ac and dc bearing oil pumps are examples of redundant equipment under this definition.)

(PE/EDPG) 422-1977

(3) (electric pipe heating systems) The introduction of auxiliary elements and components to a system to perform the same function as other elements in the system for the purpose of improving reliability. Redundant electric pipe heating systems consist of two heaters and two controllers, each with its own sensor, supplied from two power systems, all independent of each other but all applied to the same mechanical piping, valves, tanks, etc. Redundant electric pipe heating systems are referred to as primary and backup in this recommended practice. *Synonym:* redundancy.

(PE/EDPG) 622-1979s

redundant arrays of inexpensive disks (RAID) *See:* RAID storage.

redundant check (data transmission) (checking code) A check that uses extra digits (check bits) short of complete duplication, to help detect the absence of error within the character or block. (PE) 599-1985w

redundant equipment A piece of equipment or a system that duplicates the essential function of another piece of equipment or system to the extent that either may perform the required function, regardless of the state of operation or failure of the other. *Notes:* 1. Duplication of essential functions can be accomplished by the use of identical equipment, equipment diversity, or functional diversity. 2. Redundancy can be accomplished by use of identical equipment, equipment diversity, or functional diversity. *Synonym:* redundant system.

(PE/NP) 603-1998, 308-1980s, 497-1981w, 384-1992r, 379-1994, 387-1995

redundant link (local area networks) A second link from an end node or from the cascade port of a repeater that provides an alternative path to maintain network connectivity in case of a repeater or link failure. (C) 8802-12-1998

redundant system *See:* redundant equipment.

redundant systems (cable systems) Two or more systems serving the same objective, where they are also either systems where personnel or public safety is involved, such as fire pumps, or systems provided with redundancy because of the severity of economic consequences of equipment damage. *Note:* Turbine-generator alternating-current and direct-current bearing oil pumps are examples of redundant equipment under this definition. (PE/EDPG) 422-1977

redundant thyristor-levels The maximum number of levels in the series string of thyristors in a valve that may be short circuited externally or internally during service without affecting the safe operation of the valve as demonstrated by type tests, and which, if and when exceeded, would require shut down of the valve to replace the failed thyristors or acceptance of increased risk of failure of the valve.

(SUB/PE) 857-1996

reed relay A relay using glass-enclosed, magnetically closed reeds as the contact members. Some forms are mercury wetted. (PE/EM) 43-1974s

reel A cylinder with flanges on which tape or film may be wound. *Contrast:* spool. *See also:* write ring; leader.

(C) 610.10-1994w

reel puller A device designed to pull a conductor during stringing operations. It is normally equipped with its own engine, which drives the supporting shaft for the reel mechanically, hydraulically, or through a combination of both. The shaft, in turn, drives the reel. The application of this unit is essentially the same as that for the drum puller. Some of these devices function as either a puller or tensioner. *See also:* drum puller.

(T&D/PE) 524-1992r

reel setup *See:* pull site; tension site.

reel stand A device designed to support one or more conductor or groundwire reels having the possibility of being skid, trailer, or truck mounted. These devices may accommodate rope or conductor reels of varying sizes and are usually equipped with reel brakes to prevent the reels from turning when pulling is stopped. They are used for either slack or tension stringing. The designation of reel trailer or reel truck implies that the trailer or truck has been equipped with a reel stand (jacks) and may serve as a reel transport or *payout* unit, or both, for stringing operations. Depending upon the sizes of the reels to be carried, the transporting vehicles may range from single-axle trailers to semitrucks with trailers having multiple axles. *Synonyms:* reel truck; reel transporter; reel trailer. (T&D/PE) 524a-1993r, 524-1992r

reel tensioner (conductor stringing equipment) A device designed to generate tension against a pulling line or conductor during the stringing phase. Some are equipped with their own engines, which retard the supporting shaft for the reel mechanically, hydraulically, or through a combination of both. The shaft, in turn, retards the reel. Some of these devices function as either a puller or tensioner. Other tensioners are equipped only with friction type retardation. *Synonyms:* tensioner; retarder. (T&D/PE) 524a-1993r, 524-1980s

reel trailer *See:* reel stand.

reel transporter *See:* reel stand.

reel truck *See:* reel stand.

reel winder A device designed to serve as a recovery unit for a pulling line. It is normally equipped with its own engine, which drives a supporting shaft for a reel mechanically, hydraulically, or through a combination of both. The shaft, in turn, drives the reel. It is normally used to rewind a pulling line as it leaves the bullwheel puller during stringing operations. This unit is not intended to serve as a puller, but sometimes serves this function where only low tensions are involved. *Synonym:* takeup reel. (T&D/PE) 524-1992r

re-encoded checkback message Message from the initiating end that is re-encoded by the receiving end. A new message is sent to the initiating end to verify error-free receipt and proper interpretation of the message. In typical applications the initiating end is the master station and the receiving end is the RTU. Preferred usage is re-encoded, which allows the master station to verify not only that the communication was error free, but also that the RTU's I/O hardware and software acted correctly in interpreting the selection.

(SUB/PE) C37.1-1994

re-engineering (1) The process of examining and altering an existing system to reconstitute it in a new form. May include reverse engineering (analyzing a system and producing a representation at a higher level of abstraction, such as design from code), restructuring (transforming a system from one representation to another at the same level of abstraction), redocumentation (analyzing a system and producing user or maintenance documentation), forward engineering (using software products derived from an existing system, together with new requirements, to produce a new system), retargeting (transforming a system to install it on a different target system), and translation (transforming source code from one language to another or from one version of a language to another). (C/SE) J-STD-016-1995

(2) The process of improving a system after production through modification to correct a design deficiency or to make an incremental improvement. (C/SE) 1220-1998

reenterable *See:* reentrant.

reentrant Pertaining to a software module that can be entered as part of one process while also in execution as part of another process and still achieve the desired results. *Synonym:* reenterable. (C) 610.12-1990

reentrant-beam crossed-field amplifier (amplitron) (microwave tubes) A crossed-field amplifier in which the beam is reentrant and interacts with either a forward or a backward wave. (ED) [45]

reentrant beam (microwave tubes) An undeterminated recirculating electron beam. (ED) [45]

reentrant circuit (microwave tubes) A slow-wave structure that closes upon itself. (ED) [45]

reentrant function A function whose effect, when called by two or more threads, is guaranteed to be as if the threads each executed the function one after another in an undefined order, even if the actual execution is interleaved. (C/PA) 9945-1-1996

reentrant switching network (telephone switching systems) A switching network in which outlets (usually last choice) from a given connecting stage are connected to inlets of the same or previous stage. (COM) 312-1977w

reentry communication (communication satellite) Communication during re-entry of a space vehicle into the atmosphere. Usually the ionization requires a special system of modulation to overcome the communication blackout. (COM) [19]

reentry point The place in a software module at which the module is reentered following a call to another module. (C) 610.12-1990

referee test (metering) A test made by or in the presence of one or more representatives of a regulatory body or other impartial agency. (ELM) C12.1-1982s

reference *See:* linearity.

reference accuracy (automatic null-balancing electric instrument) A number or quantity that defines the limit of error under reference operating conditions. *Notes:* 1. It is usually expressed as a percent of the span. It is preferred that a + sign or − sign or both precede the number of quantity. The absence of a sign infers a ± sign. 2. Reference accuracy does not include accuracy of sensing elements or intermediate means external to the instrument. *See also:* error and correction; accuracy rating. (EEC/EMI) [112]

reference address *See:* base address.

reference air line A uniform section of air-dielectric transmission line of accurately calculable characteristic impedance used as a standard immittance. *See also:* transmission line. (IM/HFIM) [40]

reference atmosphere for refraction *See:* standard atmosphere for refraction.

reference audio noise power output (mobile communications receivers) The average audio noise power present at the output of an unsquelched receiver having no radio-frequency signal input in which the audio gain has been adjusted for the reference audio power output. (VT) 184-1969w

reference audio power output (mobile communications receivers) The manufacturer's rated audio-frequency power available at the output of a properly terminated receiver, when responding to a standard test modulated radio-frequency input signal at a −80 dBW level. (VT) 184-1969w

reference ballast (illuminating engineering) A ballast which is specially constructed, having certain prescribed characteristics and which is used for testing electric-discharge lamps and other ballasts. (EEC/IE) [126]

reference ballasts Specially constructed series ballasts having certain prescribed characteristics. *Note:* They serve as comparison standards for use in testing ballasts or lamps and are used also in selecting the reference lamps that are necessary for the testing of ballasts. Reference ballasts are characterized by a constant impedance over a wide range of operating current. They also have constant characteristics that are relatively uninfluenced by time and temperature. *See also:* primary standard; fixed impedance-type ballast. (EEC/IE) [126]

reference black level (television) The picture-signal level corresponding to a specified maximum limit for black peaks. (BT/AV) [34]

reference block (numerically controlled machines) A block within the program identified by an *o* (letter o) in place of the word address *n* and containing sufficient data to enable resumption of the program following an interruption. This block should be located at a convenient point in the program that enables the operator to reset and resume operation. (IA) [61]

reference boresight A direction established as a reference for the alignment of an antenna. *Note:* The direction can be established by optical, electrical or mechanical means. *See also:* electrical boresight. (AP/ANT) 145-1993

reference clock A clock of very high stability and accuracy that may be completely autonomous and whose frequency serves as a basis of comparison for the frequency of other clocks. (COM/TA) 1007-1991r

reference clock node *See:* master clock node.

reference codec (1) A codec that approaches the performance of an ideal codec and has superior, well-defined characteristics used for testing digital telephone sets. (COM/TA) 269-1992

(2) A well-defined analog-to-digital and digital-to-analog converter for testing digital telephones using analog test equipment. (COM/TA) 1329-1999

reference conditions The values assigned for the different influence quantities at which or within which the instrument complies with the requirements concerning errors in indication. *See also:* accuracy rating. (EEC/AII) [102]

reference current (Iref) (1) (fluorescent lamps) The value of current specified in a specific lamp standard. *Note:* It is normally the same as the value of current for which the corresponding lamp is rated. Since the reference ballast is a standard that is representative of the impedance of lamp power sources installed, it is not necessary to change this current value unless major changes in lamp standards require modification of the ballast impedance. For this reason, reference ballast characteristics are specified in terms of, and with reference to, reference current. (EEC/LB) [96]

(2) The peak value of the resistive component of a power-frequency current high enough to make the effects of stray capacitance of the arrester negligible. This current level shall be specified by the manufacturer. *Note:* Depending on the arrester design, the Iref will typically be in the range of 0.05–1.0 mA per sq cm of disk area. (SPD/PE) C62.11-1999

reference deflection (volume measurements of electrical speech and program waves) The deflection to the meter-scale point marked 0 vu, 100, or both. *Note:* This is the deflection at which the meter should be used. *See also:* vu. (BT/AV) 152-1953s

reference designation (1) (abbreviation) (symbols) Numbers, or letters and numbers, used to identify and locate units, portions thereof, and basic parts of a specific set. Compare with: functional designation and symbol for a quantity. *See also:* abbreviation. (GSD) 267-1966

(2) (electric and electronics parts and equipment) Letters or numbers, or both, used to identify and locate discrete units, portions thereof, and basic parts of a specific set. *Note:* A reference designation is not a letter symbol, abbreviation, or functional designation for an item. (GSD) 200-1975w

reference direction (1) (navigation aid terms) A direction from which other directions are reckoned; for example, true north, grid north, and so on. (AES/GCS) 172-1983w

(2) (specified circuit) With reference to the boundary of a delimited region, the arbitrarily selected direction in which electric energy is assumed to be transmitted past the boundary, into or out of the region. *Notes:* 1. When the actual direction of energy flow is the same as the reference direction, the sign is negative. 2. Unless specifically stated to the contrary, it shall be assumed that the reference direction for all power, energy, and quadergy quantities associated with the circuit is the same as the reference direction of the energy flow. 3. In these definitions it will be assumed that the reference direction of the current in each conductor of the circuit is the same as the reference direction of energy flow. (Std100/EDPG) 270-1966w

reference directivity *See:* standard directivity.

reference distance (sound measurement) A standard 1 m distance from the major machine surfaces at which mean sound level data shall be reported. (PE/EM) 85-1973w

reference document A standard that shall be on hand and available to the user in order to help in the implementation of another standard. (ATLAS) 1226-1993s

referenced shared memory object (1) A shared memory object that is open or has one or more mappings defined on it. (C/PA) 9945-1-1996

(2) A shared memory object that is open or has one or more mappings defined on it. (C) 1003.5-1999

reference edge *See:* document reference edge.

reference excursion (analog computer) The range from zero voltage to nominal full-scale operating voltage. *See also:* electronic analog computer. (C) 165-1977w, 610.10-1994w

reference expression An expression that uniquely identifies a box, a node or function, a diagram, or a model page within an IDEF0 model. (C/SE) 1320.1-1998

reference frequency The frequency upon which a phasor or amplitude-or-phase representation of signals is based. (IT) [123]

reference frequency, upper and lower *See:* bandwidth.

reference grounding point (health care facilities) A terminal bus which is the equipment grounding bus or an extension of the equipment grounding bus and is a convenient collection point for grounding of electrical appliances and equipment, and, when necessary and appropriate, exposed conductive surfaces in a patient vicinity. (NESC/EMB) [47], [86]

reference-input elements (automatic control) The portion of the controlling system that changes the reference input signal in response to the command. *See also:* feedback control system. (IA/IAC) [60]

reference input signal (1) The command expressed in a form directly usable by the system. The reference input signal is in the terms appropriate to the form in which the signal is used, that is, voltage, current, ampere-turns, etc. *See also:* feedback control system. (IA/IAC) [60]

(2) (control system feedback) A signal external to a control loop that serves as the standard of comparison for the directly controlled variable. See the figure attached to the definition of **signal, feedback.** *See also:* feedback control system. (PE/EDPG) 421-1972s

reference laboratory A laboratory responsible for the national testing program for a sector of the radioassay community. A reference laboratory is authorized to prepare testing media by adding known amounts of radioactive material for distribution to service laboratories. The reference laboratory is responsible for evaluating the performance of the service laboratories in terms of accuracy and precision. (NI) N42.23-1995

reference lamp (1) (mercury) A seasoned lamp that under stable burning conditions, in the specified operating position (usually vertically, base up), and in conjunction with the reference ballast rated input voltage, operates at values of lamp volts, watts, and amperes, each within ± 2% of the nominal values. (EEC/LB) [98], [97]

(2) (fluorescent) Seasoned lamps that under stable burning conditions, in conjunction with the reference ballast specified for the lamp size and rating, and at the rated reference ballast supply voltage, operate at values of lamp volts, watts, and amperes each within ± 2 1/2% of the values, and under conditions established by present standards. *See also:* reference ballasts. (EEC/LB) [94]

reference line (1) (navigation aid terms) A line from which angular or linear measurements are reckoned. (AES/GCS) 172-1983w

(2) (illuminating engineering) Either of two radial lines where the surface of the cone of maximum candlepower is intersected by a vertical plane parallel to the curb line and passing through the light-center of the luminaire. (EEC/IE) [126]

reference lines and points (pulse terminology) Constructs which are (either actually or figuratively) superimposed on waveforms for descriptive or analytical purposes. Unless otherwise specified, all defined lines and points lie within a waveform epoch. *See also:* knot; magnitude origin line; cubic natural spline; time origin line; magnitude-referenced point; time referenced point; time reference line; magnitude reference line. (IM/WM&A) 194-1977w

reference material (standard) A material or substance of one or more properties that are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (NI) N42.23-1995, N42.22-1995

reference model A structured collection of concepts and their relationships that scope a subject and enable the partitioning of the relationships into topics relevant to the overall subject and that can be expressed by a common means of description. (C/PA) 14252-1996

reference modulation (navigation aids) (very high-frequency omnidirectional range) That modulation of the ground-station radiation which produces a signal in the air-borne receiver whose phase is independent of the bearing of the receiver; the reference signal derived from this modulation is used for comparison with the variable signal. (AES/GCS) 172-1983w

reference noise (data transmission) The magnitude of circuit noise that will produce a circuit-noise-meter reading equal to that produced by 10^{-12} watt of electric power at 1000 Hz (hertz). (PE) 599-1985w

reference operating conditions (automatic null-balancing electric instrument) The conditions under which reference performance is stated and the base from which the values of operating influences are determined. *See also:* measurement system. (EEC/EMI) [112]

reference orientation (radioactivity monitoring instrumentation) The orientation in which the instrument is normally intended to be operated as stated by the manufacturer. (NI) N42.17B-1989r

reference performance (1) (watthour meter) Performance at specified reference conditions for each test, used as a basis for comparison with performance under other conditions of the test. (ELM) C12.1-1982s

(2) (automatic null-balancing electric instrument) The limits of the values of certain operating characteristics of the instrument that will not be exceeded under any combination of reference operating conditions. *See also:* test; electricity meter. (EEC/EMI) [112]

reference plane (1) A plane perpendicular to the direction of propagation in a waveguide or transmission line, to which measurement or immittance, electric length, reflection coefficients, scattering coefficients, and other parameters may be referred. *See also:* waveguide. (IM/HFIM) [40]

(2) A theoretical plane, having neither thickness nor tolerance, used to separate space. (C/BA/MM) 1301.2-1993, 1301.1-1991, 1301.3-1992r

(3) A theoretical plane having neither thickness nor tolerance. (C/BA) 1301.4-1996

reference phantom A 30 cm × 30 cm × 15 cm block of polymethyl methacrylate (PMMA). This phantom follows the recommendations of ICRU and ISO for a simplified practical phantom for the calibration of dosimeters. *Note:* The conversion factors for the same sized phantom constructed of ICRU tissue should be used for evaluating the dose equivalent. (NI) N42.20-1995

reference plane, electrical *See:* electrical reference plane.

reference plane, mechanical *See:* mechanical reference plane.

reference point of an instrument A physical mark, or marks, on the outside of an instrument used to position it at a point where the conventionally true value of a quantity to be measured is known. (NI) N42.20-1995

reference power supply A regulated, electronic power supply furnishing the reference voltage. *See also:* electronic analog computer. (C) 165-1977w

reference quality voltage DC source that is capable of sourcing and sinking current over a defined range without appreciable change of voltage and whose stability over a given time interval is guaranteed. (C/TT) 1149.4-1999

reference radius (sound measurement) The sum of the reference distance and one half the maximum linear dimension as defined for small-, medium-, or large machines. *See also:* machine. (PE/EM) 85-1973w

reference sensitivity (mobile communications receivers) The level of a radio-frequency signal with standard test modulation which provides a 12-decibel sinad with at least 50% reference audio power output. (VT) 184-1969w

reference standards (nuclear power generating station) Standards (that is, primary, secondary and working standards, where appropriate) used in a calibration program. These standards establish the basic accuracy limits for that program. (PE/NP) 498-1985s

reference standard watthour meter A meter used to maintain the unit of electric energy. It is usually designed and operated to obtain the highest accuracy and stability in a controlled laboratory environment. (ELM) C12.1-1982s

reference surface (fiber optics) That surface of an optical fiber which is used to contact the transverse-alignment elements of a component such as a connector. For various fiber types, the reference might be the fiber core, cladding, or buffer layer surface. *Note:* In certain cases the reference surface may not be an integral part of the fiber. *See also:* ferrule; optical waveguide connector. (Std100) 812-1984w

reference system (loudness ratings of telephone connections) A system that provides 0 dB acoustic gain between a mouth reference point at 25 mm in front of a talker's lips and an ear reference point at the entrance to the ear canal of a listener, when the listener is using an earphone. This system is assigned a loudness rating of 0 dB. The frequency characteristic of the system must be flat over the range 300-3300 Hz and show infinite attenuation outside of this range. *Note:* If an actual reference system is constructed for subjective comparison purposes, the system response at 300 and 3300 Hz shall be down 3 ± 1 dB relative to the midband response. The gain of the system shall be adjusted to compensate for the finite slope of the filter skirts and deviation from flatness of the pass band. The amount of this adjustment can be determined by first calculating the objective loudness rating (OLR) over a frequency range that includes at least the 50 dB down points of the real response, and next calculating the OLR of the ideal response, over the same frequency range. The difference between the OLRs is the required gain adjustment. (COM/TA) 661-1979r

reference test field (direction-finder testing) (navigation aid terms) That field strength, in microvolts per meter, numerically equal to the DF (direction finder) sensitivity. (AES/GCS) 172-1983w

reference threshold squelch adjustment (mobile communications receivers) The minimum adjustment position of the squelch control required to reduce the reference audio noise power output by at least 40 dB. (VT) 184-1969w

reference time (magnetic storage) An instant near the beginning of switching chosen as an origin for time measurements. It is variously taken as the first instant at which the instantaneous value of the drive pulse, the voltage response of the magnetic cell, or the integrated voltage response reaches a specified fraction of its peak pulse amplitude. (C) [20]

reference voltage (1) (analog computer) In an analog computer, a voltage used as a standard of reference, usually the nominal full scale of the computer. (C) 165-1977w

(2) The lowest peak value independent of polarity of power-frequency voltage, divided by the square root of 2, required to produce a resistive component of current equal to the reference current of the arrester or arrester element. The reference voltage of a multiunit arrester is the sum of the reference voltages of the series units. The voltage level shall be specified by the manufacturer. (SPD/PE) C62.11-1999

(3) The point on the voltage/current (V/I) characteristic where the static var compensator (SVC) is at zero output (i.e., where no vars are absorbed from, or supplied to, the transmission system at the point of connection). (PE/SUB) 1031-2000

reference volume (volume measurements of electrical speech and program waves) The level which gives a reading of 0 vu on a standard volume indicator. *Notes:* 1. The methods of reading and calibration are described in Section 3 of IEEE Std 152-1953w. 2. The "reading of 0 vu" is the algebraic sum of the meter and attenuator readings on the standard volume indicator. *See also:* standard volume indicator; vu. (BT/AV) 152-1953s

reference volume control setting The volume control position resulting in a specified nominal receive loudness rating. (COM/TA) 1329-1999

reference waveguide A uniform section of waveguide with accurately fabricated internal cross-sectional dimensions used as a standard of immittance. *See also:* waveguide. (IM/HFIM) [40]

reference white (A) (television) (original scene) The light from a nonselective diffuse reflector that is lighted by the normal illumination of the scene. *Notes:* 1. Normal illumination is not intended to include lighting for special effects. 2. In the reproduction of recorded material, the word scene refers to the original scene. **(B) (television)** (color television display) That white with which the display device simulates reference white of the original scene. *Note:* In general, the reference whites of the original scene and of the display device are not colorimetrically identical. (BT/AV) 201-1979

reference white level (television) The picture-signal level corresponding to a specified maximum limit for white peaks. *See also:* television. (BT/AV) [34]

referential integrity (A) A guarantee that a reference refers to an object that exists. **(B)** A guarantee that all specified conditions for a relationship hold true. For example, if a class is declared to require at least one instance of a related state class, it would be invalid to allow an instance that does not have such a relationship. (C/SE) 1320.2-1998

referral An outcome that can be returned by a DSA that cannot perform a directory operation itself, and that identifies one or more other DSAs more able to perform the directory operation. (C/PA) 1328.2-1993w, 1224.2-1993w, 1327.2-1993w, 1326.2-1993w

refill unit (of a high-voltage fuse unit) An assembly comprised of a conducting element, the complete arc-extinguishing medium, and parts normally required to be replaced after each circuit interruption to restore the fuse unit to its original operating condition. (SWG/PE) C37.100-1992, C37.40-1993

reflectance (1) (A) (electrical power systems in commercial buildings) The ratio of the light reflected by a surface to the light incident. **(B) (fiber optics)** The ratio of reflected power to incident power. *Note:* In optics, frequently expressed as optical density or as a percent; in communication applications, generally expressed in decibels (dB). Reflectance may be defined as specular or diffuse, depending on the nature of the reflecting surface. Formerly: "reflection." *See also:* reflection. **(C) (illuminating engineering)** ($\rho = \Phi_r/\Phi_i$) (of a surface or medium) The ratio of the reflected flux to the incident flux. Reflectance is a function of:

a) Geometry (i) of the incident flux (ii) of collection for the reflected flux;
b) spectral distribution (i) characteristic of the incident flux (ii) weighting function for the collected flux; and
c) polarization (i) of the incident flux (ii) component defined for the collected flux.

Notes: 1. Unless the state of polarization for the incident flux and the polarized component of the reflected flux are stated, it shall be considered that the incident flux is unpolarized and that the total reflected flux (including all polarizations) is evaluated. 2. Unless qualified by the term "spectral" (see spectral reflectance) or other modifying adjectives, luminous reflectance (see luminous reflectance) is meant. 3. If no qualifying geometric adjective is used, reflectance for hemispherical collection is meant. 4. Certain of the reflectance terms are theo-

retically imperfect and are recognized only as practical concepts to be used when applicable. Physical measurements of the incident and reflected flux are always biconical in nature. Directional reflectances (see above) cannot exist since one component is finite while the other is infinitesimal; here the reflectance-distribution function is required. However, the concepts of directional and hemispherical reflectances have practical application in instrumentation, measurements, and calculations when including the aspect of the nearly zero or nearly 2π conical angle would increase complexity without appreciably affecting the immediate results. 5. In each case of conical incidence or collection, the solid angle is not restricted to a right circular cone, but may be of any cross section including rectangular, a ring, or a combination of two or more solid angles. *See also:* hemispherical-directional reflectance; conical-hemispherical reflectance, $\rho(\omega_i; 2\pi)$; bidirectional reflectance; biconical reflectance; bihemispherical reflectance; hemispherical-conical reflectance; bidirectional reflectance–distribution function.

(Std100/IA/EEC/IE/PSE) 241-1990, 812-1984, [126]

(2) *See also:* power reflection coefficient.

(AP/PROP) 211-1997

(3) (laser maser) (reflectivity, ρ) The ratio of total reflected radiant power to total incident power. (LEO) 586-1980w

(4) (computer graphics) The amount of light reflected from the surface of a three-dimensional object. This quality is used in rendering three-dimensional objects in computer graphics. (C) 610.6-1991w

reflectance factor (illuminating engineering) The ratio of the flux actually reflected by a sample surface to that which would be reflected into the same reflected-beam geometry by an ideal (lossless), perfectly diffuse (lambertian) standard surface irradiated in exactly the same way as the sample. Note the analogies to reflectance in the fact that nine canonical forms are possible paralleling bihemispherical reflectance, hemispherical-conical reflectance, hemispherical-directional reflectance, conical-hemispherical reflectance, biconical reflectance, conical-directional reflectance, directional-hemispherical reflectance, directional-conical reflectance, and bidirectional reflectance, that spectral may be applied as a modifier, that it may be luminous or radiant reflectance factor, etc. (EEC/IE) [126]

reflected binary code *See:* Gray code.

reflected binary unit-distance code *See:* Gray code.

reflected code *See:* Gray code.

reflected glare (illuminating engineering) Glare resulting from reflections of high luminance in polished or glossy surfaces in the field of view. It usually is associated with reflections from within a visual task or areas in close proximity to the region being viewed. *See also:* veiling reflections.

(EEC/IE) [126]

reflected harmonics (electric conversion) Harmonics produced in the prime source by operation of the conversion equipment. These harmonics are produced by current-impedance (IZ) drop due to nonsinusoidal load currents, and by switching or commutating voltages produced in the conversion equipment. (AES) [41]

reflected-light scanning The scanning of changes in the magnitude of reflected light from the surface of an illuminated web. (IA/ICTL/IAC) [60]

reflected wave (1) (data transmission) When a wave in one medium is incident upon a discontinuity or a different medium, the reflected wave is the wave component that results in the first medium in addition to the incident wave. *Note:* The reflected wave includes both the reflected rays of geometrical optics and the diffracted wave. (PE) 599-1985w

(2) (waveguide) At a transverse plane in a transmission line or waveguide, a wave returned from a reflecting discontinuity in a direction opposite to the incident wave. *See also:* incident wave. (MTT) 146-1980w

(3) (surge arresters) A wave, produced by an incident wave, that returns in the opposite direction to the incident wave after reflection at the point of transition. (PE) [9], [84]

(4) (overhead power lines) When a wave in one medium is incident upon a discontinuity or a different medium, the reflected wave includes the wave component traveling in a different direction to the incident wave in the first medium, as well as the incident wave. If the wave is in a unidimensional medium, i.e., a transmission line, then the reflected wave travels in the opposite direction to the incident wave.

(T&D/PE) 539-1990

(5) For two media, separated by a planar interface, that part of the incident wave that is returned to the first medium. The direction of propagation of the reflected wave is given by Snell's law of reflection. (AP/PROP) 211-1997

reflecting slave An unselected slave that forces the selected slave into a write-only mode. In read transfers the reflecting slave substitutes itself for the selected slave in providing data while causing the selected slave to store the data that appears on the bus. In write transfers the reflecting slave copies the data into itself as well as the selected slave. Reflecting slaves can operate only during single-slave mode transactions.

(C/MM) 896.1-1987s

reflection (1) (fiber optics) The abrupt change in direction of a light beam at an interface between two dissimilar media so that the light beam returns into the medium from which it originated. Reflection from a smooth surface is termed specular, whereas reflection from a rough surface is termed diffuse. *See also:* total internal reflection; critical angle; reflectivity; reflectance. (Std100) 812-1984w

(2) (illuminating engineering) A general term for the process by which the incident flux leaves a (stationary) surface or medium from the incident side, without change in frequency. *Note:* Reflection is usually a combination or regular and diffuse reflection. *See also:* regular reflection; diffuse reflection.

(EEC/IE) [126]

(3) (laser maser) Deviation of radiation following incidence on a surface. (LEO) 586-1980w

(4) A form of data modification in which PDUs sent by an entity are returned in an unauthorized manner. This can be attempted by a combination of techniques involving deleting, delaying, and reinserting data; and/or modifying address or sequence control information. (C/LM) 802.10-1998

reflection coefficient (1) (waveguide) At a given frequency, at a given point, and for a given mode of propagation, the ratio of some quantity associated with the reflected wave to the corresponding quantity in the incident wave. *Note:* The reflection coefficient may be different for different associated quantities, and the chosen quantity must be specified. The voltage reflection coefficient is most commonly used and is defined as the ratio of the complex electrical field strength (or voltage) of the reflected wave to that of the incident wave. Examples of other quantities are power or current.

(MTT) 146-1980w

(2) (overhead power lines) At a given frequency, at a given point, and for a given mode of propagation, the ratio of some quantity associated with the reflected wave to the corresponding quantity in the incident wave. (T&D/PE) 539-1990

(3) *See also:* Fresnel coefficients. (AP/PROP) 211-1997

reflection color tube A color-picture tube that produces an image by means of electron reflection techniques in the screen region. *See also:* television. (ED) 161-1971w, [45]

reflection error (navigation aids) The error due to the fact that some of the total received signal arrives from a reflection rather than all by way of the direct path.

(AES/GCS) 172-1983w

reflection factor (1) (data transmission) The reflection factor between two impedances Z_1 and Z_2 is:

$$\frac{(4Z_1Z_2)^{1/2}}{Z_1 + Z_2}$$

Physically, the reflection factor is the ratio of the current delivered to a load, whose impedance is not matched to the source, to the current that would be delivered to a load of matched impedance. (PE) 599-1985w

(2) (reflex klystrons) The ratio of the number of electrons of the reflected beam to the total number of electrons that enter the reflector space in a given time. *See also:* velocity-modulated tube. (ED) [45], [84]

(3) (electrothermic power meters) The ratio of the power absorbed in, to the power incident upon, a load; mathematically, $1 - |\Gamma_t|^2$, where $|\Gamma_t|$ is the magnitude of the reflection coefficient of the load. (IM) 544-1975w

(4) (electrothermic power meters) *See also:* reflection coefficient.

(5) *See also:* Fresnel coefficients. (AP/PROP) 211-1997

reflection loss (1) (data transmission) The reflection loss for a given frequency at the junction of a source of power and a load is given by the formula

$$20\log_{10}\frac{Z_1 + Z_2}{(4Z_1Z_2)^{1/2}}\ \text{dB}$$

where Z_1 is the impedance of the source of power and Z_2 is the impedance of the load. Physically, the reflection loss is the ratio, expressed in decibels (dB), of the scalar values of the volt-amperes delivered to a load of the same impedance as the source. The reflection loss is equal to the number of decibels which corresponds to the scalar value of the reciprocal of the reflection factor. *Note:* When the two impedances have opposite phases and appropriate magnitudes, a reflection gain may be obtained. (PE) 599-1985w

(2) (waveguide) (or gain) The ratio of incident to transmitted power at a reference plane of a network. (MTT) 146-1980w

reflectionless termination A termination that terminates a waveguide or transmission line without causing a reflected wave at any transverse section. *See also:* waveguide; transmission line. (MTT) 146-1980w

reflectionless transmission line A transmission line having no reflected wave at any transverse section. *See also:* transmission line. (IM/HFIM) [40]

reflectionless waveguide A waveguide having no reflected wave at any transverse section. *See also:* waveguide. (IM/HFIM) [40]

reflection mode photocathode (photomultipliers for scintillation counting) A photocathode wherein photoelectrons are emitted from the same surface as that on which the photons are incident. (NPS) 398-1972r

reflection modulation (storage tubes) A change in character of the reflected reading beam as a result of the electrostatic fields associated with the stored signal. A suitable system for collecting electrons is used to extract the information from the reflected beam. *Note:* Typically the beam approaches the target closely at low velocity and is then selectively reflected toward the collection system. *See also:* charge-storage tube. (ED) 158-1962w

reflections (broadband local area networks) Echoes created in a cable system by impedance mismatches and cable discontinuities or irregularities. *See also:* echo. (LM/C) 802.7-1989r

reflection, specular *See:* specular reflection.

reflective array antenna An antenna consisting of a feed and an array of reflecting elements arranged on a surface and adjusted so that the reflected waves from the individual elements combine to produce a prescribed secondary pattern. *Note:* The reflecting elements are usually waveguides containing electrical phase shifters and are terminated by short circuits. *Synonym:* reactive reflector antenna. (AP/ANT) 145-1993

reflective array compressor (RAC) A device that uses reflections of the surface acoustic wave from an array of oblique grooves, metal stripes, or dots to achieve the desired dispersive delay function that provides energy-spreading or compression. (UFFC) 1037-1992w

reflective dot array (RDA) A type of device that uses reflections of the surface acoustic wave from oblique rows of metallic dots to achieve desired filter function. (UFFC) 1037-1992w

reflective memory Memory that may physically reside in more than one location (on multiple modules) but that contains the identical information within that memory at all the physical locations. (C/BA) 1014.1-1994w

reflectivity (1) (fiber optics) The reflectance of the surface of a material so thick that the reflectance does not change with increasing thickness; the intrinsic reflectance of the surface, irrespective of other parameters such as the reflectance of the rear surface. No longer in common usage. (Std100) 812-1984w

(2) (photovoltaic power system) The reflectance of an opaque, optically smooth, clean portion of material. (AES) [41]

(3) For a radio-frequency (RF) absorber, the ratio of the plane wave reflected power density (P_r) to the plane wave incident power density (P_i) at a reference point in space. It is expressed in dB as $R = 10\log_{10}(P_r/P_i)$. (EMC) 1128-1998

(4) The ratio of reflected to incident power densities of a plane wave incident on a surface and equal to the square of the magnitude of the reflection coefficient. (AP/PROP) 211-1997

reflectometer (1) (illuminating engineering) A photometer for measuring reflectance. *Note:* Reflectometers may be visual or physical instruments. (EEC/IE) [126]

(2) (illuminating engineering) An instrument for the measurement of the ratio of reflected-wave to incident-wave amplitudes in a transmission system. *Note:* Many instruments yield only the magnitude of this ratio. *See also:* instrument. (IM/HFIM) [40]

reflector (1) (data transmission) One or more conductors or conducting surfaces for reflecting radiant energy. (PE) 599-1985w

(2) (illuminating engineering) A device used to redirect the flux from a source by the process of reflection. (EEC/IE) [126]

(3) (wave propagation) A reflector comprises one or more conductors or conducting surfaces for reflecting radiant energy. *See also:* reflector element; antenna. (PE/PSIM) 81-1983

(4) A surface acoustic wave reflecting component that normally makes use of the periodic discontinuity provided by an array of metal strips, dots, or grooves. (UFFC) 1037-1992w

(5) *See also:* subreflector; horn reflector antenna; Gregorian reflector antenna; corner reflector; Cassegrain reflector antenna; offset paraboloidal reflector; paraboloidal reflector; main reflector; reflector element; spherical reflector; cylindrical reflector; reflector antenna; umbrella reflector antenna; toroidal reflector. (AP/ANT) 145-1993

reflector antenna An antenna consisting of one or more reflecting surfaces and a radiating [receiving] feed system. *Note:* Specific reflector antennas often carry the name of the reflector used as part of the term used to specify it; for example, paraboloidal reflector antenna. (AP/ANT) 145-1993

reflector element A parasitic element located in a direction other than forward of the driven element of an antenna intended to increase the directivity of the antenna in the forward direction. (AP/ANT) 145-1993

reflector space (reflex klystrons) The part of the tube following the buncher space, and terminated by the reflector. *See also:* velocity-modulated tube. (ED) [45], [84]

reflex baffle (audio and electroacoustics) A loudspeaker enclosure in which a portion of the radiation from the rear of the diaphragm is propaged outward after controlled shift of phase or other modification, the purpose being to increase the useful radiation in some portion of the frequency spectrum. (SP) [32]

reflex bunching The bunching that occurs in an electron stream that has been made to reverse its direction in the drift space. (ED) 161-1971w

reflex circuit A circuit through which the signal passes for amplification both before and after a change in its frequency. (EEC/PE) [119]

reflexive ancestor (of a class) The class itself or any of its generic ancestors. *Contrast:* ancestor. *See also:* generic ancestor. (C/SE) 1320.2-1998

reflex klystron (microwave tubes) A single-resonator oscillator klystron in which the electron beam is reversed by a negative electrode so that it passes twice through the resonator, thus providing feedback. (ED) [45]

reformatting *See:* reorganization.

reforming (semiconductor rectifiers) The operation of restoring by an electric or thermal treatment, or both, the effectiveness of the rectifier junction after loss of forming. *See also:* rectification. (IA) 59-1962w, [12]

refractance The amount that light rays are bent upon intersecting the surface of a three-dimensional object. This property is used in rendering three-dimensional objects in computer graphics. (C) 610.6-1991w

refracted near-field scanning method *See:* refracted ray method.

refracted ray (fiber optics) In an optical waveguide, a ray that is refracted from the core into the cladding. Specifically, a ray at radial position r having direction such that

$$\frac{n^2(r) - n^2(a)}{1 - (r/a)^2\cos^2\phi(r)} \leq \sin^2\theta(r)$$

where $\phi(r)$ is the azimuthal angle of projection of the ray on the transverse plane, $\theta(r)$ is the angle the ray makes with the waveguide axis, $n(r)$ is the refractive index at the core radius, and a is the core radius. Refracted rays correspond to radiation modes in the terminology of mode descriptors. *See also:* radiation mode; cladding ray; leaky ray; guided ray. (Std100) 812-1984w

refracted ray method (fiber optics) The technique for measuring the index profile of an optical fiber by scanning the entrance face with the vertex of a high numerical aperture cone and measuring the change in power of refracted (unguided) rays. *Synonym:* refracted near-field scanning method. *See also:* refracted ray; refraction. (Std100) 812-1984w

refracted wave (1) (data transmission) That part of an incident wave that travels from one medium into a second medium. *Synonym:* transmitted wave. (PE) 599-1985w

(2) For two media, that part of the incident wave that travels from the first medium into the second medium. *Note:* For planar interfaces, the direction of propagation of the refracted wave is given by Snell's law. *Synonym:* transmitted wave. (AP/PROP) 211-1997

refraction (1) (fiber optics) The bending of a beam of light in transmission through an interface between two dissimilar media or in a medium whose refractive index is a continuous function of position (graded index medium). *See also:* angle of deviation; refractive index. (Std100) 812-1984w

(2) (radio-wave propagation) Of a traveling wave, the change in direction of propagation resulting from the spatial variation of refractive index of the medium. (AP) 211-1977s

refraction error (1) (navigation aids) Error due to the bending of one or more wave paths by the propagation medium. (AES/GCS) 172-1983w

(2) Error in angle and/or range due to the bending of one or more wave paths by changes in the refractive index of the propagation medium. (AES) 686-1997

refraction loss That part of the transmission loss due to refraction resulting from nonuniformity of the medium. (SP) [32]

refractive index (1) (A) (data transmission) (wave transmission medium). The ratio of the phase velocity in free space to that in the medium. **(B) (data transmission)** (dielectric for electromagnetic wave). The ratio of the sine of the angle of incidence to the sine of the angle of refraction as the wave passes from a vacuum into the dielectric. The angle of incidence θ_i is the angle between the direction of travel of the wave in vacuum and the normal to the surface of the dielectric. The angle of refraction θ_r is the angle between the direction of travel of the wave after it has entered the dielectric and the normal to the surface. Refractive index is related to the dielectric constant through the following relation:

$$n = \frac{\sin\theta_i}{\sin\theta_r} = (\varepsilon')^{1/2}$$

where ε' is the real dielectric constant. Since ε' and n vary with frequency, the above relation is strictly correct only if all quantities are measured at the same frequency. The refractive index is also equal to the ratio of the velocity of the wave in the vacuum to the velocity in the dielectric medium. (PE) 599-1985

(2) (fiber optics) (of a medium) Denoted by n, the ratio of the velocity of light in vacuum to the phase velocity in the medium. *Synonym:* index of refraction. *See also:* index profile; scattering; core; linearly polarized mode; optical path length; numerical aperture; step index optical waveguide; normalized frequency; group index; index matching material; fused silica; cladding; profile dispersion; weakly guiding fiber; critical angle; graded index optical waveguide; dispersion; mode; power-law index profile; material dispersion; Fresnel reflection. (Std100) 812-1984w

(3) A dimensionless complex quantity, characteristic of a medium and so defined that its real part, called the refractive index, n, is the ratio of the phase velocity in free space to the phase velocity in the medium. The product of the imaginary part of the refractive index and the free space propagation constant is the attenuation constant in the medium. (AP/PROP) 211-1997

refractive index, complex *See:* complex refractive index.

refractive index contrast (fiber optics) Denoted by Δ, a measure of the relative difference in refractive index of the core and cladding of a fiber, given by $\Delta = (n_1^2 - n_2^2)/2n_1^2$ where n_1 and n_2 are, respectively, the maximum refractive index in the core and the refractive index of the homogeneous cladding. (Std100) 812-1984w

refractive index gradient The change of the atmospheric refractive index with height. Refraction may be included in propagation calculations by using an effective Earth radius of K times the geometrical radius of the Earth (6375 km) and straight line propagation. The refraction types of the atmosphere and their corresponding refractive index gradients are shown in the following table:

	Refractive index gradients		
Refraction types	dN/dh (N-Units/km)	dM/dh (M-Units/km)	K-Factor
Homogeneous	0	157	1
Adiabatic	−23	134	1.2
Standard	−39.2	118	4/3
Subrefractive	> -39.2	> 118	$< 4/3$
Extreme subrefractive	> 0	> 157	< 1
Superrefractive	< -39.2	< 118	$> 4/3$
Ducting threshold	−157	0	∞
Ducting	< -157	< 0	∞

(AP/PROP) 211-1997

refractive index profile (fiber optics) The description of the refractive index along a fiber diameter. *See also:* step index profile; power-law index profile; profile parameter; graded index profile; profile dispersion; profile dispersion parameter; parabolic profile. (Std100) 812-1984w

refractive modulus (M) (1) (data transmission) (excess modified index of refraction) The excess over unity of the modified index of refraction, expressed in millionths. It is represented by M and is given by the equation:

$$M = (n + h/a - 1)10^6$$

where n is the index of refraction at a height h above sea level, and a is the radius of the earth. (PE) 599-1985w

(2) In the troposphere, the excess over unity of the modified index of refraction, expressed in millionths:

$$M = (n + h/a - 1)10^6$$

where
a = the mean geometrical radius of the Earth
n = the refractive index at a height, h, above the local surface and $h/a << 1$

(AP/PROP) 211-1997

refractivity The amount by which the real part of the refractive index, n, exceeds unity. Refractivity is often measured in parts per million, called N-units, where $N = (n-1) \times 10^6$. (AP/PROP) 211-1997

refractivity profile The height dependence of refractivity in the atmosphere. *See also:* refractive index gradient. (AP/PROP) 211-1997

refractometer An instrument used to measure the refractive index of the atmosphere. (AP/PROP) 211-1997

refractor (illuminating engineering) A device used to redirect the flux from a source, primarily by the process of refraction. (EEC/IE) [126]

refractory A nonmetallic material highly resistant to fusion and suitable for furnace roofs and linings. (EEC/PE) [119]

refresh (1) To redraw an image on a non-permanent display surface. *Synonyms:* repaint; regenerate. (C) 610.6-1991w
(2) To ensure that the information on the terminal screen of the user is up-to-date. (C/PA) 9945-2-1993
(3) (A) The process of repeatedly producing a display image on a display surface so that the image remains visible. **(B)** To write data periodically to dynamic storage so that it is not lost. (C) 610.10-1994
(4) A periodic referencing of all storage locations in a DRAM, which typically recharges data-storage capacitors in order to maintain data integrity. (C/MM) 1596.4-1996

refresh buffer *See:* bit map.

refresh cycle *See:* display cycle.

refresh display device A display device whose screen surface does not retain an image for a long period of time, requiring the image to be continuously refreshed to remain visible and avoid flicker. *Note:* The refresh method can be either random-scan or raster scan. *Synonym:* refresh tube. *Contrast:* direct-view storage tube. (C) 610.6-1991w, 610.10-1994w

refresh line-drawing display device *See:* random-scan display device.

refresh period Applicable to RAM that is in the autorefresh mode. The maximum elapsed time between refresh commands that is sufficient to ensure that RAM contents remain defined. (C/MM) 1596.4-1996

refresh rate (1) (supervisory control, data acquisition, and automatic control) The number of times in each second that the information displayed on a nonpermanent display, for example, a crt, is rewritten or reenergized. (SWG/PE/SUB) C37.1-1987s, C37.100-1992
(2) (computer graphics) The frequency with which an image is regenerated on a display surface. (C) 610.6-1991w

refresh tube *See:* refresh display device.

REGAL *See:* range and elevation guidance for approach and landing.

regenerate (1) (electronic storage devices) To bring something into existence again after decay of its own accord or after intentional destruction. (C) 162-1963w
(2) (storage devices in which physical states used to represent data deteriorate) To restore the device to its latest undeteriorated state. *See also:* rewrite. (C) 162-1963w
(3) (storage devices in which physical states used to represent data deteriorate) *See also:* refresh. (C) 610.6-1991w
(4) *See also:* refresh. (C) 610.10-1994w

regenerated leach liquor (electrometallurgy) The solution that has regained its ability to dissolve desired constituents from the ore by the removal of those constituents in the process of electrowinning. *See also:* electrowinning. (PE/EEC) [119]

regeneration (1) (storage tubes) The replacing of stored information lost through static decay and dynamic decay. *See also:* storage tube. (ED) 158-1962w, 161-1971w
(2) (telecommunications) The process of receiving and reconstructing a digital signal so that the amplitudes, waveforms, and timing of its signal elements are re-established within specified limits. (COM/TA) 1007-1991r

regeneration of electrolyte The treatment of a depleted electrolyte to make it again fit for use in an electrolyte cell. *See also:* electrorefining. (EEC/PE) [119]

regenerative brake A form of dynamic brake in which the electrical energy generated by braking is returned to the power supply line, provided to on-board loads, or a combination thereof during the braking cycle instead of being dissipated in resistors. (VT) 1475-1999

regenerative braking A form of dynamic braking in which the kinetic energy of the motor and driven machinery is returned to the power supply system. *See also:* dynamic braking; electric drive; asynchronous machine. (PE/IA/ICTL/IAC) [9], [60]

regenerative branch (self-commutated converters) (converter circuit elements) An auxiliary branch intended to transfer energy from the load to the supply side of the converter. (IA/SPC) 936-1987w

regenerative divider (regenerative modulator) A frequency divider that employs modulation, amplification, and selective feedback to produce the output wave. (PE/EEC) [119]

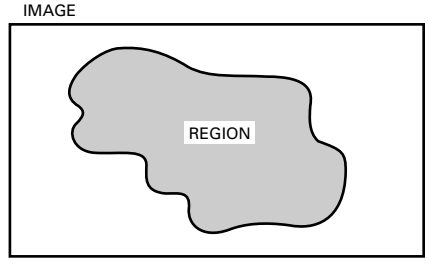
regenerative fuel-cell system A system in which the reactance may be regenerated using an external energy source. *See also:* fuel cell. (AES) [41]

regenerative repeater (1) (data transmission) A repeater that performs pulse regeneration. *Note:* The retransmitted signals are practically free from distortion. (PE) 599-1985w
(2) (fiber optics) A repeater that is designed for digital transmission. *Synonym:* regenerator. *See also:* optical repeater. (Std100) 812-1984w
(3) A repeater whose function is to re-time and re-transmit the received signal impulses that have been restored to their original strength. (C) 610.7-1995

regenerative track That part of a track on a magnetic drum or magnetic disk, used in conjunction with a read/write head, such that the heads are connected to function as circulating storage. *Synonym:* revolver track. (C) 610.10-1994w

regenerator *See:* regenerative repeater.

region (1) A connected subset of an image.



region

(C) 610.4-1990w
(2) (A) As relates to the address space of a process, a sequence of addresses. **(B)** As relates to a file, a sequence of offsets. (C/PA) 9945-1-1996, 1003.5-1999
(3) A region pertains to a particular physical section or block of a floorplan. *See also:* cluster. (C/DA) 1481-1999

regional Bell operating company (RBOC) A regional telephone company that may or may not be made up of individual operating companies. (SCC31/AMR) 1390.2-1999, 1390.3-1999, 1390-1995

regional center (1) (telephone switching systems) A toll office to which a number of sectional enters are connected. Regional centers are classified as Class 1 offices. *See also:* office class. (COM) 312-1977w
(2) Class 1 office in the North American hierarchical routing plan; a control center connecting sectional centers of the telephone system. *See also:* toll center; sectional center; end office; primary center. (C) 610.7-1995

region, Geiger-Mueller *See:* Geiger-Mueller region.

region growing (image processing and pattern recognition) An image segmentation technique in which regions are formed by repeatedly taking the union of subregions that are similar in gray levels or textures. *See also:* region partitioning. (C) 610.4-1990w

region of limited proportionality (radiation counter tubes) The range of applied voltage below the Geiger-Mueller threshold, in which the gas amplification depends upon the charge liberated by the initial ionizing event. (ED) 161-1971w

region partitioning (image processing and pattern recognition) An image segmentation technique in which regions are formed by repeatedly taking the union of sub-regions that are similar in gray levels or textures and by repeatedly splitting apart subregions that are dissimilar. *See also:* region growing. (C) 610.4-1990w

region, proportional *See:* proportional region.

regions of electromagnetic spectrum (1) (illuminating engineering) For convenience of reference, the electromagnetic spectrum is arbitrarily divided as follows:

Vacuum ultraviolet
Extreme ultraviolet 10–100 nm
Far ultraviolet 100–200 nm
Middle ultraviolet 200–300 nm
Near ultraviolet 300–380 nm
Visible 380–770 nm
Near (short wavelength) 770–1400 nm infrared
Intermediate infrared 1400–5000 nm
Far (long wavelength) 5000–1 000 000 nm infrared

Note: The spectral limits indicated above have been chosen as a matter of practical convenience. There is a gradual transition from region to region without sharp delineation. Also, the division of the spectrum is not unique. In various fields of science, the classifications may differ due to the phenomena of interest. Another division of the ultraviolet spectrum often used by photobiologists is given by the International Commission on Illumination (CIE):

- UV-A 315 to 400 nm
- UV-B 280 to 315 nm
- UV-C 100 to 280 nm

(EEC/IE) [126]

(2) (light-emitting diodes) For convenience of reference the electromagnetic spectrum near the visible spectrum is divided as follows.

Spectrum	Wavelength in Nanometers
far ultraviolet	10–280
middle ultraviolet	280–315
near ultraviolet	315–380
visible	380–780
infrared	790–10^5

Note: The spectral limits indicated above should not be construed to represent sharp delineations between the various regions. There is a gradual transition from region to region. The above ranges have been established for practical purposes. *See also:* radiant energy. (EEC/IE) [126]

register (1) (electronic computation) A device capable of retaining information, often that contained in a small subset (for example, one word), of the aggregate information in a digital computer. *See also:* address register; index register; circulating register; shift register. (C) 162-1963w

(2) (telephone switching systems) A part of an automatic switching system that receives and stores signals from a calling device or other source for interpretation and action. (COM) 312-1977w

(3) A term used to describe quadlet addresses that can be read or written by software. In the context of this document, a register does not imply a specific hardware implementation. If a bus standard allows transactions to be split, and sufficient time is allowed between the request and response subactions, the functionality of the register can be emulated by a processor on the module. (C/MM) 1212-1991s

(4) A storage device or storage location having a specified storage capacity. *See also:* strobe. (C) 610.10-1994w

(5) A set of records (paper, electronic, or a combination) maintained by a Registration Authority containing assigned names and the associated information. (C/LM) 802.10g-1995

register architecture A computer architecture whose design is based on the maintenance of data items in registers. *Contrast:* stack architecture. (C) 610.10-1994w

register-arithmetic and logic unit An arithmetic and logic unit which also contains a register array. (C) 610.10-1994w

register array *See:* register file.

register-based device A servant-only device that supports VXIbus configuration registers. Register-based devices are typically controlled by message-based devices via device-dependent register reads and writes. (C/MM) 1155-1992

register constant (meter) The factor by which the register reading must be multiplied in order to provide proper consideration of the register, or gear, ratio and of the instrument transformer ratios to obtain the registration in the desired unit. *Note:* It is commonly denoted by the symbol *Kr*. *See also:* electricity meter; moving element. (ELM) C12.1-1982s

registered images Two or more images of the same scene that have been positioned with respect to one another so that corresponding points in the images represent the same point in the scene. (C) 610.4-1990w

register file A set of registers which may be addressed by their number in the set. *Synonym:* register array. (C) 610.10-1994w

register length (1) (electronic computation) The number of characters that a register can store. (Std100) 270-1966w

(2) The storage capacity of a register. (C) 610.10-1994w

register marks Any mark or line printed or otherwise impressed on a web of material and which is used as a reference to maintain register. *See also:* photoelectric control. (IA/ICTL/IAC) [60]

register, mechanical *See:* mechanical register.

register memory (A) Use of high-speed general purpose registers as one would use memory, as in using registers to hold frequently-used data items. **(B)** Registers specifically included in the machine design for use as high-speed storage. (C) 610.10-1994

register ratio (watthour meter) The number of revolutions of the first gear of the register, for one revolution of the first dial pointer. *Note:* This is commonly denoted by the symbol R_r. (ELM) C12.1-1982s

register reading The numerical value indicated by the register. Neither the register constant nor the test dial (or dials), if any exist, is considered. *See also:* electricity meter. (EEC/PE) [119]

register set A subset of the full array of registers in a machine which the processing unit is currently allowed to use. *Note:* Machines may have N registers of which the processor may be able to address only M at a time; this divides the register array into N/M register sets. (C) 610.10-1994w

register transfer language (RTL) A computer language used to represent the flow of information on a system level; for example, to show data at the level of computer devices such as registers, gates, and ALUs. (C) 610.10-1994w

register-transfer level (RTL) (1) A description of computer operations where data transfers from register to register, latch to latch and through logic gates are described. *Note:* This may be an abstract description or microcoding. (C) 610.10-1994w

(2) A level of description of a digital design in which the clocked behavior of the design is expressly described in terms of data transfers between storage elements, which may be implied, and combinational logic, which may represent any computing or arithmetic-logic-unit logic. RTL modeling al-

lows design hierarchy that represents a structural description of other RTL models. (C/DA) 1076.6-1999

registration (1) Accurate positioning relative to a reference. (C) [20], [85]

(2) (display device) The condition in which corresponding elements of the primary-color images are in geometric coincidence. *See also:* registration. (PE/EEC) [119]

(3) (camera device) The condition in which corresponding elements of the primary-color images are scanned in time sequence. (PE/EEC) [119]

(4) Alignment of coordinate systems and phenomenological agreement between environment models. (DIS/C) 1278.3-1996

(5) (watthour meter) *See also:* watthhour meter—percentage registration. (ELM) C12.1-1988

(6) (watthour meter) *See also:* image registration. (C) 610.4-1990w

regressed (illuminating engineering) A luminaire which is mounted above the ceiling with the opening of the luminaire above the ceiling line. (EEC/IE) [126]

regression test Retesting to detect faults introduced by modification. (C/SE) 1219-1998

regression testing (software) Selective retesting of a system or component to verify that modifications have not caused unintended effects and that the system or component still complies with its specified requirements. (C) 610.12-1990

regular binary *See:* binary.

regular expression A pattern (sequence of characters or symbols) constructed according to the rules defined in 2.8. (C/PA) 9945-2-1993

regular file A file that is a randomly accessible sequence of bytes, with no further structure imposed by the system. (C/PA) 9945-1-1996, 9945-2-1993, 1003.5-1999

regular (specular) reflectance (illuminating engineering) The ratio of the flux leaving a surface or medium by regular (specular) reflection to the incident flux. (EEC/IE) [126]

regular reflection (illuminating engineering) That process by which incident flux is redirected at the specular angle. *See also:* specular angle. (EEC/IE) [126]

regular transmission (illuminating engineering) That process by which incident flux passes through a surface or medium without scattering. (EEC/IE) [126]

regular transmittance (illuminating engineering) The ratio of the regularly transmitted flux leaving a surface or medium to the incident flux. (EEC/IE) [126]

regulated circuit The circuit on the output side of the regulator, where it is desired to control the voltage, or the phase relation, or both. The voltage may be held constant at any selected point on the regulated circuit. (PE/TR) C57.15-1999

regulated frequency Frequency so adjusted that the average value does not differ from a predetermined value by an appreciable amount. *See also:* generating station. (T&D/PE) [10]

regulated power supply A power supply that maintains a constant output voltage (or current) for changes in the line voltage, output load, ambient temperature, or time. (AES) [41]

regulated-power-supply efficiency The ratio of the regulated output power to the input power. *See also:* regulated power supply. 209-1950w

regulated voltage, band of *See:* band of regulated voltage.

regulated voltage, nominal band of *See:* nominal band of regulated voltage.

regulating autotransformer (rectifier) A transformer used to vary the voltage applied to the alternating-current winding of rectifier transformer by means of de-energized autotransformer taps, and with load-tap-changing equipment to vary the voltage over a specified range on any of the autotransformer taps. *See also:* rectifier transformer. (Std100) C57.18-1964w

regulating circuit (thyristor) A circuit that together with the power controller and the thyristor trigger equipment forms a system for automatic control of the desired variable. (IA/IPC) 428-1981w

regulating device (power system device function numbers) A device that functions to regulate a quantity, or quantities, such as voltage, current, power, speed, frequency, temperature, and load at a certain value or between certain (generally close) limits for machines, tie lines, or other apparatus. (PE/SUB) C37.2-1979s

regulating limit setter (speed governing systems) A device in the load-frequency-control system for limiting the regulating range on a station or unit. *See also:* speed-governing system. (PE/PSE) 94-1970w

regulating range (load-frequency control) That range of power output within which a generating unit is permitted to respond to load frequency control. (PE/PSE) 94-1991w

regulating relay A relay whose function is to detect a departure from specified system operating conditions and to restore normal conditions by acting through supplementary equipment. (SWG/PE) C37.100-1992

regulating system, synchronous-machine *See:* synchronous-machine regulating system.

regulating transformer A transformer used to vary the voltage, or the phase angle, or both, of an output circuit (referred to as the regulated circuit) controlling the output within specified limits, and compensating for fluctuations of load and input voltage (and phase angle, when involved within specified limits. *See also:* voltage-regulating relay; line-drop compensator; series unit; regulating winding; primary circuit; main unit; excitation-regulating winding; excited winding; regulated circuit; series winding; excitation winding. (PE/TR) C57.12.80-1978r

regulating winding (power and distribution transformers) The winding of the main unit in which taps are changed to control the voltage or phase angle of the regulated circuit through the series unit. (PE/TR) C57.12.80-1978r

regulation (1) (rotating machinery) The amount of change in voltage or speed resulting from a load change. *See also:* asynchronous machine. (PE) [9]

(2) (overall) (power supplies) The maximum amount that the output will change as a result of the specified change in line voltage, output load, temperature, or time. *Note:* Line regulation, load regulation, stability, and temperature coefficient are defined and usually specified separately. *See also:* stability; temperature coefficient; load regulation; line regulation. (AES) [41]

(3) (electrical conversion) The change of one of the controlled or regulated output parameters resulting from a change of one or more of the unit's variables within specificaton limits. (AES) [41]

(4) (transformer-rectifier system) The change in output voltage as the load current is varied. It is usually expressed as a percentage of the rated load voltage when the load current is changed by its rated value.

$$\text{percent regulation} = 100\,\frac{(E_1 - E_2)}{E_2}$$

where E_1 is the no-load voltage and E_2 is the voltage at rated load current and the line voltage is held constant at rated value. (PEL/ET) 295-1969r

(5) (power supplies) *See also:* load regulation; overall regulation. (PEL/ET) 449-1990s

regulation changer (speed governing systems, hydraulic turbines) A device by means of which the speed regulation may be adjusted while the turbine is operating. (PE/EDPG) [5]

regulation curve (generator) A characteristic curve between voltage and load. The speed is either held constant, or varied according to the speed characteristics of the prime mover. The excitation is held constant for separately excited fields, and the rheostat setting is held constant for self-excited machines. (EEC/PE) [119]

regulation, frequency *See:* frequency regulation.

regulation, load *See:* load regulation.

regulation pull-out (power supply) (regulation drop-out) The load currents at which the power supply fails to regulate when the load current is gradually increased or decreased. *See also:* regulated power supply. 209-1950w

regulator, continuously acting *See:* continuously acting regulator.

regulator, noncontinuously acting *See:* noncontinuously acting regulator.

regulator, rheostatic-type *See:* rheostatic-type regulator.

regulator, synchronous machine *See:* synchronous machine regulator.

reguline A word descriptive of electrodeposits that are firm and coherent. (EEC/PE) [119]

rehashing *See:* collision resolution.

reheat turbine, condensing or noncondensing (control systems for steam turbine-generator units) Steam enters the turbine initially at one pressure, then is extracted at a lower pressure and temperature, and reheated. The steam is then readmitted to the turbine. (PE/EDPG) 122-1985s

reignition (1) A resumption of current between the contacts of a switching device during an opening operation after an interval of zero current of less than 1/4 cycle at normal frequency. (SWG/PE) C37.100-1992

(2) A process by which multiple counts are generated within a counter tube by atoms or molecules excited or ionized in the discharge accompanying a tube count. (NI/NPS) 309-1999

reinforced plastic (rotating machinery) A plastic with some strength properties greatly superior to those of the base resin, resulting from the presence of high-strength fillers imbedded in the composition. *Note:* The reinforcing fillers are usually fibers, fabrics, or mats made of fibers. The plastic laminates are the most common and strongest. (PE) [9]

reinsertion The restoration of load current to the series capacitor from the bypass path (see the corresponding figure). (T&D/PE) 824-1994

reinsertion current (series capacitor) The transient current, load current, or both, flowing through the series capacitor after the opening of the bypass path. (T&D/PE) 824-1994

reinsertion voltage (1) (series capacitor) The transient voltage, steady-state voltage, or both, appearing across the series capacitor after the opening of the bypass path. (T&D/PE) 824-1994

(2) (uniconductor waveguide) The frequency range below the cutoff frequency. *See also:* waveguide. (MTT) 146-1980w

(3) *See also:* stop band.

rejection filter (signal-transmission system) A filter that attenuates alternating currents between given upper and lower cutoff frequencies and transmits substantially all others. Also, a filter placed in the signal transmission path to attenuate interference. *See also:* signal. (IE) [43]

related multiple outage event A multiple outage event in which one outage occurrence is the consequence of another outage occurrence, or in which multiple outage occurrences were initiated by a single incident, or both. Each outage occurrence in a related multiple outage event is classified as either a primary outage or a secondary outage depending on the relationship between that outage occurrence and its initiating incident. (A) (primary outage) An outage occurrence within a related multiple outage event that occurs as a direct consequence of the initiating incident and is not dependent on any other outage occurrence. *Notes:* 1. A primary outage of a component or a unit may be caused by a fault on equipment within the unit or component or repair of a component within the unit. (B) (secondary outage) An outage occurrence that is the result of another outage occurrence. 2. Secondary outages of components or units may be caused by repair of other components or units requiring physical clearance, failure of a circuit breaker to clear a fault, or a protective relay system operating incorrectly and overreaching into the normal tripping zone of another unit. 3. Some secondary outages are solely the result of system configuration; for example, two components connected in series will always go out of service together. These secondary outages may be given special treatment when compiling outage data. 4. At present, primary outages have been referred to in the industry as independent outage occurrences, and secondary outages as dependent or related outage occurrences. (C) (common-mode outage event) A related multiple outage event consisting of two or more primary outage occurrences initiated by a single incident or underlying cause where the outage occurrences are not consequences of each other. 5. Primary outage occurrences in a common-mode outage event are referred to as common-mode outage event are referred to as common-mode outages. Examples of common-mode outage events are a single lightning stroke causing tripouts of both circuits on a common tower, and an external object causing the outage of two circuits on the same right-of-way. (PE/PSE) 859-1987w

related transmission terms (loss and gain) The term loss used with different modifiers has different meanings, even when applied to one physical quantity such as power. In view of definitions containing the word loss (as well as others containing the word gain), the following brief explanation is presented. (A) Power loss from a circuit, in the sense that it is converted to another form of power not useful for the purpose at hand (for example, I^2R loss) is a physical quantity measured in watts in the International System of Units (SI) and having the dimensions of power. For a given R, it will vary with the square of the current in R. (B) Loss may be defined as the ratio of two powers; for example: if P_o is the output power and P_i the input power of a network under specified conditions, P_i/P_o is a dimensionless quantity that would be unity if P_o, P_i. Thus, no power loss in the sense of "A" means a loss, defined as the ratio P_i/P_o, of unity. The concept is closely allied to that of efficiency. (C) Loss may also be defined as the logarithm, or as directly proportional to the logarithm, of a power ratio such as P_i/P_o. Thus if loss $= 10 \log_{10} P_i/P_o$ the loss is zero when P_i, P_o. This is the standard for measuring loss in decibels. It should be noted that in cases "B" and "C" the loss (for a given linear system) is the same whatever may be the power levels. Thus (B) and (C) give characteristics of the system and do not depend (as (A) does) on the value of the current or other dependent quantity. Power refers to average power, not instantaneous power. *See also:* network analysis. (Std100) 270-1966w

relation In a relational data model or relational database, a set of tuples, each of which has the same attributes. *Note:* Often thought of as a table of data. (C) 610.5-1990w

relational algebra An algebra that includes a set of relational operators, such as join and projection, to manipulate relations and the axioms of those operators. (C) 610.5-1990w

relational database (1) A database in which data are organized into one or more relations that may be manipulated using a relational algebra. *Contrast:* network database. (C) 610.5-1990w

(2) A database that represents data as a collection of tables linked through common entries. (PE/EDPG) 1150-1991w

relational database model An external data model that represents a relational database. (C) 610.5-1990w

relational database schema A collection of relation schemas that define the structural properties of a relational database. (C) 610.5-1990w

relational data model (A) A data model whose pattern or organization is based on a set of relations, each of which consists of an unordered set of tuples. **(B)** A data model that provides for the expression of relationships among data elements as formal mathematical relations. (C) 610.5-1990

relational engine A database engine for relational databases. *See also:* SQL engine. (C) 610.10-1994w

relational file **(A)** A file, consisting of tuples, in which all data items are associated via the same relationship. *Note:* Also called a flat file. **(B)** Any file resulting from relational algebra. (C) 610.5-1990

relational language A query language that may be used to access and retrieve data from a relational database. (C) 610.5-1990w

relationally complete Pertaining to a query language or system that can be used to form expressions from a relational algebra. (C) 610.5-1990w

relational model *See:* relational database model; relational data model.

relational operator An operator that performs an operation on relations; for example, the join or projection operators. *See also:* relational algebra. (C) 610.5-1990w

relation schema The set of all attribute names for a relation. (C) 610.5-1990w

relationship **(1)** A directed connection between two or more data items or attributes. (C) 610.5-1990w

(2) An association between two classes. (C/SE) 1420.1-1995

(3) A specific association that exists between entity sets or entities of a set that can be described by a single word or phrase. (PE/EDPG) 1150-1991w

(4) A kind of association between two (not necessarily distinct) classes that is deemed relevant within a particular scope and purpose. The association is named for the sense in which the instances are related. A relationship can be represented as a time-varying binary relation between the instances of the current extents of two state classes. (C/SE) 1320.2-1998

relationship instance An association of specific instances of the related classes. (C/SE) 1320.2-1998

relationship name A verb or verb phrase that reflects the meaning of the relationship expressed between the two entities shown on the diagram on which the name appears. (C/SE) 1320.2-1998

relative address **(1) (computers)** The number that specifies the difference between the absolute address and the base address. (MIL/C) [2], [20], [85]

(2) (software) An address that must be adjusted by the addition of an offset to determine the address of the storage location to be accessed. *Contrast:* absolute address. *See also:* self-relative address; indexed address; base address. (C) 610.12-1990

(3) An address to which a base address must be added in order to form an absolute address of a particular storage location. *See also:* symbolic address; absolute address; base address; relocatable address. (C) 610.10-1994w

relative addressing **(1) (microprocessor assembly language)** An addressing mode in which the effective address is formed by adding an offset to the program counter (or a portion thereof) during execution. (MM/C) 695-1985s

(2) An addressing mode in which a base address is used to store the beginning address of some area in storage, and all locations within that are expressed in terms of their displacement from the beginning, or the relative address. (C) 610.10-1994w

relative bearing (navigation aids) Bearing relative to heading. (AES/GCS) 172-1983w

relative bias The relative bias statistic for the ith measurement in a category with respect to the "true or expected" value (value of the spike known by comparison with or derivation from a standard reference material) is defined as:

$$B_{ri} = (A_i - A_{ai}) / A_{ai}$$

where

A_i = the ith measurement in a category being tested, not necessarily a replicate, but possibly a different quantity of spike for each measurement.

A_{ai} = the stated quantity in the test sample, as defined by the spike.

In order to avoid the expense of a large number of replicates at each radioactivity level in each category, the relative bias (which may be obtained at differing quantity levels) for that test category is calculated from N individual relative bias B_{ri} values and is defined as:

$$B_r = \overline{B}_{ri} = \sum_{i-1}^{N} B_{ri} / N$$

(NI) N42.23-1995

relative capacitivity *See:* relative dielectric constant.

relative chrominance level (linear waveform distortion) The difference between the level of the luminance and chrominance signal components. An inaccuracy in RCL will cause saturation inaccuracy of all colors in a color TV picture. (BT) 511-1979w

relative chrominance time (linear waveform distortion) The difference in absolute time between the luminance and chrominance signal components. An inaccuracy in RCT will cause registration inaccuracy of all colors relative to their luminance components in a color TV picture. (BT) 511-1979w

relative coding (computers) Coding that uses machine instructions with relative addresses. (C) [20], [85]

relative complex dielectric constant (complex capacitivity) (complex permittivity) (homogeneous isotropic material) The ratio of the admittance between two electrodes of a given configuration of electrodes with the material as a dielectric to the admittance between the same two electrodes of the configuration with vacuum as dielectric or

$$\varepsilon^* \equiv \varepsilon' - j\varepsilon'' = Y/(j\omega C_v)$$

where Y is the admittance with the material and $j\omega C_v$ is the admittance with vacuum. Experimentally, vacuum must be replaced by the material at all points where it makes a significant change in the admittance. *Note:* The word relative is frequently dropped. *See also:* relative dielectric constant. (Std100) 270-1966w

relative complex permeability (μ_r) The complex permeability of a medium normalized to the permeability of free space μ_0. (AP/PROP) 211-1997

relative complex permittivity (ε_r) The complex permittivity, of a medium normalized to the free space permittivity ε_0. (AP/PROP) 211-1997

relative contrast sensitivity (illuminating engineering) The relation between the reciprocal of the luminous contrast of a task at visibility threshold and the background luminance expressed as a percentage of the value obtained under a very high level of diffuse task illumination. (EEC/IE) [126]

relative cross-polar side lobe level *See:* cross-polar side lobe level, relative.

relative damping **(1) (instrument)** (specific damping) Under given conditions, the ratio of the damping torque at a given angular velocity of the moving element to the damping torque that, if present at this angular velocity, would produce the condition of critical damping. *See also:* accuracy rating. (EEC/PE) [119]

(2) (automatic control) (under damped system). A number expressing the quotient of the actual damping of a second-order linear system or element by its critical damping. *Note:* For any system whose transfer function includes a quadratic factor $s^2 + 2z\omega_n s + \omega_n^2$, relative damping is the value of z, since $z = 1$ for critical damping. Such a factor has a root $-\sigma + j\omega$ in the complex s-plane, from which $z = \sigma/\omega_n = \sigma(\sigma^2 + \omega^2)^{1/2}$. (PE/EDPG) [3]

relative dielectric constant (relative permittivity) (relative capacitivity) (homogeneous isotropic material) The ratio of the capacitance of a given configuration of electrodes with the material as a dielectric to the capacitance of the same electrode configuration with a vacuum (or air for most practical purposes) as the dielectric or

$$\varepsilon' = C_x/C_v$$

where C_x is the capacitance with the material and C_v is the capacitance with vacuum. Experimentally, vacuum must be replaced by the material at all points where it makes a significant change in the capacitance. *See also:* electric flux density; relative capacitivity. (Std100) 270-1966w

relative directive gain (physical media) In a given direction and at a given point in the far field, the ratio of the power flux per unit area from an antenna to the power flux per unit area from a reference antenna at a specified location and delivering the same power from the antenna to the medium. *Note:* All or part of the reference antenna must be within the smallest sphere containing the subject antenna. (AP/ANT) 145-1983s

relative distinguished name A set of AVAs, each of which is true, concerning the distinguished values of a particular entry. (C/PA) 1328.2-1993w, 1327.2-1993w, 1224.2-1993w, 1326.2-1993w

relative error The ratio of an error to the correct value. *Contrast:* absolute error. (C) 1084-1986w

relative error of indication The quotient (I) of the error of indication of a measured quantity by the conventionally true value of that measured quantity. It may be expressed as a percentage, for example:

$$I = \left(\frac{H_i - H_t}{H_t}\right) \times 100\%$$

(NI) N42.20-1995

relative full-energy peak efficiency for detector specification The ratio of full-energy peak detection efficiency for a point source of ^{60}Co(1332 keV photons) to that of a NaI(Tl) crystal, 7.6 cm diameter × 7.6 cm high, for a source-to-detector distance of 25 cm. (NI) N42.14-1991

relative fundamental content (converter characteristics) (self-commutated converters) The ratio of the rms (root-mean-square) value of the fundamental component to the rms value of the total nonsinusoidal periodic function. (IA/SPC) 936-1987w

relative gain (of an antenna) The ratio of the gain of an antenna in a given direction to the gain of a reference antenna. *Note:* Unless otherwise specified, the maximum gains of the antennas are implied. (AP/ANT) 145-1993

relative grid (navigation aid terms) Navigation in a relative grid as opposed to an absolute coordinate system (for example, geo-referenced). A relative grid, arbitrarily constructed by designating a point as the origin and constructing a set of axes U, V, W enables members to navigate in this relative grid by virtue of their U, V, W coordinates. (AES/GCS) 172-1983w

relative harmonic content (converter characteristics) (self-commutated converters) The ratio of the rms (root-mean-square) value of the harmonic content to the rms value of the total nonsinusoidal periodic function. (IA/SPC) 936-1987w

relative humidity (RH) (1) The ratio between the amount of water vapor in the gas at the time of measurement and the amount of water vapor that could be in the gas when condensation begins, at a given temperature. (PE/IC) 1125-1993 **(2)** (with respect to water or ice) The ratio, expressed as a percentage, of the water vapor pressure in moist air to the saturation vapor pressure with respect to a plane pure water (ice) surface at the same temperature. (AP/PROP) 211-1997

relative integer date A date defined as the number of days starting from any given Gregorian calendar date determined at the time of initial implementation of a given integer date system, and extending in a contiguous sequence greater than one leap year (366 days). *Note:* The freedom of choice of a start date is the principal characteristic of the relative integer date. Knowledge of the start date is not essential other than to confirm that the interval or range of dates used follows the adopted start date. Synchronization between two disparate relative integer date systems is readily achieved by converting a given Gregorian date to its relative integer date representation in both systems. The difference between the resulting relative integer dates then becomes the required offset to be added or subtracted for each system to correctly interpret the other's relative integer date. (C/PA) 2000.1-1999

relative intensity noise The ratio of the variance in the optical power to the average optical power. (C/LM) 802.3-1998

relative interfering effect (single-frequency electric wave in an electroacoustic system) The ratio, usually expressed in decibels, of the amplitude of a wave of specified reference frequency to that of the wave in question when the two waves are equal in interfering effect. The frequency of maximum interfering effect is usually taken as the reference frequency. Equal interfering effects are usually determined by judgment tests or intelligibility tests. *Note:* When applied to complex waves, the relative interfering effect is the ratio, usually expressed in decibels, of the power of the reference wave to the power of the wave in question when the two waves are equal in interfering effect. (EEC/PE) [119]

relative ionospheric opacity meter (radio-wave propagation) A radio-frequency receiving device that measures the ionospheric absorption experienced by cosmic radio noise passing through the ionosphere. *Synonym:* riometer. (AP) 211-1977s

relative lead polarity A designation of the relative instantaneous directions of current in its leads. *Notes:* 1. Primary and secondary leads are said to have the same polarity when at a given instant during most of each half cycle, the current enters an identified, or marked, primary lead and leaves the similarly identified, or marked, secondary lead in the same direction as though the two leads formed a continuous circuit. 2. The relative lead polarity of a single-phase transformer may be either additive or subtractive. If one pair of adjacent leads from the two windings is connected together and voltage applied to one of the windings, then:

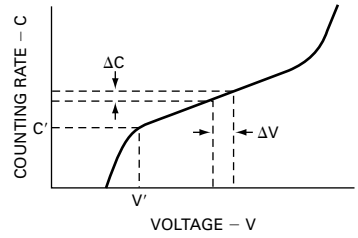
a) The relative lead polarity is additive if the voltage across the other two leads of the windings is greater than that of the higher-voltage winding alone.
b) The relative lead polarity is subtractive if the voltage across the other two leads of the windings is less than that of the higher-voltage winding alone.

3. The relative lead polarity is indicated by identification marks on primary and secondary leads of like polarity, or by other appropriate identification. *See also:* routine test; constant-current transformer. (PE/TR) [57]

relative loader *See:* relocating loader.

relative luminosity (television) The ratio of the value of the luminosity at a particular wavelength to the value at the wavelength of maximum luminosity. (BT/AV) 201-1979w

relative plateau slope (radiation counter tubes) The average percentage change in the counting rate near the midpoint of the plateau per increment of applied voltage. *Note:* Relative plateau slope is usually expressed as the percentage change in counting rate per 100 V change in applied voltage.



Counting rate-voltage characteristic in which

$$\text{relative plateau slope} = 100\,\frac{\Delta C/C}{\Delta V}$$

$$\text{normalized plateau slope} = \frac{\Delta C/\Delta V}{C'/V'} = \frac{\Delta C/C'}{\Delta V/V'}$$

plateau slope, relative
(ED/NPS/NID) 161-1971w, 309-1970s

relatively prime Describes integers whose greatest common divisor is 1. (IM/WM&A) 1057-1994w

relatively refractory state (electrobiology) The portion of the electric recovery cycle during which the excitability is less than normal. *See also:* excitability. (EMB) [47]

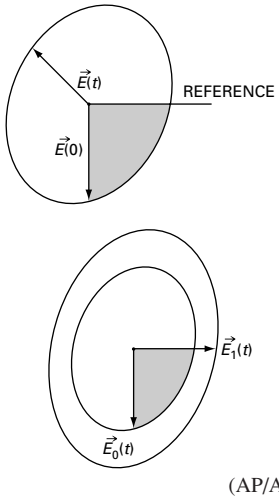
relative nonline frequency content (thyristor) The ratio of the root-mean-square (rms) value of the nonline frequency content to the total rms value of the nonsinusoidal periodic function. 445 subline frequency components (thyristor). Expressed by the frequency and the root-mean-square (rms) value of the components having a lower frequency than the line frequency (dc included). (IA/IPC) 428-1981w

relative partial gain (of an antenna with respect to a reference antenna of a given polarization) In a given direction, the ratio of the partial gain of an antenna, corresponding to the polarization of the reference antenna, to the maximum gain of the reference antenna. (AP/ANT) 145-1993

relative permeability The ratio of normal permeability to the magnetic constant. *Note:* In anisotropic media, relative permeability becomes a matrix. (Std100) 270-1966w

relative permittivity in physical media The ratio of the complex permittivity to the permittivity of free space. *See also:* relative dielectric constant. (AP/ANT) 145-1983s

relative phase (of an elliptically polarized field vector) The phase angle of the unitary factor by which the polarization-phase vector for the given field vector differs from that of a reference field vector with the same polarization. *Notes:* 1. The relative phase of an elliptically polarized field $\vec{E}_1$ can be defined with respect to that of another field $\vec{E}_0$ having the same polarization. In that case, the polarization vectors $\hat{e}_1$ and $\hat{e}_0$ have the same direction and, being of unit magnitudes, they differ only by a unitary factor: $e_1 = e^{j\alpha}e_0$. The angle α is the phase difference between $\vec{E}_1$ and $\vec{E}_0$. 2. The field vectors $\vec{E}_1(t) = \text{Re}\ \vec{E}_1 e^{j\omega t}$ and $\vec{E}_0(t) = \text{Re}\ \vec{E}_0 \hat{e}^{j\omega t}$ describe similar ellipses as t varies. The angle α is 2π times the area of the sector shown on the figure divided by the area of the ellipse described by the extremity of $\vec{E}_0(t)$. For circular polarization, α is the angle between $\vec{E}_0$ and $\vec{E}_1$ at any instant of time. 3. The phase of an elliptically polarized field vector can be expressed relative to a spatial direction in its plane of polarization. For example, the phase angle is given by 2π times the area of the sector shown on the figure, which is bounded by $\vec{E}(0)$ and the reference, divided by the area of the ellipse described by $\vec{E}(t)$. The angle is positive if it is in the same direction as the sense of polarization and negative if it is in the direction opposite to the sense of polarization.



(AP/ANT) 145-1993

relative power gain The ratio of the power gain in a given direction to the power gain of a reference antenna in its reference direction. *Note:* Common reference antennas are half-wave dipoles, electric dipoles, magnetic dipoles, monopoles, and calibrated horn antennas. (AP/ANT) 145-1983s

relative power gain in physical media In a given direction and at a given point in the far field, the ratio of the power flux per unit area from an antenna to the power flux per unit area from a reference antenna at a specified location with the same power input to both antennas. *Note:* All or part of the reference antenna must be within the smallest sphere containing the subject antenna. (AP/ANT) 145-1983s

relative precision The relative precision of the measurement process is selected for the purposes of this standard to be the relative dispersion of the values of B_{ri} from its mean B_r, and is defined to be:

$$S_A = \sqrt{\frac{\sum_{i=1}^{N} (B_{ri} - B_r)^2}{(N-1)}}$$

where N is the number of test samples measured by an individual service laboratory in a given test category. The sample size N should be at least five. (NI) N42.23-1995

relative redundancy (of a source) The ratio of the redundancy of the source to the logarithm of the number of symbols available at the source. *See also:* information theory. (IT) 171-1958w

relative refractive index (radio-wave propagation) Of two media, the ratio of their refractive indices. (AP) 211-1977s

relative response (audio and electroacoustics) The ratio, usually expressed in decibels, of the response under some particular conditions to the response under reference conditions. Both conditions should be stated explicitly. (SP) [32]

relative Seebeck coefficient The Seebeck coefficient of a couple composed of the given material as the first-named conductor and a specified standard conductor. *Note:* Common standards are platinum, lead, and copper. *See also:* thermoelectric device. (ED) [46]

relative side lobe level The maximum relative directivity of a side lobe with respect to the maximum directivity of an antenna, usually expressed in decibels. (AP/ANT) 145-1993

relative stability (stable underdamped system) (automatic control) The property measured by the relative setting times when parameters are changed. *See also:* feedback control system. (IM) [120]

relative temperature index (1) (evaluation of thermal capability) (thermal classification of electric equipment and electrical insulation) The temperature index of a new or candidate insulating material, which corresponds to the accepted temperature index of a reference material for which considerable test and service experience has been obtained. Both new and reference material are subjected to the same aging and diagnostic procedure in a comparative test. *See also:* thermal endurance graph. (EI) 1-1986r

(2) (solid electrical insulating materials) Derived at an arbitrary time by comparing the life values from thermal endurance graphs from a new and a referenced material with considerable service experience. (EI) 98-1984r

relative visual performance The potential task performance based upon the illuminance and contrast of the lighting system performance. (IA/PSE) 241-1990r

relaxation (laser maser) The spontaneous return of a system towards its equilibrium condition. (LEO) 586-1980w

relaxation oscillator Any oscillator whose fundamental frequency is determined by the time of charging or discharging of a capacitor or inductor through a resistor, producing waveforms that may be rectangular or sawtooth. *Note:* The frequency of a relaxation oscillator may be self-determined or determined by a synchronizing voltage derived from an external source. *See also:* electronic controller; oscillatory circuit. (AP/ANT) 145-1983s

relaxation time (laser maser) The time required for the deviation from equilibrium of some system parameter to diminish to $1/e$ of its initial value. (LEO) 586-1980w

relay (1) (general) An electric device designed to respond to input conditions in a prescribed manner and, after specified conditions are met, to cause contact operation or similar abrupt change in associated electric control circuits. *Notes:* 1. Inputs are usually electrical, but may be mechanical, thermal, or other quantities, or a combination of quantities. Limit switches and similar simple devices are not relays. 2. A relay may consist of several relay units, each responsive to a specified input, with the combination of units providing the desired overall performance characteristic(s) of the relay. (SWG/PE/IM/HFIM/PSR) C37.100-1992, 474-1973w, C37.90-1989r

(2) (electric and electronics parts and equipment) An electrically controlled, usually two-state, device that opens and closes electrical contacts to effect the operation of other devices in the same or another electric circuit. *Notes:* 1. A relay is a device in which a portion of one or more sets of electrical contacts is moved by an armature and its associated operating coil. 2. This concept is extended to include assembled reed relays in which the armature may act as a contact. *See also:* switch. (GSD) 200-1975w

(3) (packaging machinery) A device that is operative by a variation in the conditions of one electric circuit to affect the operation of other devices in the same or another electric circuit. *Note:* Where relays operate in response to changes in more than one condition, all functions should be mentioned. (IA/PKG) 333-1980w

(4) A special-purpose switch that is activated by an electrical signal. *See also:* operational relay. (C) 610.10-1994w

relay actuation time The time at which a specified contact functions. (EEC/REE) [87]

relay actuation time, effective *See:* effective relay actuation time.

relay actuation time, final *See:* final relay actuation time.

relay actuation time, initial *See:* initial relay actuation time.

relay actuator The part of the relay that converts electric energy into mechanical work. (EEC/REE) [87]

relay adjustment The modification of the shape or position of relay parts to affect one or more of the operating characteristics, that is, armature gap, restoring spring, contact gap. (EEC/REE) [87]

relay air gap Air space between the armature and the pole piece. This is used in some relays instead of a nonmagnetic separator to provide a break in the magnetic circuit. (EEC/REE) [87]

relay, alternating-current *See:* alternating-current relay.

relay amplifier (1) An amplifier that drives an electromechanical relay. *See also:* electronic analog computer. (C) 165-1977w, 166-1977w

(2) In an analog computer, an amplifier that drives an electromechanical relay. (C) 610.10-1994w

relay antifreeze pin Sometimes used for relay armature stop, nonmagnetic. (EEC/REE) [87]

relay armature (electromechanical relay) The moving element that contributes to the designed response of the relay and that usually has associated with it a part of the relay contact assembly. (SWG/PE) C37.100-1981s

relay armature, balanced *See:* balanced relay armature.

relay armature bounce *See:* relay armature rebound.

relay armature card An insulating member used to link the movable springs to the armature. (EEC/REE) [87]

relay armature contact (A) A contact mounted directly on the armature. **(B)** Sometimes used for relay contact, movable. (EEC/REE) [87]

relay armature, end-on *See:* end-on relay armature.

relay armature, flat-type *See:* flat-type relay armature.

relay armature gap The distance between armature and pole face. (EEC/REE) [87]

relay armature hesitation Delay or momentary reversal of armature motion in either the operate or release stroke. (EEC/REE) [87]

relay armature lifter *See:* relay armature stud.

relay armature, long-lever *See:* long-lever relay armature.

relay armature overtravel The portion of the available stroke occurring after the contacts have touched. (EEC/REE) [87]

relay armature ratio The ratio of the distance through which the armature stud or card moves to the armature travel. (EEC/REE) [87]

relay armature rebound Return motion of the armature following impact on the backstop. (EEC/REE) [87]

relay armature, short-lever *See:* short-lever relay armature.

relay armature, side *See:* side relay armature.

relay armature stop Sometimes used for relay backstop. (EEC/REE) [87]

relay armature stop, nonmagnetic *See:* nonmagnetic relay armature stop.

relay armature stud An insulating member that transmits the motion of the armature to an adjacent contact member. (EEC/REE) [87]

relay armature travel The distance traveled during operation by a specified point on the armature. (EEC/REE) [87]

relay back contacts Sometimes used for relay contacts, normally closed. (EEC/REE) [87]

relay backstop The part of the relay that limits the movement of the armature away from the pole face or core. In some relays a normally closed contact may serve as backstop. (EEC/REE) [87]

relay backup That part of the backup protection that operates in the event of failure of the primary relays. (SWG/PE) C37.100-1992, [56]

relay bank *See:* relay level.

relay bias winding An auxiliary winding used to produce an electric bias. (EEC/REE) [87]

relay blades Sometimes used for relay contact springs. (EEC/REE) [87]

relay bracer spring A supporting member used in conjunction with a contact spring. (EEC/REE) [87]

relay bridging (A) A result of contact erosion, wherein a metallic protrusion or bridge is built up between opposite contact faces to cause an electric path between them. **(B)** A form of contact erosion occurring on the break of a low-voltage, low-inductance circuit, at the instant of separation, that results in melting and resolidifying of contact metal in the form of a metallic protrusion or bridge. **(C)** Make-before-break contact action, as when a wiper touches two successive contacts simultaneously while moving from one to the other. (EEC/REE) [87]

relay brush *See:* relay wiper.

relay bunching time The time during which all three contacts of a bridging contact combination are electrically connected during the armature stroke. (EEC/REE) [87]

relay bushing Sometimes used for relay spring stud. (EEC/REE) [87]

relay chatter time The time interval from initial actuation of a contact to the end of chatter. (EEC/REE) [87]

relay coil One or more windings on a common form. (EEC/REE) [87]

relay coil, concentric-wound *See:* concentric-wound relay coil.

relay-coil dissipation The amount of electric power consumed by a winding. For the most practical purposes, this equals the I^2R loss. (EEC/REE) [87]

relay-coil resistance The total terminal-to-terminal resistance of a coil at a specified temperature. (EEC/REE) [87]

relay-coil serving A covering, such as thread or tape, that protects the winding from mechanical damage. (EEC/REE) [87]

relay-coil temperature rise The increase in temperature of a winding above the ambient temperature when energized under specified conditions for a given period of time, usually

the time required to reach a stable temperature. (EEC/REE) [87]

relay-coil terminal A device, such as a solder lug, binding post, or similar fitting, to which the coil power supply is connected. (EEC/REE) [87]

relay-coil tube An insulated tube upon which a coil is wound. (EEC/REE) [87]

relay comb An insulating member used to position a group of contact springs. (EEC/REE) [87]

relay contact actuation time The time required for any specified contact on the relay to function according to the following subdivisions. When not otherwise specified contact actuation time is relay initial actuation time. For some purposes, it is preferable to state the actuation time in terms of final actuation time or effective actuation time. (EEC/REE) [87]

relay contact arrangement The combination of contact forms that make up the entire relay switching structure. (EEC/REE) [87]

relay contact bounce Sometimes used for relay contact chatter, when internally caused. (EEC/REE) [87]

relay contact chatter The undesired intermittent closure of open contacts or opening of closed contacts. It may occur either when the relay is operated or released or when the relay is subjected to external shock or vibration. (EEC/REE) [87]

relay contact chatter, armature hesitation Chatter ascribed to delay or momentary reversal in direction of the armature motion during either the operate or the release stroke. (EEC/REE) [87]

relay contact chatter, armature impact Chatter ascribed to vibration of the relay structure caused by impact of the armature on the pole piece in operation, or on the backstop in release. (EEC/REE) [87]

relay contact chatter, armature rebound Chatter ascribed to the partial return of the armature to its operated position as a result of rebound from the backstop in release. (EEC/REE) [87]

relay contact chatter, externally caused Chatter resulting from shock or vibration imposed on the relay by external action. (EEC/REE) [87]

relay contact chatter, external shock Chatter ascribed to impact experienced by the relay or by the apparatus of which it forms a part. (EEC/REE) [87]

relay contact chatter, initial Chatter ascribed to vibration produced by opening or closing the contacts themselves, as by contact impact in closure. (EEC/REE) [87]

relay contact chatter, internally caused Chatter resulting from the operation or release of the relay. (EEC/REE) [87]

relay contact chatter, transmitted vibration Chatter ascribed to vibration originating outside the relay and transmitted to it through its mounting. (EEC/REE) [87]

relay contact combination (A) The total assembly of contacts on a relay. **(B)** Sometimes used for contact form. (EEC/REE) [87]

relay contact, fixed *See:* stationary relay contact.

relay contact follow The displacement of a stated point on the contact-actuating member following initial closure of a contact. (EEC/REE) [87]

relay contact follow, stiffness The rate of change of contact force per unit contact follow. (EEC/REE) [87]

relay contact form A single-pole contact assembly. (EEC/REE) [87]

relay contact functioning The establishment of the specified electrical state of the contacts as a continuous condition. (EEC/REE) [87]

relay contact gap *See:* relay contact separation.

relay contact, movable *See:* movable relay contact.

relay contact pole Sometimes used for relay contact, movable. (EEC/REE) [87]

relay contact rating A statement of the conditions under which a contact will perform satisfactorily. (EEC/REE) [87]

relay contacts The current-carrying parts of a relay that engage or disengage to open or close electric circuits. (EEC/REE) [87]

relay contacts, auxiliary *See:* auxiliary relay contacts.

relay contacts, back *See:* back relay contacts.

relay contacts, break *See:* normally closed relay contacts.

relay contacts, break-make *See:* break-make relay contacts.

relay contacts, bridging *See:* bridging relay contacts.

relay contacts, continuity transfer *See:* continuity transfer relay contacts.

relay contacts, double break *See:* double break relay contacts.

relay contacts, double make *See:* double make relay contacts.

relay contacts, dry *See:* dry relay contacts.

relay contacts, early *See:* early relay contacts.

relay contact separation The distance between mating contacts when the contacts are open. (EEC/REE) [87]

relay contacts, front *See:* front relay contacts.

relay contacts, interrupter *See:* interrupter relay contacts.

relay contacts, late *See:* late relay contacts.

relay contacts, low-capacitance *See:* low-capacitance relay contacts.

relay contacts, low-level *See:* low-level relay contacts.

relay contacts, make *See:* normally open relay contacts.

relay contacts, make-break *See:* make-break relay contacts.

relay contacts, multiple-break *See:* multiple-break relay contacts.

relay contacts, nonbridging *See:* nonbridging relay contacts.

relay contacts, normally closed *See:* normally closed relay contacts.

relay contacts, normally open *See:* normally open relay contacts.

relay contacts, off-normal *See:* off-normal relay contacts.

relay contacts, preliminary *See:* preliminary relay contacts.

relay contact spring (A) A current-carrying spring to which the contacts are fastened. **(B)** A non-current-carrying spring that positions and tensions a contact-carrying member. (EEC/REE) [87]

relay contacts, sealed *See:* sealed relay contacts.

relay contacts, snap-action *See:* snap-action relay contacts.

relay contact, stationary *See:* stationary relay contact.

relay contact wipe The sliding or tangential motion between two contact surfaces when they are touching. (EEC/REE) [87]

relay core The magnetic member about which the coil is wound. (EEC/REE) [87]

relay critical current *See:* relay critical voltage.

relay critical voltage That voltage (current) that will just maintain thermal relay contacts operated. *Synonym:* relay critical current. (EEC/REE) [87]

relay cycle timer A controlling mechanism that opens or closes contacts according to a preset cycle. (EEC/REE) [87]

relay damping ring, mechanical *See:* mechanical relay damping ring.

relay, direct-current *See:* direct-current relay.

relay, double-pole *See:* double-pole relay.

relay, double-throw *See:* double-throw relay.

relay driving spring The spring that drives the wipers of a stepping relay. (EEC/REE) [87]

relay drop-out *See:* relay release.

relay, dry circuit *See:* dry circuit relay.

relay duty cycle A statement of energized and deenergized time in repetitious operation, as: two seconds on, six seconds off. (EEC/REE) [87]

relay electric bias An electrically produced force tending to move the armature towards a given position. (EEC/REE) [87]

relay, electric reset *See:* electric reset relay.

relay, electromagnetic *See:* electromagnetic relay.

relay, electrostatic *See:* electrostatic relay.

relay, electrostrictive *See:* electrostrictive relay.

relay electrothermal expansion element An actuating element in the form of a wire strip or other shape having a high coefficient of thermal expansion. (EEC/REE) [87]

relay element A subassembly of parts. *Note:* The combination of several relay elements constitutes a relay unit. (SWG/PE/PSR) C37.100-1981s, C37.90-1978s

relay finish lead The outer termination of the coil. (EEC/REE) [87]

relay frame The main supporting portion of a relay. This may include parts of the magnetic structure. (EEC/REE) [87]

relay freezing, magnetic *See:* magnetic relay freezing.

relay fritting Contact erosion in which the electrical discharge makes a hole through the film and produces molten matter that is drawn into the hole by electrostatic forces and solidifies there to form a conducting bridge. (EEC/REE) [87]

relay front contacts Sometimes used for relay contacts, normally open. (EEC/REE) [87]

relay functioning time The time between energization and operation or between de-energization and release. (EEC/REE) [87]

relay functioning value The value of applied voltage, current, or power at which the relay operates or releases. (EEC/REE) [87]

relay header The subassembly that provides support and insulation to the leads passing through the walls of a sealed relay. (EEC/REE) [87]

relay heater A resistor that converts electric energy into heat for operating a thermal relay. (EEC/REE) [87]

relay heel piece The portion of a magnetic circuit of a relay that is attached to the end of the core remote from the armature. (EEC/REE) [87]

relay, high, common, low A type of relay control used in such devices as thermostats and in relays operated by them, in which a momentary contact between the common lead and another lead operates the relay, that then remains operated until a momentary contact between the common lead and a third lead causes the relay to return to its original position. (EEC/REE) [87]

relay hinge The joint that permits movement of the armature relative to the stationary parts of the relay structure. (EEC/REE) [87]

relay hold A specified functioning value at which no relay meeting the specification may release. (EEC/REE) [87]

relay housing An enclosure for one or more relays, with or without accessories, usually providing access to the terminals. (EEC/REE) [87]

relay hum The sound emitted by relays when their coils are energized by alternating current or in some cases by unfiltered rectified current. (EEC/REE) [87]

relaying A function performed at intermediate nodes on an interconnection between communicating end-systems. The relaying function is performed by connecting two independent layer entities. For example, a relaying function at the Data Link Layer connects two Data Link Layer entities to make an interconnection. (LM/C/COM) 8802-9-1996

relay inside lead *See:* relay start lead.

relay, interposing *See:* interposing relay.

relay inverse time A qualifying term applied to a relay indicating that its time of operation decreases as the magnitude of the operating quantity increases. (EEC/REE) [87]

relay just-operate value The measured functioning value at which a particular relay operates. (EEC/REE) [87]

relay just-release value The measured functioning value for the release of a particular relay. (EEC/REE) [87]

relay leakage flux The portion of the magnetic flux that does not cross the armature-to-pole-face gap. (EEC/REE) [87]

relay level A series of contacts served by one wiper in a stepping relay. (EEC/REE) [87]

relay load curves The static force displacement characteristic of the total load of the relay. (EEC/REE) [87]

relay logic A logic network that coordinates the output of measuring units and other inputs to energize output circuits when prescribed conditions and sequences have been met. (PE/PSR) C37.90.1-1989r

relay magnetic bias A steady magnetic field applied to the magnetic circuit of a relay. (EEC/REE) [87]

relay magnetic gap Nonmagnetic portion of a magnetic circuit. (EEC/REE) [87]

relay, manual-reset *See:* manual-reset relay.

relay mechanical bias A mechanical force tending to move the armature towards a given position. (EEC/REE) [87]

relay mounting plane The plane to which the relay mounting surface is fastened. (EEC/REE) [87]

relay-must-operate value A specified functioning value at which all relays meeting the specification must operate. (EEC/REE) [87]

relay must-release value A specified functioning value, at which all relays meeting the specification must release. (EEC/REE) [87]

relay nonfreeze pin Sometimes used for relay armature stop, nonmagnetic. (EEC/REE) [87]

relay nonoperate value A specified functioning value at which no relay meeting the specification may operate. (EEC/REE) [87]

relay normal condition The de-energized condition of the relay. (EEC/REE) [87]

relay operate The condition attained by a relay when all contacts have functioned. *See also:* relay contact actuation time. (EEC/REE) [87]

relay operate time The time interval from coil energization to the functioning time of the last contact to function. Where not otherwise stated the functioning time of the contact in question is taken as its initial functioning time. (EEC/REE) [87]

relay operate time characteristic The relation between the operate time of an electromagnetic relay and the operate power. (EEC/REE) [87]

relay operating frequency The rated alternating-current frequency of the supply voltage at which the relay is designed to operate. (EEC/REE) [87]

relay outside lead *See:* relay finish lead.

relay overtravel Amount of contact wipe. *See also:* relay contact wipe; relay armature overtravel. (EEC/REE) [87]

relay pickup value Sometimes used for relay must-operate value. (EEC/REE) [87]

relay pileup A set of contact arms, assemblies, or springs, fastened one on top of the other with insulation between them. (EEC/REE) [87]

relay pneumatic bellows Gas-filled bellows, sometimes used with plunger-type relays to obtain time delay. (EEC/REE) [87]

relay pole face The part of the magnetic structure at the end of the core nearest the armature. (EEC/REE) [87]

relay pole piece The end of an electromagnet, sometimes separable from the main section, and usually shaped so as to distribute the magnetic field in a pattern best suited to the application. (EEC/REE) [87]

relay pull curves The force-displacement characteristics of the actuating system of the relay. (EEC/REE) [87]

relay pull-in value Sometimes used for relay must-operate value. (EEC/REE) [87]

relay pusher Sometimes used for relay armature stud. *See also:* relay. (EEC/REE) [87]

relay rating A statement of the conditions under which a relay will perform satisfactorily. (EEC/REE) [87]

relay recovery time A cooling time required from heater de-energization of a thermal time-delay relay to subsequent re-energization that will result in a new operate time equal to 85

percent of that exhibited from a cold start. (EEC/REE) [87]

relay recovery time, instantaneous *See:* instantaneous relay recovery time.

relay recovery time, saturated *See:* saturated relay recovery time.

relay release The condition attained by a relay when all contacts have functioned and the armature (where applicable) has reached a fully opened position. (EEC/REE) [87]

relay release time The time interval from coil de-energization to the functioning time of the last contact to function. Where not otherwise stated the functioning time of the contact in question is taken as its initial functioning time. (EEC/REE) [87]

relay reoperate time Release time of a thermal relay. (EEC/REE) [87]

relay reoperate time, instantaneous *See:* instantaneous relay reoperate time.

relay reoperate time, saturated *See:* saturated relay reoperate time.

relay residual gap Sometimes used for relay armature stop, nonmagnetic. (EEC/REE) [87]

relay restoring spring A spring that moves the armature to the normal position and holds it there when the relay is de-energized. (EEC/REE) [87]

relay retractile spring Sometimes used for relay restoring spring. (EEC/REE) [87]

relay return spring Sometimes used for relay restoring spring. (EEC/REE) [87]

relay saturation The condition attained in a magnetic material when an increase in field intensity produces no further increase in flux density. (EEC/REE) [87]

relay sealing Sometimes used for relay seating. (EEC/REE) [87]

relay seating The magnetic positioning of an armature in its final desired location. (EEC/REE) [87]

relay seating time The elapsed time after the coil has been energized to the time required to seat the armature of the relay. (EEC/REE) [87]

relay shading coil Sometimes used for relay shading ring. (EEC/REE) [87]

relay shading ring A shorted turn surrounding a portion of the pole of an alternating-current magnet, producing a delay of the change of the magnetic field in that part, thereby tending to prevent chatter and reduce hum. (EEC/REE) [87]

relay shields, electrostatic spring Grounded conducting members located between two relay springs to minimize electrostatic coupling. (EEC/REE) [87]

relay shim, nonmagnetic *See:* nonmagnetic relay shim.

relay, single-pole *See:* single-pole relay.

relay, single-throw *See:* single-throw relay.

relay sleeve A conducting tube placed around the full length of the core as a short-circuited winding to retard the establishment or decay of flux within the magnetic path. (EEC/REE) [87]

relay slow-release time characteristic The relation between the release time of an electromagnetic relay and the conductance of the winding circuit or of the conductor (sleeve or slug) used to delay release. The conductance in this definition is the quantity $N^2 \cdot R$, where N is the number of turns and R is the resistance of the closed winding circuit. (For a sleeve or slug N, 1). (EEC/REE) [87]

relay slug A conducting tube placed around a portion of the core to retard the establishment or decay of flux within the magnetic path. (EEC/REE) [87]

relay soak The condition of an electromagnetic relay when its core is approximately saturated. (EEC/REE) [87]

relay soak value The voltage, current, or power applied to the relay coil to insure a condition approximating magnetic saturation. (EEC/REE) [87]

relay spool A flanged form upon which a coil is wound. (EEC/REE) [87]

relay spring buffer Sometimes used for relay spring stud. (EEC/REE) [87]

relay spring curve A plot of spring force on the armature versus armature travel. (EEC/REE) [87]

relay spring stop A member that controls the position of a pretensioned spring. (EEC/REE) [87]

relay spring stud An insulating member that transmits the motion of the armature from one movable contact to another in the same pileup. (EEC/REE) [87]

relay stack Sometimes used for relay pileup. (EEC/REE) [87]

relay stagger time The time interval between the actuation of any two contact sets. (EEC/REE) [87]

relay starting switch (rotating machinery) A relay, actuated by current, voltage, or the combined effect of current and voltage, used to perform a circuit-changing function in the primary winding of a single-phase induction motor within a predetermined range of speed as the rotor accelerates: and to perform the reverse circuit-changing operation when the motor is disconnected from the supply line. One of the circuit changes that is usually performed is to open or disconnect the auxiliary-winding circuit. *See also:* starting-switch assembly. (PE) [9]

relay start lead The inner termination of the coil. (EEC/REE) [87]

relay static characteristic The static force-displacement characteristic of the spring system or of the actuating system. (EEC/REE) [87]

relay station (mobile communication) A radio station used for the reception and retransmission of the signals from another radio station. *See also:* mobile communication system. (VT) [37]

relay system (1) (surge withstand capability) An assembly, usually consisting of current and voltage circuits, measuring units, logic, and power supplies, to provide a specific relay scheme such as line, transformer, bus, or generator protection. A relay system may include interfaces with other systems such as data logging, alarm, telecommunications, or other relay systems. (PE/PSR) C37.90.1-1989r, C37.90-1978s **(2)** An assembly that usually consists of measuring units, relay logic, communications interfaces, computer interfaces, and necessary power supplies. (SWG/PE) C37.100-1992

relay thermal A relay that is actuated by the heating effect of an electric current. *See also:* relay. (EEC/REE) [87]

relay, three-position *See:* three-position relay.

relay transfer contacts Sometimes used for relay contacts, break-make. (EEC/REE) [87]

relay transfer time The time interval between opening the closed contact and closing the open contact of a break-make contact form. (EEC/REE) [87]

relay unit (general) An assembly of relay elements that in itself can perform a relay function. *Note:* One or more relay units constitutes a relay. (PE/PSR) C37.90-1978s **(2) (A)** A subassembly of parts. *Note:* The combination of several relay elements constitutes a relay unit. **(B)** An assembly of relay elements that in itself can perform a relay function. *Note:* One or more relay units constitute a relay. (SWG/PE) C37.100-1992

relay winding Sometimes used for relay coil. (PE/TR) C57.15-1968s

relay wiper The moving contact on a rotary stepping switch or relay. (EEC/REE) [87]

release (1) (A) (telephone switching systems) Disengaging the apparatus used in a connection and restoring it to its idle condition upon recognizing a disconnect signal. **(B)** (of a mechanical switching device) A device, mechanically connected to a mechanical switching device, which releases the holding means and permits the opening or closing of the switching device. *Synonym:* tripping mechanism. **(C) (STEbus)** The ac-

tion of a transmitter in ceasing to hold a signal line in the asserted state. **(D)** The action of applying a logic zero signal to a bus line. **(E)** The state of a bus line when the signal it carries represents a logic zero. (SWG/COM) 312-1977

(2) To stop pressing a mouse button or keyboard key. (C) 1295-1993w

(3) To cease to assert a logic 1 on a bus signal line. (One module's releasing a signal line produces a change in value of the signal line only if no module is asserting the signal.). (TT/C) 1149.5-1995

(4) The formal notification and distribution of an approved version. (C/SE) 828-1998

(5) (A) The action of applying a logic 0 signal to a bus line. **(B)** The state of a bus line when the signal it carries represents a logic 0. (C/BA) 896.10-1997

release coil (of a mechanical switching device) A coil used in the electromagnet that initiates the action of a release (trip). *Synonym:* trip coil. (SWG/PE) C37.100-1992

released Having a value equal to logic 0 (said of any signal). Equivalently, in the case of an MTM-Bus signal line, not asserted by any module on the bus. (TT/C) 1149.5-1995

release delay (of a mechanical switching device) Intentional time-delay introduced into contact parting time in addition to opening time. *Note:* In devices employing a shunt release, release delay includes the operating time of protective and auxiliary relays external to the device. In devices employing direct or indirect release, release delay consists of intentional delay introduced into the function of the release. *Synonym:* tripping delay. (SWG/PE) C37.100-1992

release-delay setting (trip delay) A calibrated setting of the time interval between the time when the actuating value reaches the release setting and the time when the release operates. (SWG/PE) C37.100-1992

release-free (as applied to a mechanical device). *See also:* trip-free. (SWG/PE) C37.100-1992

release-free in any position A descriptive term indicating that a switching device is release-free at any part of the closing operation. *Note:* If the release circuit is completed through an auxiliary switch, electrical release will not take place until such auxiliary switch is closed. *Synonym:* trip-free in any position. (SWG/PE) C37.100-1981s

release-free relay *See:* trip-free relay.

release mechanism (mechanical switching device) A device, mechanically connected to the mechanical switching device, that releases the holding means and permits the opening or closing of the switching device. *Synonym:* tripping mechanism. (SWG/PE) C37.100-1981s

release setting A calibrated point at which the release is set to operate. *Synonym:* trip setting. (SWG/PE) C37.100-1992

release signal (telephone switching systems) A signal transmitted from one end of a line or trunk to indicate that the called party has disconnected. (COM) 312-1977w

release time *See:* hang-over time.

release time, relay *See:* relay release time.

relevant failure *See:* failure.

relevant rated step voltage The value of rated step voltage that corresponds to a specific value of rated through current. (PE/TR) C57.131-1995

reliability (1) (relay or relay system) A measure of the degree of certainty that the relay, or relay system, will perform correctly. *Note:* Reliability denotes certainty of correct operation together with assurance against incorrect operation from all extraneous causes. *See also:* security; dependability. (SWG/PE/PSR) C37.100-1992, [6], C37.90-1978s, [56]

(2) (reliability analysis of nuclear power generating station safety systems) The characteristic of an item or system expressed by the probability that it will perform a required mission under stated conditions for a stated mission time. (PE/NP) 352-1987r, 577-1976r

(3) (software) The ability of a system or component to perform its required functions under stated conditions for a specified period of time. (C/BA) 896.9-1994w, 610.12-1990

(4) The probability that a transformer will perform its specified function under specified conditions for a specified period of time. (PE/TR) C57.117-1986r

(5) (power system protective relaying) A combination of dependability and security. (PE/PSC) 487-1992

(6) The probability that an item will perform its intended function for a specified interval under stated conditions. (C/BA) 896.3-1993w

(7) The characteristic of equipment or software that relates to the integrity of the system and ability to maintain trouble-free operations to insure against failure. (C) 610.7-1995

(8) (general) The ability of an item to perform a required function under stated conditions for a stated period of time. *See also:* wearout-failure period; observed reliability; assessed reliability. (R/C/Std100) 1413-1998, [29], 610.7-1995

(9) (general) The probability that a device will function without failure over a specified time period or amount of usage. *Notes:* 1. This definition is most commonly used in engineering applications. In any case where confusion may arise, specify the definition being used. 2. The probability that the system will perform its function over the specified time should be equal to or greater than the reliability. (SMC/C) [63], [20], [85]

(10) The probability that a system will perform its intended functions without failure, within design parameters, under specific operating conditions, and for a specific period of time. (VT/RT) 1475-1999, 1474.1-1999

reliability allocation (nuclear power generating station) The assignment of reliability subgoals to subsystems and elements thereof within a system for the purpose of meeting the overall reliability goal for the system, if each of these subgoals is attained. (PE/NP) 380-1975w, 338-1977s

reliability, assessed *See:* assessed reliability.

reliability assessment (software) The process of determining the achieved level of reliability of an existing system or system component. *See also:* reliability; system; component. (C/SE) 729-1983s

reliability, availability, and maintainability Elements that are considered as unified for reliability enhancement. (PE/NP) 933-1999

reliability-centered maintenance (1) A systematic methodology that establishes initial preventive maintenance requirements or optimizes existing preventive maintenance requirements for equipment based upon the consequences of equipment failure. The failure consequences are determined by the application of the equipment in an operating system. (IA/PSE) 902-1998

(2) A series of orderly steps for identifying system and subsystem functions, functional failures, and dominant failure modes, prioritizing them, and selecting applicable and effective preventive maintenance tasks to address the classified failure modes. (PE/NP) 933-1999

reliability compliance test An experiment used to show whether or not the value of a reliability characteristic of an item complies with its stated reliability requirements. (R) [29]

reliability data (software) Information necessary to assess the reliability of software at selected points in the software life cycle. Examples include error data and time data for reliability models, program attributes such as complexity, and programming characteristics such as development techniques employed and programmer experience. (C/SE) 729-1983s

reliability determination test An experiment used to determine the value of a reliability characteristic of an item. *Note:* Analysis of available data may also be used for reliability determination. (R) [29]

reliability evaluation *See:* reliability assessment.

reliability, extrapolated *See:* extrapolated reliability.

reliability goal (nuclear power generating station) A design objective, stated numerically, applied to reliability or availability. (PE/NP) 380-1975w

reliability growth (software) The improvement in reliability that results from correction of faults. (C) 610.12-1990

reliability, inherent *See:* inherent reliability.

reliability model (1) (software) A model used for predicting, estimating, or assessing reliability. *See also:* reliability assessment; model; reliability. (C/SE) 729-1983s

(2) (modeling and simulation) A model used to estimate, measure, or predict the reliability of a system; for example, a model of a computer system, used to estimate the total down time that will be experienced. (C) 610.3-1989w

reliability modeling (nuclear power generating station) A logical display in a block diagram format and a mathematical representation of component functions as they occur in sequence which is required to produce system success. (PE/NP) 380-1975w, 338-1977s

reliability monitoring Direct monitoring of reliability parameters of a plant, system, or equipment (e.g., failure frequency, downtime due to the maintenance activities, outage rate). (PE/NP) 933-1999

reliability, operational *See:* operational reliability.

reliability, predicted *See:* predicted reliability.

reliability program A description of activities and techniques associated with reliability technology, not necessarily a formalized program or entity unto itself, which may be integrated with design and operations. (PE/NP) 933-1999

reliability targets The reliability goals to be achieved by the plant systems. (PE/NP) 933-1999

reliability, test *See:* test reliability.

reliability unit That portion of a system for which a single reliability model is valid, i.e., for which there is a single mechanism of failure. (PE/NP) 1082-1997

reliable service A communication service in which the received data is guaranteed to be exactly as transmitted. (DIS/C) 1278.1-1995, 1278.2-1995

relief door (rotating machinery) A pressure-operated door to prevent excessive gas pressure within a housing. (PE) [9]

relieving (electroplating) The removal of compounds from portions of colored metal surfaces by mechanical means. *See also:* electroplating. (EEC/PE) [119]

relieving anode (pool-cathode tube) An auxiliary anode that provides an alternative conducting path for reducing the current to another electrode. *See also:* electrode. (EEC/PE) [119]

relocatable Pertaining to code that can be loaded into any part of main memory. The starting address is established by the loader, which then adjusts the addresses in the code to reflect the storage locations into which the code has been loaded. *See also:* relocating loader. (C) 610.12-1990

relocatable address An address that is to be adjusted by the loader when the computer program containing the address is loaded into memory. *Note:* Generally implemented through the use of relative addressing. *Contrast:* absolute address. *See also:* relative address. (C) 610.10-1994w, 610.12-1990

relocatable code Code containing addresses that are to be adjusted by the loader to reflect the storage locations into which the code is loaded. *Contrast:* absolute code. (C) 610.12-1990

relocatable machine code (software) Machine language code that requires relative addresses to be translated into absolute addresses prior to computer execution. *See also:* address; absolute machine code. (C/SE) 729-1983s

relocate (1) (programming) (computers) To move a routine from one portion of storage to another and to adjust the necessary address references so that the routine, in its new location, can be executed. (C) [20], [85]

(2) (software) To move machine code from one portion of main memory to another and to adjust the addresses so that the code can be executed in its new location. (C) 610.12-1990

relocating assembler An assembler that produces relocatable code. *Contrast:* absolute assembler. (C) 610.12-1990

relocating loader A loader that reads relocatable code into main memory and adjusts the addresses in the code to reflect the storage locations into which the code has been loaded. *Synonym:* relative loader. *Contrast:* absolute loader. (C) 610.12-1990

relocation *See:* biasing.

relocation dictionary The part of an object module or load module that identifies the addresses that must be adjusted when a relocation occurs. (C) 610.12-1990

relocation factor *See:* offset.

reluctance (magnetic circuit) The ratio of the magnetomotive force to the magnetic flux through any cross section of the magnetic circuit. (Std100) 270-1966w

reluctance motor A synchronous motor similar in construction to an induction motor, in which the member carrying the secondary circuit has salient poles, without permanent magnets or direct-current excitation. It starts as an induction motor, is normally provided with a squirrel-cage winding, but operates normally at synchronous speed. (PE) [9]

reluctance synchronizing (rotating machinery) Synchronizing by bringing the speed of a salient pole synchronous machine to near-synchronous speed, but without applying excitation to it. (PE) [9]

reluctance torque (synchronous motor) The torque developed by the motor due to the flux produced in the field poles by action of the armature-reaction magnetomotive force. (PE) [9]

reluctivity The reciprocal of permeability. *Note:* In anisotropic media, reluctivity becomes a matrix. (Std100) 270-1966w

REM *See:* ring error monitor.

remanence The magnetic flux density that remains in a magnetic circuit after the removal of an applied magnetomotive force. *Note:* This should not be confused with residual flux density. If the magnetic circuit has an air gap, the remanence will be less than the residual flux density. *See also:* residual flux density. (Std100/PE/PSR) 163-1959w, C37.110-1996

remanent charge The charge remaining when the applied voltage is removed. *Note:* The remanent charge is essentially independent of the previously applied voltage, provided this voltage was sufficient to cause saturation. If the device was not or cannot be saturated, the value of the previously applied voltage should be stated when measurements of remanent charge are reported. *See also:* ferroelectric domain. (UFFC) 180w

remanent induction (magnetic material) The induction when the magnetomotive force around the complete magnetic circuit is zero. *Note:* If there are no air gaps or other inhomogeneities in the magnetic circuit, the remanent induction will equal the residual induction: if there are air gaps or other inhomogeneities, the remanent induction will be less than the residual induction. (Std100) 270-1966w

remanent polarization (primary ferroelectric terms) The value of the polarization P_r that remains after an applied electric field is removed. Remanent polarization can be measured by integrating the compensating surface charge released on heating a poled ferroelectric to a temperature above its Curie point. *Note:* When the magnitude of this electric field is sufficient to saturate the polarization (usually $3E_c$ that is, three times the coercive electric field), the polarization remaining after the field is removed is termed the saturation remanent polarization P_r. In a single-domain ferroelectric material, the saturation remanent polarization is equal to the spontaneous polarization. (UFFC) 180-1986w

remodulator A device located at the headend of a broadband coaxial cable system that receives inbound transmissions and converts them to outbound transmissions via an intermediate step in which the inbound signals are converted to the baseband level. The device may or may not perform operations on the contents of the baseband signal. (LM/C) 802.7-1989r

remote At a distance such that the mutual resistance of the two electrodes is essentially zero. *See also:* ground rod. (PE/PSIM) 81-1983

remote access (test, measurement, and diagnostic equipment) Pertaining to communication with a data processing facility by one or more stations that are distant from that facility. (MIL) [2]

remote-access data processing Data processing in which some or all of the input-output functions are performed at locations away from the primary computer, connected to the primary computer by telecommunication facilities. (C) 610.2-1987

remote alarm indication *See:* yellow alarm.

remote backup A form of backup protection in which the protection is at a station or stations other than that which has the primary protection. (SWG/PE) C37.100-1992

remote batch entry *See:* remote job entry.

Remote Bridge *See:* Remote MAC Bridge.

Remote Bridge Cluster A subset of the Remote Bridges in a single Group, all of which are providing, or preparing to provide, MAC-sublayer interconnection of the attached Locally Bridged Local Area Networks and other Groups. A Remote Bridge Cluster is fully connected, *ie,* it supports communication between any pair of the Remote Bridges that belong to it. Membership of a Remote Bridge Cluster is determined dynamically through protocols operating in support of the Spanning Tree Algorithm. *Note:* A Cluster can—and often will—consist of all the Remote Bridges in the relevant Group. (C/LM) 802.1G-1996

Remote Bridge Group A set of Remote Bridges, capable of communicating with each other over non-LAN communications equipment, which cooperate in providing actual or potential MAC-sublayer interconnection among all the attached Locally Bridged Local Area Networks and other attached Groups. Membership of a Remote Bridge Group is determined statically, as an aspect of the configuration of the Remotely Bridged Local Area Network. *Note:* A Remotely Bridged Local Area Network can contain more than one Remote Bridge Group. (C/LM) 802.1G-1996

Remote Bridge Subgroup A set of Remote Bridges belonging to one Group, such that each Remote Bridge in the Subgroup has a single Virtual Port representing its communication with all the other Remote Bridges in the Subgroup, and with no others. Membership of a Subgroup is determined statically, as an aspect of the configuration of the Group. (C/LM) 802.1G-1996

remote computer system A computer system located at some remote site and connected via a communications network to one or more other systems. *See also:* satellite computer. (C) 610.7-1995, 610.10-1994w

remote concentrator (telephone switching systems) A concentrator located away from a serving system control. (COM) 312-1977w

remote console A console in a remote computer system. *See also:* master console. (C) 610.10-1994w

remote control (1) (general) Control of an operation from a distance: this involves a link, usually electrical, between the control device and the apparatus to be operated. *Note:* Remote control may be over direct wire; other types of interconnecting channels such as carrier-current or microwave; supervisory control; or mechanical means. *See also:* control. (PE/PSE) [54], [84]

(2) (programmable instrumentation) A method whereby a device is programmable via its electrical interface connection in order to enable the device to perform different tasks. (IM/AIN) 488.1-1987r

(3) Control of a device from a distant point. *Note:* Remote control may be over direct wire, or over other types of interconnecting channels such as carrier-current or microwave, or by supervisory control or by (4) mechanical means. (SWG/PE/SUB) C37.100-1992, C37.1-1994

remote-control circuit Any electric circuit that controls any other circuit through a relay or an equivalent device. (NESC/NEC) [86]

remote-cutoff tube *See:* variable-mu tube.

remote data logging An arrangement for the numerical representation of selected telemetered quantities on log sheets or paper or magnetic tape, or the like, by means of an electric typewriter, teletype, or other suitable devices. (SWG/PE) C37.100-1992

remote earth (1) (potential) The location outside the influence of local grounds. Always assumed to be at zero potential. (SPD/PE) C62.23-1995

(2) That distant point on the earth's surface where an increase in the distance from a ground electrode will not measurably increase the impedance between that ground electrode and the new distant point. (PE/PSC) 367-1996

(3) The point beyond which further reduction in ground electrode or grid impedance results in negligible effects. (IA/PSE) 1100-1999

remote error-sensing (power supplies) A means by which the regulator circuit senses the voltage directly at the load. This connection is used to compensate for voltage drops in the connecting wires. (AES) [41]

remote fault The generic ability of a link partner to signal its status even in the event that it may not have an operational receive link. (C/LM) 802.3-1998

remote indication Indication of the position or condition of remotely located devices. *Note:* Remote indication may be over direct wire, or over other types of interconnecting channels such as carrier-current or microwave, or by supervisory indication or by mechanical means. (SWG/PE) C37.100-1992

remote job entry (RJE) (1) (A) Submission of jobs through a remote input device connected to a computer through a data link. *Synonym:* remote batch entry. **(B)** Submission of jobs through an input device that has access to a computer through a communications link. (LM/C/COM) 610.12-1990, 168-1956

(2) A service that allows a user to submit a batch job from a remote site. (C) 610.10-1994w

remotely controlled operation Operation of a device by remote control. (SWG/PE) C37.100-1992

remotely operated (as applied to equipment) Capable of being operated from a position external to the structure in which it is installed or from a protected position within the structure. (NESC) C2-1984s

remote line (electroacoustics) A program transmission line between a remote pickup point and the studio or transmitter site. *See also:* transmission line. (SP) 151-1965w

remote login (rlogin) A login to another computer in a remote location. (C) 610.10-1994w

Remotely Bridged Local Area Network A Bridged Local Area Network of two or more Locally Bridged Local Area Networks interconnected using non-LAN communication technologies, and providing MAC-sublayer interworking between end stations attached to any of the LANs. (C/LM) 802.1G-1996

remotely operable (as applied to equipment) Capable of being operated from a position external to the structure in which it is installed or from a protected position within the structure. (NESC) C2-1997

remote MAC (RMAC) The MAC component at the remote end of the data link as specified by its unique 48-bit address. (C/LM/CC) 8802-2-1998

Remote MAC Bridge A MAC Bridge interconnecting a Locally Bridged Local Area Network and the non-LAN communications equipment of a Remotely Bridged Local Area Network. (C/LM) 802.1G-1996

remote magnetic sensor (navigation aid terms) A magnetic sensor located on a vehicle away from disturbances which provides an electrical signal in synchro format which is pro-

portional to the vehicle heading relative to magnetic north. Often called a flux valve. (AES/GCS) 172-1983w

remote manual operation *See:* indirect manual operation.

remote master *See:* master remote unit.

remote metering *See:* telemetering.

remote on/off control The control over the on/off operation of the unit-under-test (UUT) output power by means initiated externally or away from the UUT. (PEL) 1515-2000

remote operation *See:* remotely controlled operation.

remote release *See:* remote trip.

remote SAP (RSAP) The SAP at the remote end of a data link as specified by its LLC address. (C/LM/CC) 8802-2-1998

remote station (1) (of a supervisory system) A remotely located station wherein units of switchgear or other equipment are controlled by supervisory control or from which supervisory indications or selected telemeter readings are obtained. (SWG/PE) C37.100-1992

(2) (of a supervisory system) The entire complement of devices, functional modules, and assemblies that are electrically interconnected to effect the remote station supervisory functions. The equipment includes the interface with the communication channel, but does not include the interconnecting channel. During communication with a master station, the remote station is hierarchy. *Note:*

— *Hardwired*. Station supervisory equipment that is comprised entirely of wired-logic elements.
— *Firmware*. Station supervisory equipment that uses hardware logic programmed routines in a manner similar to a computer. The routines can only be modified by physically exchanging logic memory elements.
— Station supervisory equipment that uses software routines.
— *Semiautomatic*. A station that requires both automatic and manual modes to maintain the required character of service.
— *Submaster*. A station that can perform as a master station on one message transaction and as a remote station on another message transaction.

(SWG/PE/SUB) C37.100-1992, C37.1-1994

remote-station supervisory equipment The part of a (single) supervisory system that includes all supervisory control relays and associated devices located at the remote station for selection, control, indication, and other functions to be performed. (SWG/PE) C37.100-1992

remote switching entity (telephone switching systems) An entity for switching inlets to outlets located away from a serving system control. (COM) 312-1977w

remote terminal The entire complement of devices, functional modules, and assemblies that are electrically interconnected to effect the remote terminal supervisory functions (of a supervisory system). The equipment includes the interface with the communication channel, but does not include the connecting channel. (SUB/PE) 999-1992w

remote terminal unit (RTU) (1) (supervisory control, data acquisition, and automatic control) The remote station equipment of a supervisory system. *See also:* station. (SWG) C37.100-1992

(2) A piece of equipment located at a distance from a master station to monitor and control the state of outlying equipment, and to communicate the information back to the master station or host. (PE/SUB) 1379-1997

(3) *See also:* remote station. (SUB/PE) C37.1-1994

remote trip (remote release) A general term applied to a relay installation to indicate that the switching device is located physically at a point remote from the initiating protective relay, device, or source of release power or all these. *Note:* This installation is commonly called transfer trip when a communication channel is used to transmit the signal for remote tripping. *Synonym:* remote release. (SWG/PE/PSR) C37.100-1992, C37.90-1978s

removable breaker The removable breaker consists of the circuit breaker, disconnecting provisions, network relays, auxiliary panels, current transformers, control devices, other attachments, and all interconnecting wiring, which can be rolled out of the network protector enclosure on rails for maintenance or removal. (PE/TR) C57.12.44-1994

removable conductor link A removable connector between the GIS conductor and the end of the cable termination. (PE/IC) 1300-1996

removable disk A disk that can be removed from the disk drive. *Contrast:* fixed disk. (C) 610.10-1994w

removable element (of a switchgear assembly) The portion that normally carries the circuit-switching and circuit-interrupting devices and the removable part of the primary and secondary disconnecting devices. (SWG/PE) C37.100-1992

removable storage Any storage medium, such as a disk, which can be removed from the storage device and stored or transported somewhere else. *Note:* Some portion of the interface may be included with the medium. For example, some removable disk cartridges include the heads as well as the disk. (C) 610.10-1994w

removal, fault *See:* fault removal.

removal time *See:* recovery/removal timing check.

removal timing check A timing check that establishes only the end of the stable interval for a recovery/ removal timing check. If no recovery timing check is provided for the same arc, transitions, and state, the stable interval is assumed to begin at the reference signal transition, and a negative value for the removal time is not meaningful. *See also:* recovery/ removal timing check. (C/DA) 1481-1999

rendezvous (software) The interaction that occurs between two parallel tasks when one task has called an entry of the other task, and a corresponding accept statement is being executed by the other task on behalf of the calling task. (C/SE) 729-1983s

renegotiation Restart of the Auto-Negotiation algorithm caused by management or user interaction. (C/LM) 802.3-1998

renewable fuse (1) (protection and coordination of industrial and commercial power systems) A fuse in which the element, usually a zinc link, may be replaced after the fuse has opened. Once a very popular item, this fuse is gradually losing popularity due to the possibility of using higher ampere-rated links or multiple links in the field, which can present a hazard. (IA/PSP) 242-1986r

(2) A fuse or fuse unit that, after circuit interruption, may be restored readily for service by the replacement of the renewal element, fuse link, or refill unit. *Synonyms:* field-renewable fuse unit; field-renewable fuse; renewable fuse unit. (SWG/PE) C37.100-1992

renewable fuse unit *See:* renewable fuse.

renewal element (of a low-voltage fuse) The part of a renewable fuse that is replaced after each interruption to restore the fuse to operating condition. (SWG/PE) C37.100-1992

renewal parts Those parts that must be replaced during maintenance as a result of wear. (SWG/PE) C37.100-1992

reoperate time, relay *See:* relay reoperate time.

reorder* *See:* order.

* Deprecated.

reorganization (A) The process of rearranging the contents of a database so that space allocation is minimized and efficiency is maximized. Techniques include pointer optimization and garbage collection. *Synonym:* restructuring. *See also:* concurrent reorganization. **(B)** The process of rearranging the logical schema or physical structure of a database. *Synonym:* reformatting. (C) 610.5-1990

repagination *See:* automatic pagination.

repaint *See:* refresh.

repair (1) (failure data for power transformers and shunt reactors) Any operation that requires the dismantling, modification, or replacement of transformer components that

results in restoring the transformer to normal service quality. (PE/TR) C57.117-1986r

(2) (nuclear power quality assurance) The process of restoring a nonconforming characteristic to a condition such that the capability of an item to function reliably and safely is unimpaired, even though that item still does not conform to the original requirement. (PE/NP) [124]

(3) (test, measurement, and diagnostic equipment) The restoration or replacement of parts or components of material as necessitated by wear and tear, damage, failure of parts or the like in order to maintain the specific item of material in efficient operating condition. (MIL) [2]

(4) Work done to restore the component or the circuit breaker to condition for operation. (SWG/PE) C37.10-1995

(5) Includes incoming inspection and test, damage appraisal, cleaning, replacement or fixing of damaged part(s) or both, assembly, postrepair inspection and test, and refinishing. (IA/PC) 1068-1996

repairable item *See:* repaired item.

repaired item An item that is repaired after a failure. *See also:* reliability. (R) [29]

repair facility The entity contracted to make repairs; includes the "on site" repair(s) made by employees of that entity in addition to repair(s) made at a shop operated by or under the supervision of that entity. (IA/PC) 1068-1996

repair rate (nuclear power generating station) The expected number of repair actions of a given type completed on a given item per unit of time. (PE/NP) 352-1987r, 933-1999

repair time The repair time of a failed component or the duration of a failure is the clock time from the occurrence of the failure to the time when the component is restored to service, either by repair of the failed component or by substitution of a spare component for the failed component. It includes time for diagnosing the trouble, locating the failed component, waiting for parts, repairing or replacing, testing, and restoring the component to service. It does not include the time required to restore service to a load by putting alternate circuits into operation. *Synonym:* forced outage duration. (IA/PSE) 399-1997, 493-1997

repair unavailability *See:* unavailability.

repair urgency (electric generating unit reliability, availability, and productivity) When a planned or unplanned outage is initiated, the urgency with which repair activities are carried out is classified according to one of three classes as defined in maximum effort, normal effort, and low-priority effort. (PE/PSE) 762-1987w

repeat The action of receiving a bit stream (for example, frame, token, or fill) and placing it on the medium. Stations repeating the bit stream may copy it into a buffer or modify control bits as appropriate. *Contrast:* transmit. (C/LM) 8802-5-1998

repeatability (1) (electric pipe heating systems) The closeness of agreement among a number of consecutive measurements of the output for the same value of the input under the same operating conditions approaching from the same direction. With respect to electric pipe heating systems, repeatability is usually associated with temperature controllers and is the difference in degrees for repeated operation at a specific temperature setting. (PE/EDPG) 622A-1984r

(2) (electric heat tracing systems) The closeness of agreement among a number of consecutive measurements of the output for the same value of the input under the same operating conditions approaching from the same direction. With respect to electric heat tracing systems, repeatability is usually associated with temperature controllers and is the difference in degrees for repeated operation at a specific temperature setting. (PE/EDPG) 622B-1988r

(3) (measurement) (control equipment) The closeness of agreement among repeated measurements of the same variable under the same conditions. *See also:* measurement system. (PE/PSE) 94-1970w

(4) (supervisory control, data acquisition, and automatic control) The measure of agreement among multiple readings of an output for the same value of input, made under the same operating conditions, approaching from the same direction, using full-range traverses. (SWG/SUB/PE) C37.1-1987s, C37.100-1992

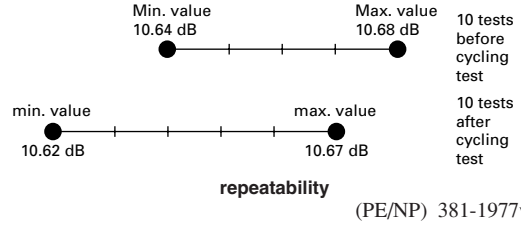
(5) (electrical analog indicating instruments) The ability of an instrument to repeat its readings taken when the pointer is deflected upscale, compared to the readings taken when the pointer is deflected downscale, expressed as a percentage of the full-scale value. *See also:* moving element; measurement system. (EEC/AII) [102]

(6) (analog computer) A quantitative measure of the agreement among repeated operations. (C) 165-1977w

(7) (A) (attenuator, variable in fixed steps) Maximum difference in decibels of residual or incremental characteristic insertion loss for a selected position between the extreme values of a first and second set of ten measurements before and after the specified stepping life. **(B) (attenuator, variable in fixed steps)** (two-port, due to insertion/removal cycle) The maximum difference in decibels between the extreme value of ten measurements before and ten measurements after the number of complete insertion/removal cycles specified in insertion/removal life. **(C) (inertial sensors)** (continuously variable attenuator, due to cycling) Maximum difference in decibels between the extreme values of a first set of ten measurements for a selected calibration point, five of which are approached from the opposite direction, and the extreme values of a similar second set after the specified cycling life. (IM/HFIM/GYAC) 474-1973

(8) (accelerometer) (inertial sensors) (gyros) The closeness of agreement among repeated measurements of the same variable under the same conditions when changes in conditions or nonoperating periods occur between measurements. (AES/GYAC) 528-1994

(9) (nuclear power generating station) The closeness of agreement among a number of consecutive measurements of the output for the same value of the input under the same operating conditions, approaching from the same direction.



repeatability

(PE/NP) 381-1977w

(10) (software) *See also:* test repeatability. (C) 610.12-1990

repeated selection sort A selection sort in which the set of items to be sorted is divided into subsets; one item that fits specified criteria is selected from each subset, forming a second-level subset; a selection sort is then applied to this second-level subset; the selected item is appended to the sorted set and is replaced in the second-level subset by the next eligible item in the original subset; and the process is repeated until all items are in the sorted set. *See also:* tournament sort. (C) 610.5-1990w

repeater (1) A device used to extend the length, topology, or interconnectivity of the physical medium beyond that imposed by a single segment, up to the maximum allowable end-to-end trunk transmission line length. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing applied to normal data and collision signals. (C/LM) 802.9a-1995w

(2) (data transmission) A combination of apparatus for receiving either one-way or two-way communication signals and delivering corresponding signals which are either amplified, reshaped, or both. A repeater for one-way communication signals is termed a "one-way repeater" and one for two-way communication signals a "two-way repeater." (PE) 599-1985w

(3) (communication satellite) A receiver-transmitter combination, often aboard a satellite or spacecraft, which receives a signal, performs signal processing (amplification, frequency translation, etc.) and retransmits it. Used in active communication satellite to relay signals between earth stations. *Synonym:* transponder. (COM) [24]

(4) A device that restores signals to their original shape and transmission level at the physical layer only. (C) 610.7-1995

(5) The physical layer coupler of ring segments that provides for physical containment of channels, dividing the ring into segments. A repeater can receive any valid token ring signal and retransmit it with the same characteristics and levels as a transmitting station. (C/LM) 8802-5-1998

(6) A device used to extend the length, topology, or interconnectivity of the physical medium beyond that imposed by a single segment, up to the maximum allowable end-to-end transmission line length. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing applied to the normal data and collision signals. For wired star topologies, repeaters provide a data distribution function. In 100BASE-T, a device that allows the interconnection of 100BASE-T Physical Layer (PHY) network segments using similar or dissimilar PHY implementations (e.g., 100BASE-X to 100BASE-X, 100BASE-X to 100BASE-T4, etc.). Repeaters are only for use in half duplex mode networks. (C/LM) 802.3-1998

(7) (local area networks) A device used to extend the length, topology, and interconnectivity of the physical medium beyond that imposed by a single segment. Demand-priority repeaters perform the functions of restoring signal amplitude, waveform, and timing. They also arbitrate access to the network from connected end nodes and optionally collect statistics regarding network operations. (C) 8802-12-1998

(8) (fiber optics) *See also:* optical repeater. 812-1984w

repeater medium access control sublayer (local area networks) The sublayer in the repeater that arbitrates packet sequencing and controls packet routing. (C) 8802-12-1998

repeater port *See:* port.

repeater servomechanism (1) In an analog computer, a positional servomechanism in which loop input signals from a transmitting transducer are compared with loop feedback signals from a compatible or identical receiving transducer. The latter is mechanically coupled to the servomechanism to produce a mechanical shaft motion or position linearly related to the motion or position of the transmitting transducer. (C) 610.10-1994w

(2) A positional servomechanism in which loop input signals from a transmitting transducer are compared with loop feedback signals from a compatible or identical receiving transducer mechanically coupled to the servomechanism to produce a mechanical shaft motion or position linearly related to motion or position of the transmitting transducer. *See also:* electronic analog computer. (C) 165-1977w

repeater set (1) A repeater unit plus its associated MAUs and, if present, AU interfaces (AUIs). (LM/C) 8802-3-1990s

(2) A repeater unit plus its associated Physical Layer interfaces [Medium Attachment Units (MAUs) or PHYs] and, if present, Attachment Unit (AU) or Media Independent (MI) interfaces (i.e., AUIs, MIIs). (C/LM) 802.3-1998

repeater station (data transmission) An intermediate point in a transmission system where line signals are received, amplified or reshaped, and retransmitted. (PE) 599-1985w

repeater unit The portion of a repeater that is inboard of its Physical Medium Attachment (PMA)/ Physical Signaling Sublayer (PLS), or PMA/Physical Coding Sublayer (PCS) interfaces. (LM/C) 802.3-1998, 8802-3-1990s

repeating field A field within a record that may have multiple occurrences within a record; for example, the data element "Student Name" may have up to 30 occurrences within the following record structure:

Repeating Field

01	Course Name	20 characters
01	Instructor Name	25 characters
01	Students (30)	
	02 Student Name	25 characters
	02 Student Number	9 characters

(C) 610.5-1990w

repeating group A collection of data elements that may have multiple occurrences within a record; for example, the data elements representing the name and age of each dependent within an employee record. (C) 610.5-1990w

repeating port A transmitting port on a physical layer (PHY) that is repeating a packet from the PHY's receiving port. (C/MM) 1394a-2000

repeat key A key that continues to operate as long as it is held down. (C) 610.10-1994w

repeller (electron tube) (reflector) An electrode whose primary function is to reverse the direction of an electron stream. *See also:* electrode. (ED) 161-1971w

reperforator *See:* perforator.

reperforator switching center A message-relaying center at which incoming messages are received on a reperforator that perforates a storage tape from which the message is retransmitted into the proper outgoing circuit. The reperforator may be of the type that also prints the message on the same tape, and the selection of the outgoing circuit may be manual or under control of selection characters at the head of the message. *See also:* telegraphy. (COM) [49]

repetition equivalent (of a complete telephone connection, including the terminating telephone set) A measure of the grade of transmission experienced by the subscribers using the connection. It includes the combined effects of volume, distortion, noise, and all other subscriber reactions and usages. The repetition equivalent of a complete telephone connection is expressed numerically in terms of the trunk loss of a working reference system when the latter is adjusted to given an equal repetition rate. (EEC/PE) [119]

repetition instruction (1) An instruction that causes one or more instructions to be executed an indicated number of times. (C) [20], [85]

(2) A computer instruction that causes one or more instructions to be executed an indicated number of times, for example:

```
do 10 times:

write a record

add one to a counter

end
```

(C) 610.10-1994w

repetition rate The average number of partial discharge pulses per second measured over a selected period of time. (SWG/PE) 1291-1993r

repetition rate *n* (dry-type transformers) (failure data for power transformers and shunt reactors on electric utility power systems) (partial discharge measurement in liquid-filled power transformers and shunt reactors) The partial discharge pulse repetition rate n is the average number of partial discharge pulses per second measured over a selected period of time. (PE/TR) C57.113-1988s, C57.124-1991r

repetitive addressing (1) A method of implied addressing in which the operation field of a computer instruction is understood to address the operands of the last instruction executed. *Contrast:* one-ahead addressing. (C) 610.12-1990

(2) A method of implied addressing, applicable only to zero-address instructions, in which the operation field of an instruction implicitly addresses the operands of the last instruction executed. (C) 610.10-1994w

repetitively pulsed laser (laser maser) A laser with multiple pulses of radiant energy occurring in a sequence. (LEO) 586-1980w

repetitive operation (analog computer) A condition in which the computer operates as a repetitive device; the solution time may be a small fraction of a second or as long as desired, after which the problem is automatically and repetitively cycled through reset, hold, and operate. (C) 165-1977w

repetitive peak forward current (semiconductor) The peak value of the forward current including all repetitive transient currents. (IA) [12]

repetitive peak line voltage (thyristor) The highest instantaneous value of the line voltage including all repetitive transient voltages, but excluding all nonrepetitive transient voltages. (IA/IPC) 428-1981w

repetitive peak OFF-state current (semiconductor) The maximum instantaneous value of the OFF-state current that results from the application of repetitive peak-OFF-state voltage. (IA) [12]

repetitive peak OFF-state voltage The maximum instantaneous value of the OFF-state voltage that occurs across a thyristor, including all repetitive transient voltages, but excluding all nonrepetitive transient voltages. (IA/ED) 223-1966w, [62], [46], [12]

repetitive peak ON-state current (semiconductor) The peak value of the ON-state current including all repetitive transient currents. (IA) [12]

repetitive peak reverse current (semiconductor) The maximum instantaneous value of the reverse current that results from the application of repetitive peak reverse voltage. (IA) [12]

repetitive peak reverse voltage (1) (semiconductor rectifiers) The maximum instantaneous value of the reverse voltage, including all repetitive transient voltages but excluding all nonrepetitive transient voltages, that occurs across a semiconductor rectifier cell, rectifier diode, or rectifier stack. *See also:* semiconductor rectifier stack; principal voltage-current characteristic; rectification. (IA/ED) 59-1962w, [12], [62], [46], 223-1966w

(2) (reverse-blocking thyristor) The maximum instantaneous value of the reverse voltage which occurs across the thyristor, including all repetitive transient voltages, but excluding all non-repetitive transient voltages. (IA) [12]

repetitive peak reverse-voltage rating (rectifier circuit element) The maximum value of repetitive peak reverse voltage permitted by the manufacturer under stated conditions. *See also:* average forward current rating. (IA) 59-1962w, [62], [12]

repetitive surge and follow-current withstand The number of surges of specified voltage and current amplitudes and waveshapes that may be applied to a device without causing degradation beyond specified limits. The repetitive surge and follow-current withstand ratings apply to a device connected to an ac line of specified characteristics and to pulses applied at specified rates and phase angles. The effects of any cumulative heating that may occur are included. (SPD/PE) C62.62-2000

replaceable unit A collection of one or more parts considered as a single part for the purposes of replacement and repair due to physical constraints of the unit under test (UUT). (ATLAS) 1232-1995

replacement part A part for use in place of an existing component of switching equipment. (SWG/PE) C37.30-1971s

replay *See:* reversible execution.

replicate One of multiple aliquants of a sample. (NI) N42.23-1995

replica temperature relay A thermal relay whose internal temperature rise is proportional to that of the protected apparatus or conductor, over a range of values and durations of overloads. (SWG/PE) C37.100-1992

replication (1) (A) Theoretically, repetition of an experiment in exact detail. **(B)** Obtaining similar results from similar experiments. (T&D/PE) 539-1990

(2) The process by which copies of entries are created and maintained. (C/PA) 1328.2-1993w, 1326.2-1993w, 1224.2-1993w, 1327.2-1993w

reply (1) (transponder operation) (navigation aids) A radio-frequency signal or combination of signals transmitted as a result of an interrogation. (AES/GCS) 172-1983w

(2) Messages from the printer to the host. *Synonym:* response. (C/MM) 1284.1-1997

(3) The response sent from a target to an initiator indicating that the target has successfully or unsuccessfully executed the process specified by the command originally sent from the initiator to the target. (C/MM) 1284.4-2000

(4) *See also:* transaction completion. (C/MM) 1212.1-1993

replying agent An agent that participates in a transfer operation with the bus owner. (C/MM) 1296-1987s

reply phase The final phase of a transfer operation that consists of one or more consecutive data and/or status transfers on the parallel system bus. (C/MM) 1296-1987s

report The data objects/elements sent to a master device from slave devices. Used only in connection with slave devices. A slave device may parse requests for objects that it cannot generate or report. (PE/SUB) 1379-1997

report-by-exception The reporting of data (e.g., from RTU to master station) only when the data either changes state (e.g., for a status or digital input point) or exceeds a predefined deadband (e.g., for an analog input point). (SUB/PE) C37.1-1994

Report Generation Language A problem-oriented language designed for file processing and report creation. (C) 610.13-1993w

reporting period A period assumed to be one year unless otherwise stated. (PE/T&D) 1366-1998

reporting period time The duration of the reporting period (equals service time plus outage time). (PE/PSE) 859-1987w

report standard A standard that describes the characteristics of describing results of engineering and management activities. (C) 610.12-1990

report writer (1) A query language that can produce formatted reports using data from a database or other files. (C) 610.5-1990w

(2) A software tool or programming language used specifically for generating reports. (C) 610.13-1993w

repository (A) A collection of all software-related artifacts (e.g., the software engineering environment) belonging to a system. **(B)** The location/format in which such a collection is stored. (C/SE) 1219-1998

repository of last resort In a hierarchical memory (or cache-based) environment, a storage location that "owns" the only, or last remaining, copy of sharable data. *Note:* It may be a unique source, an ultimate destination, or simply a "safe" repository of data that may not be invalidated, unless action is taken to preserve a copy of that data at some higher level in the memory (or cache) hierarchy. In a cache-only Futurebus+ system (e.g., one where even the main DRAM storage is also designed as a hardware cache), the repository of last resort begins life as the binding of an address to a physical location in one of the caches, along with the creation of the data by initialization, a copy from some higher level in the memory hierarchy, or by its arrival from some I/O device. This data may migrate around the system, and be owned by different caches at different times, provided no less than one copy of that data is maintained somewhere. A repository of last resort may end its life by an explicit instruction to "destroy" the data by migration to a higher level in the memory (or cache hierarchy), or by transfer of ownership through some I/O device to another system, storage device, or display. (C/BA) 10857-1994

representation (1) A likeness, picture, drawing, block diagram, description, or symbol that logically portrays a physical,

operational, or conceptual image or situation. (C/SE) 1233-1998

(2) One or more properties used by an algorithm for the realization of a responsibility. (C/SE) 1320.2-1998

representational model *See:* descriptive model.

representation property A property on which an algorithm operates. (C/SE) 1320.2-1998

representation standard A standard that describes the characteristics of portraying aspects of an engineering or management product. (C) 610.12-1990

representative sample (nuclear power generating station) Production/prototype equipment used in a qualification program that is equivalent to that for which qualification is sought in terms of design, function, materials, and manufacturing techniques and processes. (SWG/PE/NP) 649-1980s, C37.100-1992

reproduce *See:* duplicate.

reproducibility (1) The ability of a system or element to maintain its output/input precision over a relatively long period of time. *See also:* precision; accuracy. (IA) [61]

(2) (transmission lines and waveguides) The degree to which a given set of conditions or observations, using different components or instruments each time, can be reproduced. *See also:* measurement system. (IM/HFIM) [40]

(3) (automatic null-balancing electric instrument) The closeness of agreement among repeated measurements by the instrument for the same value of input made under the same operating conditions, over a long period of time, approaching from either direction. *Notes:* 1. It is expressed as a maximum nonreproducibility in percent of span for a specified time. 2. Reproducibility includes drift, repeatability, and dead band. *See also:* measurement system. (EEC/EMI) [112]

(4) (radiation protection) (precision) The degree of agreement of repeated measurements of the same property expressed quantitatively as the standard deviation computed from the results of the series of measurements. (NI) N323-1978r

(5) (supervisory control, data acquisition, and automatic control) The measure of agreement among multiple readings of the output for the same value of input, made under the same operating conditions, approaching from either direction, using full-range traverses. (SUB/PE) C37.1-1987s

reproducing punch *See:* card reproducing punch.

reproducing stylus A mechanical element adapted to following the modulations of a record groove and transmitting the mechanical motion thus derived to the pickup mechanism. *See also:* phonograph pickup. (SP) [32]

reproductibility *See:* repeatability.

reproduction speed (facsimile) The area of copy recorded per unit time. *See also:* recording. (COM) 168-1956w

reprogrammable read-only memory (RPROM) *See:* erasable programmable read-only memory.

reprographics Automated composition, production, and reproduction of printed material. Methods include photocomposition, computer-aided typesetting, and offset printing. *See also:* office automation. (C) 610.2-1987

repulsion-induction motor A motor with repulsion-motor windings and short-circuited brushes, without an additional device for short-circuiting the commutator segments, and with a squirrel-cage winding in the rotor in addition to the repulsion motor winding. (PE) [9]

repulsion motor A single-phase motor that has a stator winding arranged for connection to a source of power and a rotor winding connected to a commutator. Brushes on the commutator are short-circuited and are so placed that the magnetic axis of the rotor winding is inclined to the magnetic axis of the stator winding. This type of motor has a varying-speed characteristic. *See also:* asynchronous machine. (PE) [9]

repulsion-start induction motor A single-phase motor with repulsion-motor windings and brushes, having a commutator-short-circuiting device that operates at a predetermined speed of rotation to convert the motor into the equivalent of a squirrel-cage motor for running operation. For starting operation, this motor performs as a repulsion motor. *See also:* asynchronous machine. (PE) [9]

request (1) Transaction that is generated by a requester, to initiate an action on a responder. For a processor-to-memory read transaction, for example, the request transfers the memory address and command from the processor to memory. In the case of a split transaction, the request would be a separate bus transaction. In the case of a connected transaction, the request would be the connection phase of a bus transaction. (C/BA) 896.3-1993w

(2) (local area networks) (Request_Normal, Request_High) A link control signal indicating that a lower entity has traffic pending for the network. (C) 8802-12-1998

(3) A command, generated by a requester, to initiate an action on a responder. For a processor-to-memory read transaction, for example, the request transfers the memory address and command from the processor to memory. In the case of a split transaction, the request would be a separate bus transaction. In the case of a connected transaction, the request would be the connection phase of a bus transaction. (C/BA) 10857-1994, 896.4-1993w, 1014.1-1994w

(4) A subaction with a transaction code and optional data sent by a node (the requester) to another node (the responder). (C/MM) 1394-1995

(5) A message sent from one object (the sender) to another object (the receiver), directing the receiver to fulfill one of its responsibilities. Specifically, a request may be for the value of an attribute, for the value of a participant property, for the application of an operation, or for the truth of a constraint. *Request* also encompasses sentences of such requests. Logical sentences about the property values and constraints of objects are used for queries, pre-conditions, post-conditions, and responsibility realizations. *See also:* message. (C/SE) 1320.2-1998

(6) A type of primitive in which one layer entity solicits another layer entity to perform a particular function. (EMB/MIB) 1073.4.1-2000

(7) A primary packet (with optional data) sent by one node's link (the requester) to another node's link (the responder). (C/MM) 1394a-2000

(8) *See also:* transaction initiation. (C/MM) 1212.1-1993

request echo The echo packet generated by a responder or agent when it strips the request send packet. (C/MM) 1596-1992

request for proposal (RFP) (1) A request for services, research, or a product prepared by a customer and delivered to prospective developers with the expectation that prospective developers will respond with their proposed cost, schedule, and development approach. (C/SE) 1362-1998

(2) A document used by the acquirer as a means to announce intention to potential bidders to acquire a specified system or software product (which may be part of a system). (C/SE) 1062-1998

requester-capable A term used to describe RamLink slaves that behave as DMA masters in the sense that they generate request packets and receive response packets. The delivery of these request and response packets is done by the controller. (C/MM) 1596.4-1996

requested batch service A service that is either rejected or performed prior to a response from the service to the requester. (C/PA) 1003.2d-1994

requester (1) (VSB) A functional module that resides on the same board as a master and requests use of the DTB whenever its master needs it. When implementing serial arbitration, after requesting use of the DTB, the requester waits for the bus to be granted to it by the arbiter. In the parallel arbitration method, the requester that is associated with the active master initiates an arbitration cycle. This arbitration cycle is used to determine which master will be granted use of the DTB. The

VSB specification calls the requester that is associated with the master the "active requester." Requesters that have a bus request pending and that participate in an arbitration cycle are called "contending requesters." (MM/C) 1096-1988w

(2) (VMEbus) A functional module that resides on the same printed-circuit board (pcb) as an interrupt handler or a master and requests use of the data transfer bus (DTB) whenever its interrupt handler or master needs it. (BA/C) 1014-1987

(3) A module that initiates a transaction by sending a request (containing address, command, and sometimes data). (C/BA) 1014.1-1994w, 896.3-1993w, 896.4-1993w, 10857-1994

(4) The node that initiates a transaction, by initiating a request subaction. (C/MM) 1596-1992

(5) A node that initiates a transaction by generating a request subaction (containing address, command, and sometimes data). (C/MM) 1212-1991s

requesting agent An agent that has entered arbitration for bus access. *See also:* arbitration operation. (C/MM) 1296-1987s

request message A message that generates one or more response messages when processed. (C/BA) 896.2-1991w

request packet A packet that is generated by a controller to initiate a directed transaction with a selected slave. (C/MM) 1596.4-1996

request phase The initial phase of a transfer operation in which the bus owner places command and address information on the parallel system bus. (C/MM) 1296-1987s

request send The packet generated by a requester to initiate an action in the responder, containing address, command, and, if appropriate, data. In a processor-to-memory read transaction, for example, the request send transfers the memory address and command from the processor to memory. (C/MM) 1596-1992

request subaction (1) A request send and its echo. Often called simply a "request." (C/MM) 1596-1992

(2) A subaction that is generated by a requester to initiate an action on the responder. For a processor-to-memory read transaction, for example, the request subaction transfers the memory address and command from the processor to memory. (C/MM) 1212-1991s

request test (metering) A test made at the request of a customer. (ELM) C12.1-1982s

required feature Either a single facility or behavior, or one of a pair of alternative facilities or behaviors, required by a POSIX standard that is always present on a conformng implementation. (C/PA) 13210-1994, 2003.1-1992

required hyphen In word processing, a hyphen that is to appear in a word or phrase regardless of whether the word or phrase is divided to achieve justification; for example, the hyphen in "computer-aided design." *Note:* A required hyphen is not subject to hyphen drop. *Synonym:* embedded hyphen. *Contrast:* discretionary hyphen. (C) 610.2-1987

required input motion (valve actuators) The input motion in terms of acceleration, velocity, and displacement expressed as a function of frequency that a device being tested shall withstand and still perform its intended function. (PE/NP) 382-1985

required inputs The set of items necessary to perform the minimum V&V tasks mandated within any life cycle activity. (C/SE) 1012-1998

required outputs The set of items produced as a result of performing the minimum V&V tasks mandated within any life cycle activity. (C/SE) 1012-1998

required reserve (power operations) (electric power supply) The system planned reserve capability needed to ensure a specified standard of service. (PE/PSE) 858-1987s, 346-1973w

required response spectrum (RRS) (1) (seismic qualification of Class 1E equipment for nuclear power generating stations) The response spectrum issued by the user or his agent as part of his specifications for qualification or artificially created to cover future applications. The RRS constitutes a requirement to be met. (SWG/PE/NP/PSR) 344-1987r, C37.98-1977s, C37.81-1989r

(2) The response spectrum issued by the user or the user's agent as part of the specifications for proof testing, or artificially created to cover future applications. The RRS constitutes a requirement to be met. (SWG/PE/NP) C37.100-1992, 382-1985

(3) The response spectrum issued by the user or the user's agent as part of the specifications for qualification. The RRS constitutes a requirement to be met. (PE/SUB) 693-1997

required time (availability) The period of time during which the user requires the item to be in a condition to perform its required function. (R) [29]

requirement (1) (A) A characteristic that a system or a software item is required to possess in order to be acceptable to the acquirer. **(B)** A binding statement in a standard or another portion of the contract. Requirements are expressed using the word "shall." (C/SE) J-STD-016-1995

(2) A statement that identifies a product or process operational, functional, or design characteristic or constraint, which is unambiguous, testable or measurable, and necessary for product or process acceptability (by consumers or internal quality assurance guidelines). (C/SE) 1220-1998

(3) (A) A condition or capability needed by a user to solve a problem or achieve an objective. **(B)** A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document. **(C)** A documented representation of a condition or capability as in definition (A) or (B). (C/SE) 1233-1998

requirements analysis (A) (software) The process of studying user needs to arrive at a definition of system, hardware, or software requirements. **(B) (software)** The process of studying and refining system, hardware, or software requirements. (C) 610.12-1990

requirements baseline The composite set of operational, functional, and physical requirements that serve to guide development and management decision processes. (C/SE) 1220-1994s

requirements baseline validation The process of evaluating the results of the requirements analysis activities of the systems engineering process to ensure compliance with customer expectations, project and enterprise constraints, and external constraints. (C/SE) 1220-1994s

requirements demonstration metric The result of dividing the total number of separately-identified requirements in the software requirements specification (SRS) that have been successfully demonstrated, by the total number of separately-identified requirements in the SRS. (C/SE) 730-1998

requirements inspection *See:* inspection.

requirements phase (1) (software verification and validation plans) The period of time in the software life cycle during which the requirements, such as functional and performance capabilities for a software product, are defined and documented. (C/SE) 1012-1986s

(2) (software) The period of time in the software life cycle during which the requirements for a software product are defined and documented. (C) 610.12-1990

requirements review A process or meeting during which the requirements for a system, hardware item, or software item are presented to project personnel, managers, users, customers, or other interested parties for comment or approval. Types include system requirements review, software requirements review. *Contrast:* design review; formal qualification review; code review; test readiness review. (C) 610.12-1990

requirements specification (software) A document that specifies the requirements for a system or component. Typically included are functional requirements, performance require-

ments, interface requirements, design requirements, and development standards. *Contrast:* design description. *See also:* functional specification; performance specification. (C) 610.12-1990

requirements specification language (software) A specification language with special constructs and, sometimes, verification protocols, used to develop, analyze, and document hardware or software requirements. *See also:* design language. (C) 610.12-1990, 610.13-1993w

requirement standard (software) A standard that describes the characteristics of a requirements specification. (C) 610.12-1990

requirements verification *See:* verification.

reradiated field An electromagnetic field resulting from currents induced in a secondary, predominantly conducting, object by electromagnetic waves incident on that object from one or more primary radiating structures or antennas. Reradiated fields are sometimes called "reflected" or more correctly "scattered fields." The scattering object is sometimes called a "re-radiator" or "secondary radiator." *See also:* scattered radiation. (NIR) C95.1-1999

reradiation (1) (A) The scattering of incident radiation. **(B)** The radiation of signals amplified in a radio receiver. *See also:* radio receiver. (EEC/PE) [119]

(2) The process by which an electromagnetic signal induces currents into a structure, which then causes radiation from that structure. (T&D/PE) 1260-1996

rerecording (electroacoustics) The process of making a recording by reproducing a recorded sound source and recording this reproduction. *See also:* dubbing. (SP) [32]

rerecording system (electroacoustics) An association of reproducers, mixers, amplifiers, and recorders capable of being used for combining or modifying various sound recordings to provide a final sound record. *Note:* Recording of speech, music, and sound effects may be so combined. *See also:* dubbing; phonograph pickup. (SP) [32]

rerefining (insulating oil) The use of primary refining processes on used electrical insulating liquids that are suitable for further use as electrical insulating liquids. *Note:* Techniques may include a combination of distillation and acid, clay or hydrogen treating, and other physical and chemical means. (PE/TR) 637-1985r

rering signal (telephone switching systems) A signal initiated by an operator at the calling end of an established connection to recall the operator at the called end or the customer at either end. (COM) 312-1977w

rerunability An attribute of a batch job. If a batch job may be rerun from the beginning after an abnormal termination without affecting the validity of the results, the job is said to be rerunable. (C/PA) 1003.2d-1994

rerun point (computers) The location in the sequence of instructions in a computer program at which all information pertinent to the rerunning of the program is available. (MIL/C) [2], [20], [85]

rerun time That part of operating time that is used for repeating operations or programs whose repetition is due to faults or mistakes in operations. (C) 610.10-1994w

rescue point *See:* restart point.

reseal voltage rating (surge arresters) The maximum arrester recovery voltage permitted for a specified time following one or more unit operation(s) with discharge currents of specified magnitude and duration. (PE) [8]

reservation charge *See:* capacity charge.

reserve (1) (test, measurement, and diagnostic equipment) The setting aside of a specific portion of memory for a storage area. (MIL) [2]

(2) (electric power system) (generating stations electric power system) A qualifying term used to identify equipment and capability that is available and is in excess of that required for the load. *Note:* The reserve may be connected to the system and partially loaded or may be made available by closing switches, contactors, or circuit breakers. Reserve not in operation and requiring switching is sometimes called standby equipment. (PE/EDPG) 505-1977r

(3) (power operations) *See also:* operating reserve; nonspinning reserve; customer generation reserve; spinning reserve; installed reserve; electrical reserve; voltage reduction reserve; interruptible load reserve; required reserve. (PE/PSE) 858-1987s

reserve cell A cell that is activated by shock or other means immediately prior to use. *See also:* electrochemistry. (EEC/PE) [119]

reserved (1) The term used for signals, bits, fields, and code values that are set aside for future standardization. (C/BA) 1496-1993w

(2) Used to describe an instruction field or register field that is reserved for definition by future versions of the architecture. A reserved field should only be written to zero by software. A reserved register field shall read as zero in hardware; software intended to run on future versions of IEEE 1754 should not assume that the field will read as zero. *See also:* ignored; unused. (C/MM) 1754-1994

(3) (FASTBUS acquisition and control) Bus lines, connector pins, codes, bits, etc held for future assignment by the NIM committee. They are not to be used until and except as so assigned. (NID) 960-1993

(4) An object in the delivery, retrieval, or input queue that the client can access without first removing it from that queue, but that no other client can access simultaneously. (C/PA) 1224.1-1993w

(5) Any protocol elements identified as "reserved" are intended for future standardization. Reserved elements shall not be used. Reserved fields or bits shall be set to 0 and shall not be checked. (C/MM) 1284.4-2000

reserved segment interconnect A segment interconnect is said to be reserved if it has gained mastership of the far-side segment and is asserting GK=1 onto that segment. (NID) 960-1993

reserved signal Signals that the application cannot accept and for which the application cannot modify the signal action or masking because the signals are reserved for use by the Ada language implementation. (C) 1003.5-1999

reserved word A word in a programming language whose meaning is fixed by the rules of that language and which, in certain or all contexts, cannot be used by the programmer for any purpose other than its intended one. Examples include IF, THEN, WHILE. (C) 610.12-1990

reserve, electrical *See:* electrical reserve.

reserve equipment The installed equipment in excess of that required to carry peak load. *Note:* Reserve equipment not in operation is sometimes referred to as standby equipment. *See also:* generating station. (T&D/PE) [10]

reserve generation (RG) (1) (electric generating unit reliability, availability, and productivity) The energy that a unit could have produced in a given period but did not, because it was not required by the system. This is the difference between available generation and actual generation. (PE/PSE) 762-1987w

(2) A flexible type of coaxial cable. RG is a military term. (C/CC) 802.7-1989r

reserve, installed *See:* installed reserve.

reserve, nonspinning *See:* nonspinning reserve.

reserve, operating *See:* operating reserve.

reserve, required *See:* required reserve.

reserve shutdown (power system measurement) (electric generating unit reliability, availability, and productivity) The state in which a unit is available but not in service. *Note:* This is sometimes referred to as economy shutdown. (PE/PSE) 762-1987w

reserve shutdown forced derated hours (electric generating unit reliability, availability, and productivity) The reserve shutdown hours during which a Class 1, 2, or 3 unplanned derating was in effect. (PE/PSE) 762-1987w

reserve shutdown hours (electric generating unit reliability, availability, and productivity) The number of hours a unit was in the reserve shutdown state. (PE/PSE) 762-1987w

reserve shutdown maintenance derated hours (electric generating unit reliability, availability, and productivity) The reserve shutdown hours during which a Class 4 unplanned derating was in effect. (PE/PSE) 762-1987w

reserve shutdown planned derated hours (electric generating unit reliability, availability, and productivity) The reserve shutdown hours during which a basic or extended planned derating was in effect. (PE/PSE) 762-1987w

reserve shutdown unit derated hours (electric generating unit reliability, availability, and productivity) The reserve shutdown hours during which a unit derating was in effect. (PE/PSE) 762-1987w

reserve shutdown unplanned derated hours (electric generating unit reliability, availability, and productivity) The reserve shutdown hours during which an unplanned derating was in effect. (PE/PSE) 762-1987w

reservoir operating curve (power operations) A curve, or family of curves (reservoir capability versus time), indicating how a reserve is to be operated under specified conditions to obtain best or predetermined results. (PE/PSE) 858-1987s

reservoir operating rule curve (electric power supply) A curve, or family of curves (reservoir capability versus time), indicating how a reservoir is to be operated under specified conditions to obtain best or predetermined results. (PE/PSE) 346-1973w

reservoir storage (power operations) (electric power system) The volume of water in a reservoir at a given time. (PE/PSE) 858-1987s, 346-1973w

reset (1) (A) (electronic digital computation) To restore a storage device to a prescribed state, not necessarily that denoting zero. **(B) (electronic digital computation)** To place a binary cell in the initial or zero state. *See also:* set. (C/MIL/ICTL) 162-1963, [20], 270-1966, [60], [85], [2], 610.10-1994

(2) (analog computer) The computer control state in which integrators are held constant and the proper initial condition voltages or charges are applied or reapplied. *See also:* initial condition. (C) 165-1977w

(3) (software) To set a variable, register, or other storage location back to a prescribed state. *See also:* initialize; clear. (C) 610.12-1990, 610.10-1994w

(4) An action that occurs when certain error conditions occur, or when error conditions exceed a preset value. Reset causes the Data Link layer to go to the offline state. Reconnection can than be requested by the DCC. (EMB/MIB) 1073.3.1-1994

(5) When describing the operating status of an S-module, the state of the S-module's Status registers produced by execution of the Reset Slave Status command. (TT/C) 1149.5-1995

(6) The state of an inverse-time overcurrent relay when the integral of the function of current *F(I)* that produces a time-current characteristic is zero. (PE/PSR) C37.112-1996

(7) (of a relay) The action of a relay as it makes designated response to decreases in input. As a qualifying term, reset denotes the state of a relay when all response to decrease of input has been completed. Reset is also used to identify the maximum value of an input quantity reached by progressive decreases that will permit the relay to reach the state of complete reset from pickup. *Note:* In defining the designated performance of relays having multiple inputs, reset describes the state when all inputs are zero and also when some input circuits are energized, if the resulting state is not altered from the zero-input condition. (SWG/PE/PSR) C37.100-1992, C37.90-1978s

reset action (process control) A component of control action in which the final control element is moved at a speed proportional to the extent of proportional-position control action. *Note:* This term applies only to a multiple control action including proportional-position control action. *See also:* proportional plus integral control action; positioning control system. (PE/EDPG) [3]

reset, automatic *See:* automatic reset.

reset characteristic The time versus current curve that defines the time required for the integral of the function of current *F(I)* to reach zero for values below current pickup when the integral is initially at the trip value. (PE/PSR) C37.112-1996

reset control action (electric power system) Action in which the controller output is proportional to the input signal and the time integral of the input signal. The number of times per minute that the integral control action repeats the proportional control action is called the reset rate. *Note:* Applies only to a controller with proportional control action plus integral control action. *See also:* speed-governing system. (PE/PSE) 94-1970w

reset current or voltage (faulted circuit indicators) The nominal rms (root-mean-square) value of current or voltage that will cause the indicator of the automatic current or voltage reset FCI (faulted circuit indicator) to change from FAULT to NORMAL indication. (T&D/PE) 495-1986w

reset device A device whereby the brakes may be released after an automatic train-control brake application. (EEC/PE) [119]

reset dwell time The time spent in reset. In cycling the computer from reset, to operate, to hold, and back to reset, this time must be long enough to permit the computer to recover from any overload and to charge or discharge all integrating capacitors to appropriate initial voltages. *See also:* electronic analog computer. (C) 165-1977w

reset interval (1) (automatic circuit recloser) The time required for the counting mechanism to return to the starting position. (SWG/PE) C37.60-1981r

(2) (of an automatic circuit recloser or automatic line sectionalizer) The time required, after a counting operation, for the counting mechanism to return to the starting position of that counting operation. (SWG/PE) C37.100-1992

reset, manual *See:* manual reset.

reset on inertial navigation systems (navigation aid terms) Use of external data (for example, position fix) to refine alignment of and to calibrate the inertial navigation system. (AES/GCS) 172-1983w

reset packet A packet used during initialization to reset the node's CSR state, empty ring buffers, initialize the ring interface and establish that ring closure has been achieved. (C/MM) 1596-1992

reset pulse A drive pulse that tends to reset a magnetic cell. (Std100) 163-1959w

reset rate (process control) (proportional plus reset control action or proportional plus reset plus rate control action) The number of times per minute that the effect of proportional-position control action is repeated. *See also:* integral action rate. (PE/EDPG) [3]

reset switch A machine-operated device that restores normal operation to the control system after a corrective action. *See also:* photoelectric control. (IA/ICTL/IAC) [60]

resettability (1) (electric pipe heating systems) The restoring of a mechanism, electrical circuit, or device to the prescribed state. Resettability is usually associated with temperature controllers and is the difference in degrees when returning to original temperature setting. (PE/EDPG) 622A-1984r, 622B-1988r

(2) (oscillators) The ability of the tuning element to retune the oscillator to the same operating frequency for the same set of input conditions. (ED) 158-1962w

reset test A test or collection of tests that is invoked by a command_reset. Although a reset test is actually a form of initialization test, the term reset test is used to avoid confusing its functionality with the initialization tests that are invoked by writing to the TEST_START register. (C/MM) 1212-1991s

reset time (faulted circuit indicators) The time required for the FCI (faulted circuit indicator) to return automatically to NORMAL indication after its reset current or voltage has been established, or for the elapsed time automatic reset FCI to reset. (T&D/PE) 495-1986w

(2) (A) (of a relay) The time interval from occurrence of specified conditions to reset. *Note:* When the conditions are not specified it is intended to apply to a picked-up relay and to be a sudden change from picked value of input to zero input. **(B)** (of an automatic circuit recloser or automatic line sectionalizer) The time required, after one or more counting operations, for the counting mechanism to return to the starting position. (SWG/PE) C37.100-1992

resident Pertaining to computer programs that remain in a particular storage device or in main storage. (C) 610.10-1994w

resident control program *See:* kernel.

residential-custodial care facility (health care facilities) A building, or part thereof, used for the lodging or boarding of 4 or more persons who are incapable of self-preservation because of age, or physical or mental limitation. This includes facilities such as homes for the aged, nurseries (custodial care for children under 6 years of age), and mentally retarded care institutions. Day care facilities that do not provide lodging or boarding for institutional occupants are not classified as residential custodial care facilities. (NESC/NEC) [86]

residential zone A zone that includes single-family and multifamily residential units, as defined by local ordinances. (PE/SUB) 1127-1998

residual-component telephone-influence factor (three-phase synchronous machine) The ratio of the square root of the sum of the squares of the weighted residual harmonic voltages to three times the root-mean-square no-load phase-to-neutral voltage. (PE) [9]

residual control A microprogramming technique in which the meaning of a field in a microinstruction depends on the value in an auxiliary register. *Contrast:* bit steering. *See also:* two-level encoding. (C) 610.12-1990

residual current (protective relaying) The sum of the three-phase currents on a three-phase circuit. The current that flows in the neutral return circuit of three wye-connected current transformers is residual current. (PE/PSR) C37.95-1973s

residual-current state (thermionics) The state of working of an electronic valve or tube in the absence of an accelerating field from the anode of a diode or equivalent diode, in which the cathode current is due to the nonzero velocity of emission of electrons. *See also:* electron emission; inductive coordination. (ED) [45], [84]

residual element A circuit element connected to a function pin that, for operational reasons, cannot be isolated from the pin in test mode. A residual element can be connected to a power supply pin, or another function pin, or another residual element, provided it can be modelled over a defined working range by a network of ideal resistors, capacitors, and inductors together with independent dc sources. (C/TT) 1149.4-1999

residual error (1) (electronic navigation) The sum of the random errors and the uncorrected systematic errors. *See also:* navigation. (AES/RS) 686-1982s, [42]

(2) (software) The difference between an optimum result derived from experience or experiment and a theoretically exact result. (C) 1084-1986w

residual-error rate *See:* undetected error rate.

residual flux density The magnetic flux density at which the magnetizing force is zero when the material is in a symmetrically cyclically magnetized condition. *See also:* remanence. (Std100/PE/PSR) 163-1959w, C37.110-1996

residual frequency-modulation (frequency modulation) (spectrum analyzer) Short term displayed frequency instability (jitter) of the spectrum analyzer caused by instability of the local oscillators. Given in terms of peak-to-peak frequency deviation (Hz). *Notes:* 1. Any influencing factors such as phase lock on or off, etc. should be given. 2. For the purpose of this standard "short term" shall mean measurements made during a specified period of time. The recommended time duration is 20 s to 20 μs per division. This will accommodate incidental FM from less than one Hz to tens of kHz. The manufacturer shall specify the time to be used. *Synonym:* incidental frequency modulation. (IM) [14], 748-1979w

residual induction (1) (magnetic material) The magnetic induction corresponding to zero magnetizing force in a material that is in a symmetrically cyclically magnetized condition. (Std100) 270-1966w

(2) (residual flux density) (toroidal magnetic amplifier cores) The magnetic induction at which the magnetizing force is zero when the magnetic core is cyclically magnetized with a half-wave sinusoidal magnetizing force of a specified peak magnitude. *Note:* This use of the term residual induction differs from the standard definition that requires symmetrically cyclically magnetized conditions. (MAG) 393-1977s

residual life The remaining period of time during which a system, structure, or component is expected to perform its intended function under specified service conditions. (PE/NP) 1205-1993

residual magnetism (ferromagnetic bodies) A property by which they retain a certain magnetization (induction) after the magnetizing force has been removed. (Std100) 270-1966w, [84]

residual modulation *See:* carrier noise level.

residual probe pickup (slotted line) (constancy of probe coupling) The noncyclical variation of the amplitude of the probe output over its complete range of travel when reflected waves are eliminated on the slotted section by proper matching at the output and the input, discounting attenuation along the slotted section. It is defined by the ratio of one-half of the total variation to the average value of the probe output, assuming linear amplitude response of the probe, at a specified frequency(ies) within the range of usage. *Note:* This quantity consists of two parts of which one is reproducible and the other is not. The repeatable part can be eliminated by subtraction in repeated measurements, while the nonrepeatable part must cause an error. The residual probe pickup depends to some extent on the insertion depth of the probe. *See also:* measurement system; residual standing-wave ratio. (IM/HFIM) [40]

residual reflected coefficient (reflectometer) The erroneous reflection coefficient indicated when the reflectometer is terminated in reflectionless terminations. *See also:* measurement system. (IM/HFIM) [40]

residual relay A relay so applied that its input, derived from external connections of instrument transformers, is proportional to the zero-phase-sequence component of a polyphase quantity. (SWG/PE) C37.100-1992

residual response (1) (non-real time spectrum analyzer) A spurious response in the absence of an input. (IM) [14]

(2) (spectrum analyzer) A spurious response in the absence of an input, not including noise and zero pip. (IM) 748-1979w

residuals The differences between the recorded data and the fitted sine wave for sine-wave curve fitting. (IM/WM&A) 1057-1994w

residual standing-wave ratio (SWR) (slotted line) The standing-wave ratio measured when the slotted line is terminated by a reflectionless termination and fed by a signal source that provides a nonreflecting termination for waves reflected toward the generator. *Note:* Residual standing-wave ratio does not include the residual noncyclical probe pickup or the attenuation encountered as the probe is moved along the line. *See also:* residual probe pickup. (IM/HFIM) [40]

residual voltage (1) (arresters) (discharge voltage) The voltage that appears between the line and ground terminals of an arrester during the passage of discharge current. *See also:* inductive coordination. (PE) [8], [84]

(2) (protective relaying) The sum of the three line-to-neutral voltages on a three-phase circuit. (PE/PSR) C37.95-1973s

residue The value of $\lim_{s \to s_0} (s - s_0) \times F(s)$, where $F(s)$; has the complex pole s_0. *See also:* pole. (C/DA) 1481-1999

residue check (computers) A check in which each operand is accompanied by the remainder obtained by dividing this number by n, the remainder then being used as a check digit or digits. *See also:* modulo *N* check. (C) [20], [85]

resin (rotating machinery) Any of various hard brittle solid-to-soft semisolid amorphous fusible flammable substances of either natural or synthetic origin; generally of high molecular weight, may be either thermoplastic or thermosetting. (PE) [9]

resin-bonded paper-insulated bushing (outdoor electric apparatus) A bushing in which the major insulation is provided by paper bonded with resin. (PE/TR) 21-1976

resin impregnated paper-insulated bushing A bushing in which the internal insulation consists of a condenser wound from untreated paper and subsequently impregnated with a curable resin. *Note:* A resin impregnated paper bushing may be provided with an insulating envelope, in which case the intervening space may be filled with another insulating medium. (PE/TR) C57.19.03-1996

resist (electroplating) Any material applied to part of a cathode or plating rack to render the surface nonconducting. *See also:* electroplating. (EEC/PE) [119]

resistance (1) (A) (network analysis) That physical property of an element, device, branch, network, or system that is the factor by which the mean-square conduction current must be multiplied to give the corresponding power lost by dissipation as heat or as other permanent radiation or loss of electromagnetic energy from the circuit. **(B) (network analysis)** The real part of impedance. *Note:* Definitions (A) and (B) are not equivalent but are supplementary. In any case where confusion may arise, specify definition being used. *See also:* resistor. (IA/IM/IAC/HFIM) 270-1966, [60], [40]

(2) (shunt) The quotient of the voltage developed across the instrument terminals to the current passing between the current terminals. In determining the value, account should be taken of the resistance of the instrument and the measuring cable. The resistance value is generally derived from a direct-current measurement such as by means of a double Kelvin bridge. (PE/PSIM) 4-1978s

(3) (automatic control) A property opposing movement of material, or flow of energy, and involving loss of potential (voltage, temperature, pressure, level). (PE/EDPG) [3]

(4) *See also:* radiation resistance; antenna resistance. (AP/ANT) 145-1993

resistance, apparent *See:* apparent resistance.

resistance, body *See:* body resistance.

resistance box A rheostat consisting of an assembly of resistors of definite values so arranged that the resistance of the circuit in which it is connected may be changed by known amounts. (Std100) 270-1966w

resistance braking A system of dynamic braking in which electric energy generated by the traction motors is dissipated by means of a resistor. *See also:* dynamic braking. (EEC/PE) [119]

resistance bridge smoke detector (fire protection devices) A device that responds to an increase of smoke particles and moisture, present in products of combustion, which fall on an electrical bridge grid. As these conductive substances fall on the grid they reduce the resistance of the grid and cause the detector to respond. (NFPA) [16]

resistance-capacitance characteristic, input (oscilloscopes) The direct-current resistance and parallel capacitance to ground present at the input of an oscilloscope. (IM) 311-1970w

resistance-capacitance coupling Coupling between two or more circuits, usually amplifier stages, by means of a combination of resistance and capacitance elements. *See also:* coupling. (EEC/PE) [119]

resistance-capacitance oscillator Any oscillator in which the frequency is determined principally by resistance-capacitance elements. *See also:* oscillatory circuit. (EEC/PE) [119]

resistance drop (power and distribution transformers) The component of the impedance voltage drop in phase with the current. (PE/TR) C57.12.80-1978r

resistance furnace An electrothermic apparatus, the heat energy for which is generated by the flow of electric current against ohmic resistance internal to the furnace. (EEC/PE) [119]

resistance grading (cr corona shielding) A form of corona shielding embodying high resistance material on the surface of the coil. *Synonym:* corona shielding. (PE) [9]

resistance grounded (1) (power and distribution transformers) Grounded through impedance, the principal element of which is resistance. *Note:* The resistance may be inserted either directly, in the connection to the ground, or indirectly, as for example, in the secondary of a transformer, the primary of which is connected between neutral and ground, or in series with the delta-connected secondary of a wye-delta grounding transformer. (PE/TR) C57.12.80-1978r

(2) (system grounding) Grounded through impedance, the principal element of which is resistance. *Note:* The high-resistance-grounded system is designed to meet the criterion of $R_0 \leq X_{C0}$ in order to limit transient overvoltages due to arcing ground faults. The ground-fault current is usually limited to less than 10 A. X_{C0} is the distributed per-phase capacitive reactance to ground of the system. The low-resistance-grounded system permits a higher ground-fault current (on the order of 25 A to several hundred amperes) to obtain sufficient current for selective relay performance. For the usual system the criterion for limiting transient overvoltages is $R_0/X_0 \geq 2$. (IA/PSE) 142-1982s

resistance lamp An electric lamp used to prevent the current in a circuit from exceeding a desired limit. (EEC/PE) [119]

resistance magnetometer A magnetometer that depends for its operation upon the variation of electrical resistance of a material immersed in the field to be measured. *See also:* magnetometer. (EEC/PE) [119]

resistance method of temperature determination (power and distribution transformers) The determination of the temperature by comparison of the resistance of a winding at the temperature to be determined, with the resistance at a known temperature. (PE/TR) C57.12.80-1978r, C57.15-1999

resistance modulation (bolometric power meters) A change in resistance of the bolometer resulting from a change in power (RF, ac, or dc) dissipated in the element. *Note:* The resistance modulation sensitivity is the (dc) change in resistance per unit (dc) change in power at normal bias and at a constant ambient temperature. Resistance modulation frequency response is the frequency of repetitive (sinusoidal) power change for which the peak-to-peak resistance change is 3 dB lower than the asymptotic, maximum value at zero frequency. (IM) 470-1972w

resistance modulation effect (bolometric power meters) A component of substitution error (for dc power substitution) in bolometer units in which both ac and dc bias is used. *Note:* This component is dependent upon the frequency of the ac bias and the frequency response of the element: it is usually very small, and usually not included in the effective efficiency correction for substitution error. It is caused by resistance modulation of the element, and is more pronounced in barretters than in thermistors. (IM) 470-1972w

resistance-reduction factor A number usually less than or equal to 1.0 used in load and resistance factor design (LRFD). Called strength-reduction factor in 751-1990. (T&D/PE) 751-1990

resistance relay A linear-impedance form of distance relay for which the operating characteristic on an *R-X* diagram is a straight line of constant resistance. *Note:* The operating char-

acteristic may be described by the equation $R = K$ or $Z\cos\theta = K$, where K is a constant, and θ is the angle by which the input voltage leads the input current. (SWG/PE) C37.100-1992

resistance starting A form of reduced-voltage starting employing resistances that are short-circuited in one or more steps to complete the starting cycle. *See also:* resistance starting, motor-armature; resistance starting, generator-field. (IA/ICTL/IAC/APP) [60], [75]

resistance starting, generator-field Field resistance starting provided by one or more resistance steps in series with the shunt field of a generator, the output of which is connected to a motor armature. *See also:* resistance starting; resistance starting, motor-armature. (IA/IAC) [60]

resistance starting, motor-armature Motor resistance starting provided by one or more resistance steps connected in series with the motor armature. *See also:* resistance starting; resistance starting, generator-field. (IA/IAC) [60]

resistance-start motor A form of split-phase motor having a resistance connected in series with the auxiliary winding. The auxiliary circuit is opened when the motor has attained a predetermined speed. *See also:* asynchronous machine. (EEC/PE) [119]

resistance temperature detector (resistance thermometer resistor) (resistance thermometer detector) A resistor made of some material for which the electrical resistivity is a known function of the temperature and that is intended for use with a resistance thermometer. It is usually in such a form that it can be placed in the region where the temperature is to be determined. *Note:* A resistance temperature detector with its support and enclosing envelope, is often called a resistance thermometer bulb. *See also:* electric thermometer; embedded temperature detector. (EEC/PE) [119]

resistance thermometer (resistance temperature meter) An electric thermometer that operates by measuring the electric resistance of a resistor, the resistance of which is a known function of its temperature. The temperature-responsive element is usually called a resistance temperature detector. *Note:* The resistance thermometer is also frequently used to designate the sensor and its enclosing bulb alone, for example, as in platinum thermometer, copper-constantan thermometer, etc. *See also:* instrument; electric thermometer. (PE/PSIM) 119-1974w

resistance times capacitance (RC), RC time constant The product of some resistance and some capacitance (having the dimensions of time) or a time constant computed in some other way. (C/DA) 1481-1999

resistance to ground (surge arresters) The ratio, at a point in a grounding system, of the component of the voltage to ground that is in phase with the ground current, to the ground current that produces it. (PE) [8], [84]

resistance voltage drop (1) The component of voltage drop in phase with the current. (PE/TR) C57.16-1996

(2) The component of the impedance voltage in phase with the current. (PE/TR) C57.15-1999

resistant (1) (rotating machinery) Material or apparatus so constructed, protected or treated, that it will not be injured readily when subjected to the specified material or condition, for example, fire-resistant, moisture-resistant. *See also:* asynchronous machine. (SWG/PE/PSR) C37.30-1971s, C37.90-1978s

(2) (power and distribution transformers) So constructed, protected, or treated that the apparatus will not be damaged when subjected to the specified material or conditions for a specified time. (PE/TR) C57.12.80-1978r

(3) (used as a suffix) So constructed, protected, or treated that damage will not occur readily when the device is subjected to the specified material or condition. (SWG/PE) C37.100-1992, C37.40-1993

resistive attenuator (waveguide) A length of waveguide designed to introduce a transmission loss by the use of some dissipative material. *See also:* waveguide; absorptive attenuator. (AP/ANT) [35], [84]

resistive conductor A conductor used primarily because it possesses the property of high electric resistance. (T&D/PE) [10]

resistive coupling The association of two or more circuits with one another by means of resistance mutual to the circuits. (PE/PSIM) 81-1983

resistive distributor brush Resistive pickup brush in an ignition distributor cap. *See also:* electromagnetic compatibility. (EMC/INT) [53], [70]

resistive feedback preamplifier (germanium gamma-ray detectors) A charge-sensitive preamplifier in which charge that accumulates on the feedback capacitor is continually discharged through a resistor in parallel with the capacitor. (NPS) 325-1986s

resistive ignition cable High-tension ignition cable, the core of which is made of resistive material. *See also:* electromagnetic compatibility. (EMC/INT) [53], [70]

resistive loads Loads for which the current supplied by the low-voltage power supply/battery varies proportionally with the source voltage. *Note:* These loads will demand less current when the source voltage is switched from the low-voltage power supply to the battery. Typically, relays fall into this category. (VT) 1476-2000

resistivity (material) A factor such that the conduction-current density is equal to the electric field in the material divided by resistivity. (PE/PSIM) 81-1983

resistivity, volume *See:* volume resistivity.

resistor (1) An element within a circuit that has specified resistance value designed to restrict the flow of current. *See also:* potentiometer. (C) 610.10-1994w

(2) A device with the primary purpose of introducing resistance into an electric circuit. (A resistor as used in electric circuits for purposes of operation, protection, or control, commonly consists of an aggregation of units. Resistors, as commonly supplied, consist of wire, metal, ribbon, cast metal, or carbon compounds supported by or embedded in an insulating medium. The insulating medium may enclose and support the resistance material as in the case of the porcelain tube type or the insulation may be provided only at the points of support as in the case of heavy duty ribbon or cast iron grids mounted in metal frames.) (IA/MT) 45-1998

resistor, bias *See:* bias resistor.

resistor furnace A resistance furnace in which the heat is developed in a resistor that is not a part of the charge. (EEC/PE) [119]

resistor-start motor A single-phase induction motor with a main winding and an auxiliary winding connected in series with a resistor, with the auxiliary winding circuit opened for running operation. (PE) [9]

resistor-transistor logic (RTL) A family of circuit logic in which the basic circuit element is a network of resistors and transistors. (C) 610.10-1994w

re-solution (electrodeposition) The passing back into solution of metal already deposited on the cathode. (EEC/PE) [119]

resolution (1) (supervisory control, data acquisition, and automatic control) The least value of the measured quantity that can be distinguished. (SWG/PE/SUB) C37.100-1992, C37.1-1994

(2) (A) (data transmission) The result of deriving from a sound, scene, or other form of intelligence, a series of discrete elements wherefrom the original may subsequently be synthesized. **(B) (data transmission)** The degree to which nearly equal values of a quantity can be discriminated. **(C) (data transmission)** The fineness of detail in a reproduced spatial pattern. **(D) (data transmission)** The degree to which a system or a device distinguishes fineness of detail in a spatial pattern. (COM/PE) 599-1985

(3) (storage tubes) A measure of the quantity of information that may be written into and read out of a storage tube. *Notes:* 1. Resolution can be specified in terms of number of bits, spots, lines, or cycles. 2. Since the relative amplitude of the

output may vary with the quantity of information, the true representation of the resolution of a tube is a curve of relative amplitude versus quantity. *See also:* storage tube. (ED) 158-1962w

(4) (television) A measure of ability to delineate picture detail. *Note:* Resolution is usually expressed in terms of a number of lines N (normally alternate black and white lines) the width of each line is $1/N$ times the picture height. In television practice, where the raster has a 4/3 aspect ratio, resolution, measured in either the horizontal or the vertical direction, is the number of test chart lines observable in a distance equal to the vertical dimension of the raster. (BT/AV) 201-1979w

(5) (oscilloscopes) A measure of the total number of trace lines discernible along the coordinate axes, bounded by the extremities of the graticule or other specific limits. *See also:* oscillograph. (IM/HFIM) [40]

(6) (transmission lines and waveguides) The degree to which nearly equal values of a quantity can be discriminated. (IM/HFIM) [40]

(7) The smallest distinguishable increment into which a quantity is divided in a device or system. *See also:* feedback control system. (IA/ICTL/IAC) [60]

(8) (digital delay line) The time spacing between peaks of the doublet. (UFFC) [22]

(9) (acousto-optic deflector) The ratio of the angular swing to the minimum resolvable angular spread of one spot. The minimum spot size depends on the optical beam amplitude and phase distribution, as well as the criteria used to define minimum spot size. When the Rayleigh criteria is used for minimum spot size, resolution, N, is given by $N = 1/\alpha\ \tau\Delta f$, with $\alpha = 1$ rectangular beam, constant amplitude: 1.22 circular beam, constant amplitude: 1.34 circular beam, Gaussian amplitude. For operation in the scanning mode, the resolution will be reduced as the scan time approaches the access time. (UFFC) [17]

(10) (A) (spectrum analyzer) (general). The ability to display adjacent responses discretely (Hz, Hz dB down). The measure of resolution is the frequency separation of two responses that merge with a 3 dB notch. **(B) (spectrum analyzer)** (resolution). As a minimum, instruments will be specified and controls labeled on the basis of two equal amplitude responses under the best operational conditions. **(C) (spectrum analyzer)** (skirt resolution). The frequency difference between two signals of specified unequal amplitude when the notch formed between them is 3 dB down from the smaller signal. **(D) (spectrum analyzer)** (optimum resolution). For every combination of frequency span and sweep time there exists a minimum obtainable value of resolution (R). This is the optimum resolution (R_o), which is defined theoretically as:

$$R_o = K\sqrt{\frac{\text{Frequency Span}}{\text{Sweep Time}}}$$

The factor K shall be unity unless otherwise specified. (IM) [14], 748-1979

(11) (pulse measurement) The smallest change in the pulse characteristic, property, or attribute being measured which can unambiguously be discerned or detected in a pulse measurement process. (IM/WM&A) 181-1977w

(12) (electrothermic power meters) The smallest discrete or discernible change in power that can be measured. In IEEE Std 544-1975w, resolution includes the estimated uncertainty with which the power changes can be determined on the readout scale. (IM) 544-1975w

(13) (plutonium monitoring) The minimum detectable change in instrument response. (NI) N317-1980r

(14) (image processing and pattern recognition) In image processing, the degree to which closely spaced objects in an image can be distinguished from one another. (C) 610.4-1990w

(15) In micrographics, the ability of a photographic system to record fine detail. (C) 610.2-1987

(16) (A) (computer graphics) The smallest distance between two display elements that can be addressed. **(B) (computer graphics)** The fineness of a raster display device expressed in pixels per inch, pixels per screen, number of horizontal lines by number of dots per line, dots per inch, or other ratio. (C) 610.6-1991, 610.10-1994

(17) A measure of the ability to delineate picture detail. (BT/AV) 208-1995

(18) (accelerometer) (gyros) The largest value of the minimum change in input, for inputs greater than the noise level, that produces a change in output equal to some specified percentage (at least 50%) of the change in output expected using the nominal scale factor. (AES/GYAC) 528-1994

(19) A measure of the ability to delineate display detail. (C) 610.10-1994w

(20) The minimum time interval that a clock can measure or whose passage a timer can detect. (C) 1003.5-1999

(21) *See also:* energy resolution. (NPS) 325-1996

resolution bandwidth (spectrum analyzer) The width, in Hz, of the spectrum analyzer's response to a continuous wave (CW) signal. This width is usually defined as the frequency difference at specified points on the response curve, such as the 3 or 6 dB down points. The manufacturer will specify the dB down points to be used. (IM) [14], 748-1979w

resolution cell The one-dimensional or multidimensional region related to the ability of a radar to resolve multiple targets. *Note:* The dimensions that involve resolution can include range, angle, and radial velocity (Doppler frequency). The three dimensional spatial resolution cell is, for example:

$$\theta_a \times \theta_e \times (c\tau/2)$$

where
θ_a = azimuth beamwidth
θ_e = elevation beamwidth
τ = pulsewidth
c = velocity of propagation of electromagnetic waves

Synonym: resolution element. (AES) 686-1997

resolution element *See also:* resolution cell. (AES) 686-1997

resolution, energy *See:* energy resolution.

resolution error (analog computer) The error due to the inability of a transducer to manifest changes of a variable smaller than a given increment. (C) 165-1977w

resolution of output adjustment (inverters) (of any output parameter, voltage, frequency, etc.) The minimum increment of change in setting. *See also:* self-commutated inverters. (IA) [62]

resolution phase The initial phase of an arbitration operation in which all agents requesting access to the bus drive an arbitration ID onto the parallel system bus. Agents mutually resolve requests and allow the agent with the highest priority to gain access to the bus. *See also:* arbitration operation. (C/MM) 1296-1987s

resolution, pulse height *See:* pulse-height resolution.

resolution response In television, the ratio of the peak-to-peak signal amplitude, given by a test pattern consisting of alternate black and white bars of equal widths representing a given TV line number on a test chart, to the peak-to-peak signal amplitude, given by large black areas and large white areas having the same luminance as the black and white bars in the test pattern. (BT/AV) 208-1995

resolution, structural *See:* structural resolution.

resolution test chart In micrographics, a chart containing a number of increasingly smaller horizontal and vertical lines of specific size and spacing, used to measure resolution. *See also:* target. (C) 610.2-1987

resolution time (1) (counter tube or counting system) (radiation counters) The minimum time interval between two distinct events that will permit both to be counted. *See also:* anticoincidence. (ED) [45]

(2) (sequential events recording systems) The minimum time interval between any two distinct events that will permit both to be recorded in sequence of occurrence. *See also:* event. (PE/EDPG) [5], [1]

resolution, time *See:* time resolution.

resolution time correction (radiation counters) Correction to the observed counting rate to allow for the probability of the occurrence of events within the resolution time. *See also:* anticoincidence. (ED) [45]

resolution wedge (television) A narrow-angle wedge-shaped pattern calibrated for the measurement of resolution and composed of alternate contrasting strips that gradually converge and taper individually to preserve equal widths along any given line at right angles to the axis of the wedge. *Note:* Alternate strips may be black and white of maximum contrast or strips of different colors. (BT/AV) 201-1979w

resolver (analog computer) A device or computing element used for vector resolution or composition. The rectangular mode is the mode of operation that produces a transformation from polar to rectangular coordinates or a rotation of rectangular coordinates. The polar mode of operation that produces a transformation from rectangular to polar coordinates. (C) 165-1977w

(2) (A) In an analog computer, a device or computing element used for vector resolution or composition. **(B)** A functional unit whose input analog variables are the polar coordinates of a point and whose output analog variables are the Cartesian coordinates of the same point, or vice-versa. (C) 610.10-1994

resolving power (illuminating engineering) The ability of the eye to perceive the individual elements of a grating or any other periodic pattern with parallel elements measured by the number of cycles per degree that can be resolved. The resolution threshold is the period of the pattern that can be just resolved. Visual acuity, in such a case, is the reciprocal of one half of the period expressed in minutes. The resolution threshold for a pair of points or lines is the distance between them when they can just be distinguished as two, not one, expressed in minutes of arc. (EEC/IE) [126]

resolving time (1) (navigation aids) The minimum time interval by which two events must be separated, to be distinguishable in a navigation system, by the time measurement alone. (AES/GCS/RS) 172-1983w, 686-1990

(2) (liquid-scintillation counting) The minimum time that must exist between successive events if they are to be counted as separate events. (NI) N42.15-1990

(3) The time from the start of a counted pulse to the instant a succeeding pulse can assume the minimum strength to be detected by the counting circuit. *Note:* This quantity pertains to the combination of tube and recording circuit. *See also:* half-amplitude recovery time. (NI/NPS) 309-1999

resonance (1) (seismic design of substations) A dynamic condition which occurs when any input frequency of vibration coincides with one of the natural frequencies of the structure. In a plot of the response of the structure (acceleration, velocity, displacement) versus input frequency for a constant input, as the input frequency approaches one of the natural frequencies of the structure the response increases to a maximum value if damping is less than critical. The response of the structure at resonance may be much greater than the input, if the damping is low. (PE/SUB) 693-1984s

(2) The enhancement of the response of a physical system to a periodic excitation when the excitation frequency is equal to a natural frequency of the system. (CAS) [13]

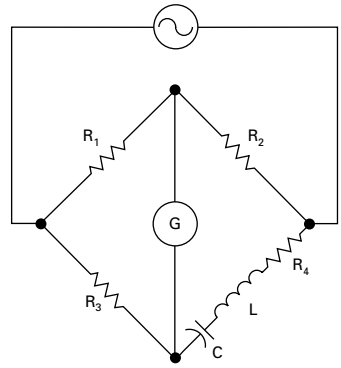
(3) (automatic control) Of a system or element, a condition evidenced by large oscillatory amplitude, which results when a small amplitude of a periodic input has a frequency approaching one of the natural frequencies of the driven system. *Note:* In a feedback control system, this occurs near the stability limit. (PE/EDPG) [3]

(4) (data transmission) A condition in a circuit containing inductance and capacitance in which the capacitive reactance is equal to the inductive reactance. This condition occurs at only one frequency in a circuit with fixed constants, and the circuit is said to be "tuned" to this frequency. The resonance frequency can be changed by varying the value of the capacitance or inductance of the circuit. (PE) 599-1985w

(5) (mechanical) A dynamic condition that occurs when any forcing frequency of mechanical vibration coincides with one of the natural frequencies of the structure. *Note:* In a plot of the response of the structure (acceleration, velocity, and displacement) vs. forcing frequency for a constant forcing input, as the forcing frequency approaches one of the natural frequencies of the structure, the response increases to a maximum at the natural frequency if damping is less than critical. The response of the structure at resonance may be much greater than the input, depending on the damping. (SWG/SUB/PE) C37.122-1983s, C37.100-1992, C37.122.1-1993

(6) (A) (in an oscillating system) The rapid increase or decrease of the oscillation magnitude as the excitation frequency approaches one of the natural frequencies of the system. **(B)** (of a traveling wave) The change in magnitude as the frequency of the wave approaches or coincides with a natural frequency of the medium (e.g., a plasma frequency). (AP/PROP) 211-1997

resonance bridge A 4-arm alternating-current bridge in which both an inductor and a capacitor are present in one arm, the other three arms being (usually) nonreactive resistors, and the adjustment for balance includes the establishment of resonance for the applied frequency. *Note:* Normally used for the measurement of inductance, capacitance, or frequency. Two general types can be distinguished according as the inductor and capacitor are effectively in series or in parallel. *See also:* bridge.



resonance bridge

(EEC/PE) [119]

resonance charging (A) (charging inductors) (direct current) The charging of the capacitance (of a pulse-forming network) to the initial peak value of voltage in an oscillatory series resistance- inductance-capacitance (RLC) circuit, when supplied by a direct voltage. *Note:* in order to provide a pulse train, the network capacitance is repetitively discharged by a synchronous switch at the time when the current through the charging inductor is zero and the peak voltage to which the network capacitance is charged approaches two times the power-supply direct voltage. **(B) (charging inductors)** (alternating current) The charging of the capacitance (of a pulse-forming network) to the peak value of voltage selected, in an oscillatory resistance-inductance-capacitance (RLC) circuit, when supplied by an alternating voltage. *Note:* In order to provide a pulse train, the network capacitance is repetitively discharged at a time in the charging cycle when the current through the charging inductor is zero. At these times the voltage may be essentially:

$$\frac{\pi E_p}{2},\ \pi E_p,\ \frac{3\pi E_p}{2},\ \text{etc.}$$

The value chosen depends upon the pulse-repetition rate and the frequency of the alternating voltage. (E_p = peak alternating voltage supply.) (MAG) 306-1969

resonance curve, carrier-current line trap (power-system communication) A graphical plot of the ohmic impedance of a carrier current line trap with respect to frequency at frequencies near resonance. *See also:* power-line carrier. (PE) 599-1985w

resonance frequency (1) (resonant frequency) (networks) Any frequency at which resonance occurs. *Note:* For a given network, resonance frequencies may differ for different quantities, and almost always differ from natural frequencies. For example, in a simple series resistance-inductance-capacitance circuit there is a resonance frequency for current, a different resonance frequency for capacitor voltage, and a natural frequency differing from each of these. *See also:* network analysis. (Std100) 270-1966w

(2) (crystal unit) The frequency for a particular mode of vibration to which, discounting dissipation, the effective impedance of the crystal unit is zero. *See also:* crystal. (EEC/PE) [119]

resonance frequency of charging (charging inductors) The frequency at which resonance occurs in the charging circuit of a pulse-forming network. *Note:* In IEEE Std 306-1969w, it will be assumed to be the frequency determined as follows:

$$f_0 = \frac{1}{2\pi\sqrt{LC_O}}$$

where

f_0 = resonance frequency of charging
C_0 = capacitance of pulse-forming network
L = charging inductance

(MAG) 306-1969w

resonance mode (laser maser) A natural oscillation in a resonator characterized by a distribution of fields which have the same harmonic time dependence throughout the resonator. (LEO) 586-1980w

resonant cavity *See:* optical cavity.

resonant frequency (1) A frequency at which a response peak occurs in a system subjected to forced vibration. This frequency is accompanied by a phase shift of response relative to the excitation. (PE/SUB/NP) 344-1987r, 693-1997

(2) (of an antenna) A frequency at which the input impedance of an antenna is nonreactive. (AP/ANT) 145-1993

(3) The frequency, f, at which a parallel resonant resistive-inductive-capacitive (RLC) load has unity power factor

$$f = 1/(2\pi\sqrt{C \times L})$$

where

f = the resonant frequency
C = effective load capacitance (including shunt capacitors)
L = effective load inductance

Also, the frequency at which the reactive powers P_{qL} and P_{qC} are equal, and hence the parallel RLC load appears equivalent to the load resistance only. (SCC21) 929-2000

(4) (networks) *See also:* resonance frequency.

resonant gap (microwave gas tubes) The small region in a resonant structure interior to the tube, where the electric field is concentrated. (ED) 161-1971w

resonant grounded *See:* ground-fault neutralizer grounded.

resonant grounded neutral system A system in which one or more neutral points are connected to ground through reactors that approximately compensate the capacitive component of a single-phase-to-ground-fault current. *Note:* With resonant grounding of a system, the fault current is limited such that an arc fault in air will be self-extinguishing. (PE/C) 1313.1-1996

resonant grounded system (surge arresters) (arc-suppression coil) A system grounded through a reactor, the reactance being of such value that during a single line-to-ground fault, the power-frequency inductive current passed by this reactor essentially neutralizes the power-frequency capacitive component of the ground-fault current. *Note:* With resonant grounding of a system, the net current in the fault is limited to such an extent that an arc fault in air would be self-extinguishing. *See also:* ground. (PE/SPD) 32-1972r, [8], [84]

resonant iris (waveguide components) An iris designed to have equal capacitive and inductive susceptances at the resonant frequency. (MTT) 147-1979w

resonant line oscillator An oscillator in which the principal frequency-determining elements are one or more resonant transmission lines. *See also:* oscillatory circuit. (AP/BT/ANT) 145-1983s, 182A-1964w

resonant mode (1) (general) A component of the response of a linear device that is characterized by a certain field pattern, and that when not coupled to other modes is representable as a single-tuned circuit. *Note:* When modes are coupled together, the combined behavior is similar to that of the corresponding single-tuned circuits correspondingly coupled. *See also:* waveguide. (EEC/PE) [119]

(2) (cylindrical cavities) When a metal cylinder is closed by two metal surfaces perpendicular to its axis a cylindrical cavity is formed. The resonant modes in this cavity are designated by adding a third subscript to indicate the number of half-waves along the axis of the cavity. When the cavity is a rectangular parallelepiped the axis of the cylinder from which the cavity is assumed to be made should be designated since there are three possible cylinders out of which the parallelepiped may be made. *See also:* guided wave. (MM) 210-1945w

resonating (steady-state quantity or phasor) The maximizing or minimizing of the amplitude or other characteristic provided the maximum or minimum is of interest. *Notes:* 1. Unless otherwise specified, the quantity varied to obtain the maximum or minimum is to be assumed to be frequency. 2. Phase angle is an example of a quantity in which there is usually no interest in a maximum or a minimum. 3. In the case of amplification, transfer ratios, etc., the amplitude of the phasor is maximized or minimized: in the case of currents, voltages, charges, etc., it is customary to think of the amplitude of the steady-state simple sine-wave quantity as being maximized or minimized. *See also:* network analysis. (Std100) 270-1966w

resonating capacitor Provides the capacitance associated with ferroresonant regulating circuits for the purpose of producing ferroresonance. (PEL) 449-1998

resonating capacitor voltamperes The product of the voltage across the resonating capacitor and the current through the resonating capacitor (root-mean-square values) under stated operating conditions. (PEL) 449-1998

resonating winding The winding of the ferroresonant transformer used to connect the resonating capacitance to the circuit. *Note:* It is wound on the secondary section of the core and is separated from the primary winding by a magnetic shunt. It may itself be the output winding or a portion of the output winding. (PEL) 449-1998

resonator A device, the primary purpose of which is to introduce resonance into a system. *See also:* network analysis. (Std100) 270-1966w

(2) (A) A resonating system. **(B)** A device designed to operate in the vicinity of a natural frequency of that device. **(C)** (electrical circuit) An electrical network designed to present a given natural frequency at its terminal. (CAS) [13]

resonator grid (electron tube) An electrode, connected to a resonator, that is traversed by an electron beam and that provides the coupling between the beam and the resonator. *See also:* velocity-modulated tube. (Std100) [84]

resonator mode (oscillators) A condition of operation corresponding to a particular field configuration for which the electron stream introduces a negative conductance into the coupled circuit. *See also:* oscillatory circuit. (ED) 161-1971w

resonator, waveguide *See:* waveguide resonator.

resonant wavelengths (cylindrical cavities) Those given by $\lambda_r = 1[(1/\lambda_c)^2 + (1/2c)^2]^{1/2}$ where λ_c is the cutoff wavelength for the transmission mode along the axis, l is the number of half-period variations of the field along the axis, and c is the axial length of the cavity. *See also:* guided wave. (MM) 210-1945w

resource (1) An attribute of a widget or widget class, represented by a named data value in the defining structure of the widget. (C) 1295-1993w

(2) Any capability that must be scheduled, assigned, or controlled by the underlying implementation to assure nonconflicting usage by processes. (ATLAS) 1232-1995

(3) That part of a LAN/MAN environment for which a managed object provides the management view. The management view of a resource may be limited to a subset of the functionality of the resource; some aspects of the resource may therefore be inaccessible for management purposes. (LM/C) 15802-2-1995

resource allocation The assignment of physical resources to virtual resources such that the virtual resource requirements are satisfied. (SCC20) 1232.1-1997

Resource Description Language (RDL) A standardized computer language used to describe test instrument capabilities and communication sequences. (ATLAS) 1226-1993s

resource lock A type of an attention cycle that indicates to slaves that data items will be referenced in a locked fashion and any nonbus path to referenced data items should be locked out. A null cycle clears this state. (C/MM) 1196-1987w

resource management The identification, estimation, allocation, and monitoring of the means used to develop a product or perform a service. Example is estimating. (C) 610.12-1990

resource manager (1) A message-based commander located at logical address 0 that provides configuration management services, such as address map configuration, commander/servant mappings, self-test, and diagnostics management. (C/MM) 1155-1992

(2) A process or activity that initializes and manages the resources in a system. (SCC20) 1226-1998

respecialize A change by an instance from being an instance of its current subclass to being an instance of one of the other subclasses in its current cluster. *Contrast:* specialize; unspecialize. (C/SE) 1320.2-1998

responder (1) A module that completes a transaction by sending a response (containing the completion status and sometimes data). (C/BA) 1014.1-1994w, 896.3-1993w

(2) The node that completes a transaction, by returning a response subaction. (C/MM) 1596-1992

(3) A node that completes a transaction by returning a response subaction (containing completion status and sometimes data). (C/MM/BA) 1212-1991s, 10857-1994, 896.4-1993w

(4) The function that completes an I/O transaction-initiation/transaction-completion exchange by sending a completion message to the initiator. (C/MM) 1212.1-1993

(5) The file service user that accepts an FTAM regime establishment requested by the initiator. (C/PA) 1238.1-1994w

responder beacon *See:* transponder.

responding slave *See:* slave; interrupt-acknowledge cycle.

response (1) (radiation protection) The instrument reading. (NI) N323-1978r

(2) (airborne radioactivity monitoring) The instrument indication produced as a result of some influence quantity. (NI) N42.17B-1989r

(3) The output, as a function of time or frequency, when a step input voltage or current is applied to the system. (PE/PSIM) 4-1995

(4) A reply generated by a responder, to complete a transaction initiated by a requester. For a processor-to-memory read transaction, for example, the response returns the data and status from the memory to the processor. In the case of a split transaction, the response would be a separate bus transaction. In the case of a connected transaction, the response would be the data and disconnection phases of a bus transaction. (C/BA) 1014.1-1994w, 896.3-1993w, 896.4-1993w, 10857-1994

(5) A pulse, signal, or set of signals indicating a reaction to a preceding transmission. (SUB/PE) 999-1992w

(6) For a dosimeter, the indication (R) produced as a result of some influence quantity. (NI) N42.20-1995

(7) In the context of message transmission, the set of packets sent by an S-module during a single message. In the context of the operation of S-modules, an S-module's action that is a direct consequence of the command most recently received by that S-module. (TT/C) 1149.5-1995

(8) A subaction sent by a node (the responder) that sends a response code and optional data back to another node (the requester). (C/MM) 1394-1995

(9) (of a device or system) A quantitative expression of the output as a function of the input under conditions that must be explicitly stated. *Note:* The response characteristic, often presented graphically, gives the response as a function of some independent variable such as frequency or time. (SWG/PE) C37.100-1992

(10) A reply represented in the control field of a response protocol data unit (PDU). It advises the address destination logical link control (LLC) of the action taken by the source LLC to one or more command PDUs. (EMB/MIB) 1073.4.1-2000

(11) A primary packet (with optional data) sent in response to a request subaction. (C/MM) 1394a-2000

response, acceleration-forced *See:* acceleration-forced response.

response data The information sensed from a test subject as the result of an applied stimulus. (SCC20) 1226-1998

response echo The echo packet generated by a requester or agent when it strips the response send packet. (C/MM) 1596-1992

response-expected request The request subaction component of a response-expected transaction. (C/MM) 1596-1992

response-expected transaction A transaction that normally consists of a request subaction and a response subaction. For example, the read, write, and lock transactions are all response-expected transactions. (C/MM) 1596-1992

response, forced *See:* forced response.

response function (linear passive networks) The ratio of response to excitation, both expressed as functions of the complex frequency, $s = \sigma + j\omega$. *Note:* The response function is the Laplace transform of the response due to unit impulse excitation. (CAS) 156-1960w

response, Gaussian *See:* Gaussian response.

response, impulse-forced *See:* impulse-forced response.

response, indicial *See:* indicial response.

response, instrument *See:* instrument response.

responseless request The request subaction component of a responseless transaction. (C/MM) 1596-1992

responseless transaction A transaction that consists of only a request subaction (there is never any response subaction). For example, the move and event transactions are responseless transactions. (C/MM) 1596-1992

response packet A packet that is generated by a slave to return data or status from an address specified by a previous request packet. (C/MM) 1596.4-1996

response protocol data unit (logical link control) All PDUs sent by a logical link control (LLC) in which the command/response (C/R) bit is equal to "1." (LM/PE/C/TR/CC) 799-1987w, 8802-2-1998

response, ramp-forced automatic control *See:* ramp-forced automatic control response.

responses Signals or interrupts generated by a device to notify another device of an asynchronous event. Responses contain

the information in the sender's response register. (C/MM) 1155-1992

response send The packet generated by a responder to complete a transaction initiated by a requester. In a processor's memory-read transaction, for example, the response send returns the requested data and related status information from the memory to the processor. (C/MM) 1596-1992

response, sinusoidal *See:* sinusoidal response.

response spectrum (1) (seismic qualification of Class 1E equipment for nuclear power generating stations) (valve actuators) A plot of the maximum response, as a function of oscillator frequency, of an array of single-degree-of-freedom (SDOF) damped oscillators subjected to the same base excitation. (PE/NP) 344-1987r, 382-1985

(2) (seismic testing of relays) (as applied to relays) A plot of the peak acceleration response of damped, single-degree-of-freedom bodies, at a damping value expressed as a percent of critical damping of different natural frequencies, when these bodies are rigidly mounted on the surface of interest. (PE/PSR) C37.98-1977s

(3) (Class 1E metal-enclosed power switchgear) A plot of the maximum response of single-degree-of-freedom bodies of different natural frequencies, at a damping value expressed as a percent of critical damping, when these bodies are rigidly mounted on the surface of interest (that is, on the ground for the ground response spectrum or on the floor of a building for the floor's response spectrum) when that surface is subjected to a given earthquake's motion as modified by any intervening structures. (SWG/PE) C37.81-1989r

(4) (mechanical) A plot of the maximum response of single-degree-of-freedom bodies at a damping value expressed as a percentage of critical damping of different natural frequencies when these bodies are rigidly mounted on the surface of interest (i.e., on the ground for a ground-response spectrum or on the floor for a floor-response spectrum) when that surface is subjected to a given earthquake's motion as modified by intervening structures. (SWG/SUB/PE) C37.122-1983s, C37.100-1992, C37.122.1-1993

(5) A plot of the maximum response of an array of single-degree-of-freedom (SDOF) identically damped oscillators with different frequencies, all subjected to the same base excitation. (PE/SUB) 693-1997

response, steady-state *See:* steady-state response.

response, step-forced *See:* step-forced response.

response subaction (1) A response send and its echo. Often called simply a "response." (C/MM) 1596-1992

(2) A subaction that is returned by a responder to complete a transaction initiated by a requester. In a processor-memory read transaction, for example, the response subaction returns the data and status from the memory to the processor. (C/MM) 1212-1991s

response time (1) (A) (data transmission) (magnetic amplifier). The time (preferably in seconds; may also be in cycles of supply frequency) required for the output quantity to change by some agreed-upon percentage of the differential output quantity in response to a step change in control signal equal to the differential control signal. *Notes:* 1. The initial and final output quantities correspond to the test output quantities. The response time is the maximum obtained including differences arising from increasing or decreasing output quantity or time phase of signal application. **(B) (data transmission)** (turn-ON response time) (control devices). The time required for the output voltage to change from rated OFF voltage to rated ON amplifiers, one serving to amplify the telephone voltage in response to a step change in control signal equal to 120% of the differential trip signal. *Note:* The absolute magnitude of the initial signal condition is the absolute magnitude of the trip OFF control signal plus 10% of the differential trip signal. **(C) (data transmission)** (Turn OFF response time) (control devices). The time required for the output voltage to change from rated ON voltage to rated OFF voltage in response to a step change in control signal equal to 120% of the differential trip signal. *Note:* The absolute magnitude of the initial signal condition is the absolute magnitude of the trip ON control signal minus 10% of the differential trip signal. **(D) (data transmission)** (electrically tuned oscillator). The time following a change in the input to the tuning element required for a characteristic to reach a predetermined range of values within which it remains. **(E) (data transmission)** (instrument). The time required after an abrupt change has occurred in the measured quantity to a new constant value until the pointer, or indicating means, has first come to apparent rest in its new position. *Notes:* 1. Since, in some instruments, the response time depends on the magnitude of the deflection, a value corresponding to an initial deflection from zero to end scale is used in determining response time for rating purposes. 2. The pointer is at apparent rest when it remains within a range on either side of its final position equal to one-half the accuracy rating, when determined as specified above. **(F) (data transmission)** (bolometric power meter). The time required for the bolometric power indication to reach 90% of its final value after a fixed amount of radio-frequency power is applied to the bolometer unit. **(G) (data transmission)** (thermal converter). The time required for the output electromotive force to come to its new value after an abrupt change has occurred in the input quantity (current, voltage, or power) to a new constant value. *Notes:* 1. Since, in some thermal converters, the response time depends upon the magnitude and direction of the change, the value obtained for an abrupt change from zero to rated input quantity is used for rating purposes. 2. The output electromotive force is considered to have come to its new value when all but 1 percent of the change in electromotive force has been indicated. **(H) (data transmission)** (industrial control). The time required, following the initiation of a specified stimulus to a system, for an output going in the direction of necessary corrective action to first reach a specified value. *Note:* The response time is expressed in seconds. **(I) (data transmission)** (electrical conversion). The elapsed time from the initiation of a transient until the output has recovered to 63% of its maximum excursion. **(J) (data transmission)** (arcwelding apparatus). The time required to attain conditions within a specified amount of their final value in an automatically regulated welding circuit after a definitely specified disturbance has been initiated. **(K) (data transmission)** (photoelectric lighting control) (industrial control). The time required for operation following an abrupt change in illumination from 50% above to 50% below the minimum illumination sensitivity. **(L)** (control system or element) (time of response) (control system, feedback) The time required for an output to make the change from an initial value to a large specified percentage of the steady state, either before overshoot or in the absence of overshoot. *Note:* If the term is unqualified, time of response of a first-order system to a unit-step stimulus is generally understood; otherwise the pattern and magnitude of the stimulus should be specified. Usual percentages are 90, 95, or 99. **(M)** (data circuit) The amount of time elapsed between generation of an inquiry at a data communications terminal and receipt of a response at that same terminal. Response time, thus defined includes: transmission time to the computer processing time at the computer, including access time to obtain any file records needed to answer the inquiry; and transmission time back to the terminal. (PE) 599-1985

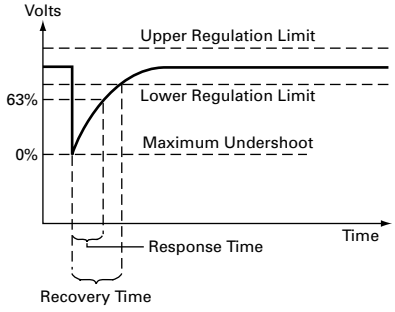
(2) (station control and data acquisition) The time between initiating some operation and obtaining results. (SWG/PE/SUB) C37.100-1992, C37.1-1987s

(3) (sequential events recording systems) The time interval between receiving a finite input status change and the recognition by the system of the status change. The time interval is usually expressed in milliseconds. (PE/EDPG) [1]

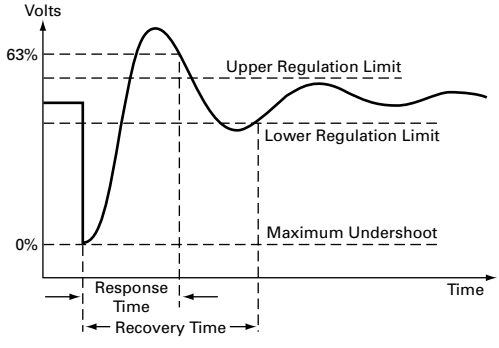
(4) (temperature measurement) The time required for the indication of a thermometer, which has been subjected to an essentially instantaneous change in temperature, to traverse

63% of the temperature interval involved. Following such a temperature change the indication of the thermometer may be expected to traverse 99% of the temperature interval in a period ranging from 5 to 8 time constants so defined, depending on the details of its construction. (PE/PSIM) 119-1974w

(5) (faulted circuit indicators) The time required for the faulted circuit indicator (FCI) to respond to a specified value of fault current.



Response and recovery time for a critically damped circuit.



Response and recovery time for an underdamped circuit.

response time

(T&D/PE) 495-1986w

(6) (monitoring radioactivity in effluents) The time interval from a step change in the input concentration at the instrument inlet to a reading of 90% (nominally equivalent to 2.2 time constants) of the ultimate recorded output.

(NI) N42.18-1980r

(7) (airborne radioactivity monitoring) The time interval required for the instrument reading to change from 10% to 90% of the final reading following a step change in the radiation field (i.e., signal) at the detector, or, for integrating monitors, 90% of the final value of the first derivative of the indication with respect to time (i.e., rate of change).

(NI) N42.17B-1989r

(8) (software) The elapsed time between the end of an inquiry or command to an interactive computer system and the beginning of the system's response. *See also:* turnaround time; port-to-port time; think time.

(C) 610.12-1990, 610.10-1994w

(9) A quantity that is indicative of the speed with which a system responds to changing voltages or currents.

(PE/PSIM) 4-1995

(10) The time required for a field probe to reach 90% of its steady state value when the field is applied as a step function. The measurement includes test set up response time, thus giving worst case results. (EMC) 1309-1996

(11) The duration from a step change in control signal input until the static var compensator (SVC) output reaches 90% of required output, before any overshoot.

(PE/SUB) 1031-2000

(12) (lagged-demand meter) *See also:* time characteristic.

(ELM) C12.1-1982s

(13) (lagged-demand meter) *See also:* demand meter—time characteristic. (ELM) C12.1-1981

response timer A timing device within a FASTBUS master or segment interconnect used to terminate an operation that has failed to complete within a given (excessive) period of time.

(NID) 960-1993

response time, ramp-forced *See:* ramp-forced response time.

response to signal removal (measuring the performance of tone address signaling systems) The time interval from the end of signal present condition to the time the receiver indication terminates. (COM/TA) 752-1986w

response to signal start (measuring the performance of tone address signaling systems) The time interval from start of a signal present condition to the time at which the appropriate indication occurs in the receiver. (COM/TA) 752-1986w

response to tone removal (measuring the performance of tone address signaling systems) The time interval from the end of tone present condition to the time the receiver indication terminates. (COM/TA) 752-1986w

response to tone start (measuring the performance of tone address signaling systems) The time interval from the start of a tone present condition to the time at which the appropriate indication occurs in the receiver.

(COM/TA) 752-1986w

response_timeout An implied split-transaction-error status that is returned when the response subaction is not returned within an expected timeout interval. (C/MM) 1212-1991s

responsibility A generalization of properties (attributes, participant properties, and operations) and constraints. An instance possesses knowledge, exhibits behavior, and obeys rules. These are collectively referred to as the instance's responsibilities. A class abstracts the responsibilities in common to its instances. A responsibility may apply to each instance of the class (instance-level) or to the class as a whole (class-level).

(C/SE) 1320.2-1998

responsivity (fiber optics) The ratio of an optical detector's electrical output to its optical input, the precise definition depending on the detector type; generally expressed in amperes per watt or volts per watt of incident radiant power. *Note:* "Sensitivity" is often incorrectly used as a synonym.

(Std100) 812-1984w

responsor (1) (navigation aids) The receiving component of an interrogator-responsor. (AES/GCS) 172-1983w

(2) The receiving part of an interrogator-responsor.

(AES/RS) 686-1990

rest and de-energized (rotating machinery) The complete absence of all movement and of all electric or mechanical supply. *See also:* asynchronous machine. (PE) [9]

restart (1) (computers) To reestablish the execution of a routine, using the data recorded at a checkpoint.

(MIL/C) [2], [20], [85]

(2) (software) To cause a computer program to resume execution after a failure, using status and results recorded at a checkpoint. (C) 610.12-1990

(3) Resume the processing of a job from the point of the last checkpoint. Typically, this is done if the job has been interrupted because of a system failure. (C/PA) 1003.2d-1994

restart instruction An instruction in a computer program at which the program may be restarted. (C) 610.10-1994w

restart point A point in a computer program at which execution can be restarted following a failure. *Synonym:* rescue point.

(C) 610.12-1990

resting potential (biological) The voltage existing between the two sides of a living membrane or interface in the absence of stimulation. (EMB) [47]

resting potential The normal potential difference between the inside and the outside of a cell, usually about 80 mV, with the inside negative relative to the outside.

(T&D/PE) 539-1990

restorable fire detector (fire protection devices) A device whose sensing element is not ordinarily destroyed by the process of detecting a fire. Restoration may be manual or automatic. (NFPA) [16]

restoration *See:* image restoration.

restore To recover the state of a system, computer program, or database to a specific point. *See also:* roll back; rollforward. (C) 610.5-1990w

restoring force gradient (direct-acting recording instrument) The rate of change, with respect to the displacement, of the resultant of the electric, or of the electric and mechanical, forces tending to restore the marking device to any position of equilibrium when displaced from that position. *Note:* The force gradient may be constant throughout the entire travel of the marking device or it may vary greatly over this travel, depending upon the operating principles and the details of construction. *See also:* accuracy rating. (EEC/PE) [119]

restoring torque gradient (instrument) The rate of change, with respect to the deflection, of the resultant of the electric, or electric and mechanical, torques tending to restore the moving element to any position of equilibrium when displaced from that position. *See also:* accuracy rating. (EEC/PE) [119]

restraint relay A relay so constructed that its operation in response to one input is restrained or controlled by a second input. (SWG/PE) C37.100-1992

restricted character string type A simple type whose values are strings of characters from some defined character set. (C/PA) 1238.1-1994w

restricted radiation frequencies for industrial, scientific, and medical equipment Center of a band of frequencies assigned to industrial, scientific, and medical equipment either nationally or internationally and for which a power limit is specified. *See also:* electromagnetic compatibility. (INT) [53], [70]

restricted-service tone (telephone switching systems) A class-of-service tone that indicates to an operator that certain services are denied the caller. (COM) 312-1977w

restriction *See:* clearance.

restrictive [security] attribute A security attribute that indicates the minimum level of privilege required by an active entity (i.e., subject) in order to gain access to a resource (i.e., object). Commonly, a set of restrictive security attributes are associated with each resource. An active entity may only gain access to a resource if its set of privileges is higher than, or a superset of (i.e., dominates), the attribute set for the resource. (C/LM) 802.10g-1995, 802.10-1998

restrike A resumption of current between the contacts of a switching device during an opening operation after an interval of zero current of $\frac{1}{4}$ cycle at normal frequency or longer. (SWG/PE) C37.100-1992

restrike time (nuclear security systems) The time period during which a momentary loss or reduction of illumination results from the need to cool down to restrike the arc after a momentary loss or reduction of electrical power to a luminaire. (PE/NP) 692-1986s

restriking voltage (1) (gas tube) The anode voltage at which the discharge recommences when the supply voltage is increasing before substantial deionization has occurred. (ED) [45], [84]

(2) The voltage that appears across the terminals of a switching device immediately after the breaking of the circuit. *Note:* This voltage may be considered as composed of two components. One, which subsists in steady-state conditions, is direct current or alternating current at service frequency, according to the system. The other is a transient component that may be oscillatory (single or multifrequency) or nonoscillatory (for example, exponential) or a combination of these depending on the characteristics of the circuit and the switching device. *See also:* switch. (IA/ICTL/IAC) [60], [84]

restructuring *See:* reorganization.

result (1) (binary floating-point arithmetic) The bit string (usually representing a number) that is delivered to the destination. (C/MM) 754-1985r

(2) (radix-independent floating-point arithmetic) The digit string (usually representing a number) that is delivered to the destination. (C/MM) 854-1987r

(3) Information that is returned from an interface operation or a directory operation and that constitutes the outcome of the processing that was performed. (C/PA) 1328.2-1993w, 1327.2-1993w, 1224.2-1993w, 1326.2-1993w

resultant color shift (illuminating engineering) The difference between the perceived color of an object illuminated by a test source and of the same object illuminated by a reference source, taking account of the state of chromatic adaptation in each case; that is, the resultant of colorimetric shift and adaptive color shift. *See also:* state of chromatic adaptation. (EEC/IE) [126]

resultant magnetic field The resultant magnetic field is given by the expression

$$B_R = \sqrt{B_x^2 + B_y^2 + B_z^2}$$

where

B_x, B_y, and B_z are the rms values of the three orthogonal field components.

Notes: 1. The resultant magnetic field is also given by the expression

$$B_R = \sqrt{B_{\max}^2 + B_{\min}^2}$$

where $B_{\max}$ and $B_{\min}$ are the rms values of the semimajor and semiminor axes of the magnetic field ellipse, respectively. The resultant B_R is always $\geq B_{\max}$. If the magnetic field is linearly polarized, $B_{\min} = 0$ and $B_R = B_{\max}$. If the magnetic field is circularly polarized, $B_{\max} = B_{\min}$ and $B_R = 1.41 B_{\max}$. 2. A three-axis magnetic field meter simultaneously measures the rms values of the three orthogonal field components and combines them according to the second equation to indicate the resultant magnetic field. Although power line magnetic fields are typically two dimensional in nature, i.e., elliptically polarized, unless two axes of a three-axis probe are in the plane of the ellipse, each of the three probes will sense a component of the rotating magnetic field vector. (T&D/PE) 644-1994, 1308-1994

resuming port A previously suspended port that has observed bias or has been instructed to generate bias. In either case, the resuming port engages in a protocol with its connected peer physical layer (PHY) in order to reestablish normal operations and become active. (C/MM) 1394a-2000

retained image (image burn) A change produced in or on the target that remains for a large number of frames after the removal of a previously stationary light image and that yields a spurious electric signal corresponding to that light image. *See also:* camera tube. (ED) 161-1971w

retainer *See:* separator.

retaining ring (1) (rotating machinery) (steel) A mechanical structure surrounding parts of a rotor to restrain radial movement due to centrifugal action. *See also:* rotor. (PE) [9]

(2) (insulation) The insulation forming a dielectric and mechanical barrier between the rotor end windings and the high-strength steel retaining ring. *See also:* rotor. (PE) [9]

retaining ring liner (rotating machinery) Insulating ring between the end winding and the metallic ring which secures the coil ends against centrifical force. (PE) [9]

retardation (deceleration) The operation of reducing the motor speed from a high level to a lower level or zero. *See also:* electric drive. (IA/ICTL/IAC) [60]

retardation coil *See:* inductor.

retardation test (rotating machinery) A test in which the losses in a machine are deduced from the rate of deceleration of the machine when only these losses are present. *See also:* asynchronous machine; direct-current commutating machine. (PE) [9]

retard coil *See:* inductor.

retarder *See:* bullwheel tensioner.

retarding-field (positive-grid) oscillator An oscillator employing an electron tube in which the electrons oscillate back and forth through a grid maintained positive with respect to the cathode and the plate. The frequency depends on the electron-transit time and may also be a function of the associated circuit parameters. The field in the region of the grid exerts a retarding effect that draws electrons back after passing through it in either direction. Barkhausen-Kurz and Gill-Morell oscillators are examples. *See also:* oscillatory circuit. (AP/ANT) 145-1983s

retarding magnet A magnet used for the purpose of limiting the speed of the rotor of a motor-type meter to a value proportional to the quantity being integrated. *See also:* braking magnet; watthour meter; drag magnet. (EEC/PE) [119]

retard transmitter A transmitter in which a delay period is introduced between the time of actuation and the time of transmission. *See also:* protective signaling. (EEC/PE) [119]

retention (metal-nitride-oxide field-effect transistor) The time period defined by the time elapsed between the instant of writing a metal-nitride-oxide semiconductor (MNOS) transistor into a given high conduction or low conduction (HC or LC) state, and the instant when either state becomes indistinguishable from the other. (ED) 581-1978w

retention characteristic (metal-nitride-oxide field-effect transistor) A plot of both high conduction (HC) and low conduction (LC) threshold voltages v HC or v LC as a function (commonly the logarithm) of the time trd elapsed after the instant of writing. (ED) 581-1978w

retention cycle The length of time specified for data on a data medium to be preserved. *Synonym:* retention period. (C) 610.10-1994w

retention failure The inability to correctly sense the state of a memory cell within the limits of device specifications dependent on the time period of data storage. (ED) 641-1987w

retention longevity The time elapsed between the instant of writing a data pattern into a memory and the time when the read failure rate exceeds some predetermined value. *Note:* This definition allows for soft errors and fits reliability prediction and specification methods. (ED) 641-1987w

retention period *See:* retention cycle.

retention pit A pit designed to retain (hold) oil-contaminated liquids. (SUB/PE) 980-1994

retention time (1) The time interval between the instant of writing a memory pattern into a memory and the first retention failure. (ED) 641-1987w

(2) The time interval between the instant that data is stored and the instant that the data can no longer be read correctly. *Note:* Unless otherwise qualified, the term "read-only memory" implies that the data content is determined by the structure of the memory and in unalterable. (ED) 1005-1998

retention time at maximum read rate The retention tune using the maximum specified read rate on a single address. (ED) 641-1987w

retention time, maximum *See:* maximum retention time.

retentivity (magnetic material) That property that is measured by its maximum residual induction. *Note:* The maximum residual induction is usually associated with a hysteresis loop that reaches saturation, but in special cases this is not so. (Std100) 270-1966w

Re Test Okay (RTOK) The result of a UUT passing at any level of maintenance after failing at a previous level of maintenance. In maintenance, it is a unit determined faulty at one level, but good at the next level of maintenance. (ATLAS) 1232-1995

reticle (navigation aid terms) A system of lines, etc., placed in the focal plane of an optical instrument to serve as a reference. (AES/GCS) 172-1983w

retina (1) (illuminating engineering) A membrane lining the posterior part of the inside of the eye. It comprises photoreceptors (cones and rods) which are sensitive to light, and nerve cells which transmit to the optic nerve the responses of the receptor elements. (EEC/IE) [126]

(2) (laser maser) That sensory membrane which receives the incident image formed by the cornea and lens of the human eye. The retina lines the inside portion of the eye. (LEO) 586-1980w

retirement (A) (software) Permanent removal of a system or component from its operational environment. **(B) (software)** Removal of support from an operational system or component. *See also:* software life cycle; system life cycle. (C) 610.12-1990

retirement phase (software) The period of time in the software life cycle during which support for a software product is terminated. (C) 610.12-1990

retrace (oscillography) Return of the spot on the cathode-ray tube to its starting point after a sweep; also that portion of the sweep waveform that returns the spot to its starting point. *See also:* oscillograph. (IM/HFIM) [40]

retrace blanking *See:* blanking.

retrace interval (television) The interval corresponding to the direction of sweep not used for delineation. *See also:* flyback. (BT/AV) 201-1979w

retrace line The line traced by the electron beam in a cathode-ray tube in going from the end of one line or field to the start of the next line or field. 188-1952w

retraining The process of re-acquiring receiver parameters and synchronizing the scramblers of two connected 100BASE-T2 PHYs. *See also:* receiver training. (C/LM) 802.3-1998

retransmit contacts Auxiliary contacts on an annunciator that provide an output to a remote device to indicate that the annunicator has been actuated. (SUB/PE) C37.123-1996

retrieval *See:* information retrieval.

retrieval code In micrographics, a code used for manual or automatic retrieval of microimages. (C) 610.2-1987

retrieval queue One of two alternative databases that the service uses to convey objects to the client of the MA interface. (C/PA) 1224.1-1993w

retrieve To move data out of a storage device or data medium. *Contrast:* store. *See also:* read. (C) 610.5-1990w

retrodirective antenna An antenna whose monostatic cross section is comparable to the product of its maximum directivity and its area projected in the direction toward the source, and is relatively independent of the source direction. *Note:* Active devices can be added to enhance the return signal. For this case, the term shall be qualified by the word active; that is, active retrodirective antenna system. (AP/ANT) 145-1993

retrofill (handling and disposal of transformer grade insulating liquids containing PCBs) The process of replacing the dielectric liquid in a transformer. (LM/C) 802.2-1985s

retrograde orbit (communication satellite) An inclined orbit with an inclination between 90° and 180°. (COM) [19]

retro-reflector (illuminating engineering) A device designed to reflect light in a direction close to that at which it is incident, whatever the angle of incidence. (EEC/IE) [126]

retrospective trace A trace produced from historical data recorded during the execution of a computer program. *Note:* This differs from an ordinary trace, which is produced cumulatively during program execution. *See also:* execution trace; variable trace; symbolic trace; subroutine trace. (C) 610.12-1990

retry A mechanism whereby a transaction that (for whatever reason) could not complete in the current operation is attempted again at a later time. (C/BA) 1014.1-1994w

retry period The time a master waits after failing to receive a response before trying the operation again. This time should be randomized to avoid system deadlocks. (NID) 960-1993

return (1) (A) (software) To transfer control from a software module to the module that called it. *See also:* return code. **(B) (software)** To assign a value to a parameter that is ac-

cessible by a calling module; for example, to assign the value 25 to parameter AGE for use by a calling module. *See also:* return value. **(C) (software)** A computer instruction or process that performs the transfer in definition definition (A). (C) 610.12-1990

(2) (software) *See also:* carriage return. (C) [85]

(3) (local area networks) A secondary link control signal indicating that the pre- empted normal-priority round-robin cycle in a lower repeater is not complete. (C) 8802-12-1998

return air Air returned from the conditioned space. (IA/PSE) 241-1990r

return-beam mode (camera tubes) A mode of operation in which the output current is derived, usually through an electron multiplier, from that portion of the scanning beam not accepted by the target. *See also:* camera tube. (ED) [45]

return beam multiplier gain (diode-type camera tube) The dimensionless ratio between the output signal current at the final anode of the electron multiplier in a return beam camera tube and the modulated portion of the beam current falling on the first dynode of the multiplier. The output signal current is the value of the output current less the dark current. (ED) 503-1978w

return code (1) A code used to influence the execution of a calling module following a return from a called module. (C) 610.12-1990

(2) A value returned by a function indicating whether the function completed successfully. If the function did not complete successfully, it may return a nonzero return code; the exact value may indicate one of several possible severity conditions: informational, warning, error, severe, terminal error, etc. (C/DA) 1481-1999

(3) A value, returned to the caller of an operation, providing information about the completion status of the operation. This standard defines two forms of return codes. (IM/ST) 1451.1-1999

return code register A register used to store a code which is used to influence the carrying out of following programs. (C) 610.10-1994w

return difference (network analysis) One minus the loop transmittance. (CAS) 155-1960w

return interval *See:* retrace interval.

return loss (1) (A) (data transmission) At a discontinuity in a transmission system the difference between the power incident upon the discontinuity. **(B) (data transmission)** The ratio in decibels of the power incident upon the discontinuity to the power reflected from the discontinuity. *Note:* This ratio is also the square of the reciprocal to the magnitude of the reflection coefficient.

Return loss $= 20\log_{10}(1/\Gamma)$.

(C) (data transmission) More broadly, the return loss is a measure of the dissimilarity between two impedances, being equal to the number of decibels that corresponds to the scalar value of the reciprocal of the reflection coefficient, and hence being expressed by the following formula:

$$20\log_{10}\left|\frac{Z_1 + Z_2}{Z_1 - Z_2}\right| \text{ decibel}$$

where Z_1 and Z_2 = the two impedances. (MTT/PE) 146-1980, 599-1985

(2) (waveguide) (or gain) The ratio of incident to reflected power at a reference plane of a network. (MTT) 146-1980w

(3) (transmission characteristics of PCM telecommunications circuits and systems) A measure of power reflected back to the originating end of a channel due to impedance mismatch. This measurement is also used to characterize equipment impedance accuracy vs. a test impedance. (COM/TA) 1007-1991r

(4) (broadband local area networks) The degree of impedance mismatch for an RF component or system. The return loss term expresses the coefficient of reflection in decibels. At the location of an impedance mismatch, part of the incident signal is reflected back toward its source, creating a reflected signal. The return loss is the number of decibels that the reflected signal level is below the incident signal level. (LM/C) 802.7-1989r

(5) In 10BROAD36, the ratio in decibels of the power reflected from a port to the power incident to the port. An indicator of impedance matching in a broadband system. (C/LM) 802.3-1998

(6) The ratio, in dB, of the power incident upon the discontinuity to the power reflected from the discontinuity. *Note:* This ratio is also the square of the reciprocal of the magnitude of the reflection coefficient. (EMC) 1128-1998

return loss, echo *See:* echo return loss.

return loss, singing *See:* singing return loss.

return path Direction towards the headend. *See also:* inbound. (LM/C) 802.7-1989r

return signal (control system feedback) (closed loop) The signal resulting from a particular input signal, and transmitted by the loop and to be subtracted from that input signal. See the figure attached to the definition of **signal, error.** *See also:* feedback control system. (PE/EDPG) 421-1972s

return stroke (lightning) The luminescent, high-current discharge that is initiated after the stepped leader and pilot streamer have established a highly ionized path between charge centers. *See also:* direct-stroke protection. (T&D/PE) [10]

return swing (pulse transformers) (last transition ringing) The maximum amount by which the instantaneous pulse value is below the zero axis in the region following the backswing. It is expressed in amplitude units or as a percentage of AM. (PEL/ET) 390-1987r

return to bias (magnetic tape pulse recorders for electricity meters) A method whereby a recording head current, which results in a magnetic field polarity opposite that of the bias magnet, is applied momentarily in order to record a pulse. (ELM) C12.14-1982r

return-to-reference recording Magnetic recording such that the patterns of magnetization used to represent zeros and ones occupy only part of the storage cell, and the remainder of the cell is magnetized to a reference condition. *Contrast:* nonreturn-to-reference recording. *See also:* return-to-zero recording. (C) 610.10-1994w

return-to-zero recording Return-to-reference recording in which the reference condition is the absence of magnetization. (C) 610.10-1994w

return trace (1) (television) The path of the scanning spot during the retrace interval. (BT/AV) 201-1979w

(2) (oscillography) (television) The path of the scanning spot during the retrace. *See also:* television; oscillograph. (IM) 311-1970w

return-transfer function (control system feedback) (closed loop) The transfer function obtained by taking the ratio of the Laplace transform of the return signal to the Laplace transform of its corresponding input signal. *See also:* feedback control system. (PE/EDPG) [3]

return value A value assigned to a parameter by a called module for access by the calling module. (C) 610.12-1990

reusability The degree to which a software module or other work product can be used in more than one computer program or software system. *See also:* generality. (C) 610.12-1990

(2) (A) The degree to which an asset can be used in more than one software system, or in building other assets. **(B)** In a reuse library, the characteristics of an asset that make it easy to use in different contexts, software systems, or in building different assets. (C/SE) 1517-1999

reusable Pertaining to a software module or other work product that can be used in more than one computer program or software system. *See also:* generality. (C) 610.12-1990

reusable software product A software product developed for one use but having other uses, or one developed specifically to be usable on multiple projects or in multiple roles on one

project. Examples include, but are not limited to, commercial off-the-shelf software products, acquirer-furnished software products, software products in reuse libraries, and pre-existing developer software products. Each use may include all or part of the software product and may involve its modification. This term can be applied to any software product (for example, requirements, architectures, etc.), not just to software itself. (C/SE) J-STD-016-1995

reuse The use of an asset in the solution of different problems. (C/SE) 1517-1999

reused source statements Unmodified source statements obtained for the product from an external source. (C/SE) 1045-1992

reuse sponsor A member of the organization's management who authorizes, approves, promotes, and obtains the funding and other resources for the Reuse Program. (C/SE) 1517-1999

revenue service (A) Transit service excluding deadheading or layovers. **(B)** Any service scheduled for passenger trips. (VT/RT) 1474.1-1999

reverberant sound Sound that has arrived at a given location by a multiplicity of indirect paths as opposed to a single direct path. *Notes:* 1. Reverberation results from multiple reflections of sound energy contained within an enclosed space. 2. Reverberation results from scattering from a large number of inhomogeneities in the medium or reflection from bounding surfaces. 3. Reverberant sound can be produced by a device that introduces time delays that approximate a multiplicity of reflections. *See also:* echo. (SP) [32]

reverberation The presence of reverberant sound. (SP) [32]

reverberation chamber An enclosure especially designed to have a long reverberation time and to produce a sound field as diffuse as possible. *See also:* anechoic chamber. (SP) [32]

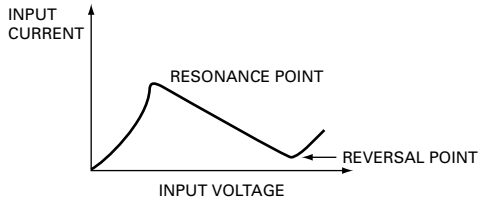
reverberation room *See:* reverberation chamber.

reverberation time (T_{60}) (1) The time required for the mean-square sound pressure level, or electric equivalent, originally in a steady state, to decrease 60 dB after the source output is stopped. (SP) [32]
(2) The time it takes for sound in a room to decay 60 dB from its initial, steadystate value. (COM/TA) 1329-1999

reverberation-time meter An instrument for measuring the reverberation time of an enclosure. *See also:* instrument. (EEC/PE) [119]

reversal (storage battery) (storage cell) A change in normal polarity of the cell or battery. *See also:* charge. (PE/EEC) [119]

reversal point That point on the input current versus input voltage characteristics where the input current reaches a minimum value and begins to increase. See figure under output voltage versus input voltage characteristics and figure below.



Reversal point without jump resonance

Reversal point

(PEL) 449-1998

reverse The direction of operation that is opposite to forward. (VT) 1475-1999

reverse-battery signaling (telephone switching systems) A method of loop signaling in which the direction of current in the loop is changed to convey on-hook and off-hook signals. (COM) 312-1977w

reverse-battery supervision (telephone switching systems) A form of supervision employing reverse-battery signaling. (COM) 312-1977w

reverse bias (light-emitting diodes) (reverse voltage) The bias voltage that is applied to an LED (light emitting diode) in the reverse direction. (IE/EEC) [126]

reverse-blocking current (reverse-blocking thyristor) The reverse current when the thyristor is in the reverse-blocking state. *See also:* principal current. (IA/ED) 223-1966w, [46], [12], [62]

reverse-blocking diode-thyristor A two-terminal thyristor that switches only for positive anode-to-cathode voltages and exhibits a reverse-blocking state for negative anode-to-cathode voltages. (IA/IPC) 428-1981w

reverse-blocking impedance (reverse-blocking thyristor) The differential impedance between the two terminals through which the principal current flows, when the thyristor is in the reverse-blocking state at a stated operating point. *See also:* principal voltage-current characteristic. (ED) [46]

reverse-blocking state (reverse-blocking thyristor) The condition of a reverse-blocking thyristor corresponding to the portion of the anode-to-cathode voltage-current characteristic for reverse currents of lower magnitude than the reverse-breakdown current. *See also:* principal voltage-current characteristic. (ED) [46]

reverse-blocking triode thyristor (SCR) (1) A three-terminal thyristor that switches only for positive anode-to-cathode voltages and exhibits a reverse-blocking state for negative anode-to-cathode voltages. (IA/IPC) 428-1981w
(2) A monocrystalline reverse-blocking semiconductor device with bistable character in the forward direction normally having three pn junctions and a gate electrode at which a suitable electrical signal will cause switching from the off state to the on state within the first quadrant of the anode to cathode voltage−current characteristics. If cooling means are integrated, they are included. *Note:* In this document the word thyristor means a reverse-blocking triode thyristor. *See also: p-n* junction. (IA/IPC) 444-1973w

reverse-breakdown current (reverse-blocking thyristor) The principal current at the reverse-breakdown voltage. *See also:* principal current. (PE/PSR) C37.93-1976s

reverse-breakdown voltage (reverse-blocking thyristor) The value of negative anode-to-cathode voltage at which the differential resistance between the anode and cathode terminals changes from a high value to a substantially lower value. *See also:* principal voltage-current characteristic. (PE/PSR) C37.93-1976s

reverse channel (1) Data path from the peripheral to the host. (C/MM) 1284-1994
(2) *See also:* backward channel. (C) 610.10-1994w

reverse-conducting diode-thyristor A two-terminal thyristor that switches only for positive anode-to-cathode voltages and conducts large currents at negative at negative anode-to-cathode voltages comparable in magnitude to the ON-state voltages. (IA/IPC) 428-1981w

reverse-conducting triode-thyristor A three-terminal thyristor that switches only for positive anode-to-cathode voltages and conducts large currents at negative anode-to-cathode voltages comparable in magnitude to the ON-state voltage. (IA/IPC) 428-1981w

reverse contact A contact that is closed when the operating unit is in the reverse position. (EEC/PE) [119]

reverse coupling The ratio of the spurious signal generated by a signal at some other input to the recorder and the signal recorded at the specified input of the recorder. (IM/WM&A) 1057-1994w

reverse current (1) Current that flows upon application of reverse voltage. (EEC/PE) [119]
(2) (reverse-blocking or reverse-conducting thyristor) The principal current for negative anode-to-cathode voltage. *See also:* principal current. (PE/PSR) C37.93-1976s

(3) (metallic rectifier) The current that flows through a metallic rectifier cell in the reverse direction. *See also:* rectification. (PE/EEC) [119]

(4) (semiconductor rectifiers) The total current that flows through a semiconductor rectifier device in the reverse direction. *See also:* rectification. (ED) 216-1960w

reverse-current cleaning *See:* anode cleaning.

reverse-current cutout A magnetically operated direct-current device that operates to close an electric circuit when a predetermined voltage condition exists and operates to open an electric circuit when more than a predetermined current flows through it in the reverse direction. *Fixed-voltage type:* A reverse-current cutout that closes an electric circuit whenever the voltage at the cutout terminal exceeds a predetermined value and is of the correct polarity. It opens the circuit when more than a predetermined current flows through it in the reverse direction. *Differential-voltage type:* A reverse-current cutout that closes an electric circuit when a predetermined differential voltage appears at the cutout terminal, provided this voltage is of the correct polarity and exceeds a predetermined value. It opens the circuit when more than a predetermined current flows through it in the reverse direction. (EEC/PE) [119]

reverse-current relay A relay that operates on a current flow in a dc circuit in a direction opposite to a predetermined reference direction. (SWG/PE) C37.100-1992

reverse-current release (trip) A release that operates upon reversal of the direct current in the main circuit from a predetermined direction. (SWG/PE) C37.100-1992

reverse-current trip *See:* reverse-current release.

reverse-current tripping *See:* reverse-current release.

reverse-power tripping *See:* reverse-current release.

reverse data transfer phase When data transfers from the peripheral to the host. (C/MM) 1284-1994

reverse direction (semiconductor rectifier diode) The direction of higher resistance to steady-state direct-current: that is, from the cathode to the anode. (IA/ED) [12], [127]

reverse-electrode coaxial detector (germanium gamma-ray detectors) Reverse-electrode geometry. A coaxial detector in which the outer contact is a p-type layer. (NPS) 325-1996

reverse emission (vacuum tubes) The inverse electrode current from an anode during that part of a cycle in which the anode is negative with respect to the cathode. *See also:* electron emission. (ED) [45]

reverse engineering The process of extracting software system information (including documentation) from source code. (C/SE) 1219-1998

reverse execution *See:* reversible execution.

reverse gate current (thyristor) The gate current when the junction between the gate region and the adjacent anode or cathode region is reverse biased. *See also:* principal current. (ED) [46]

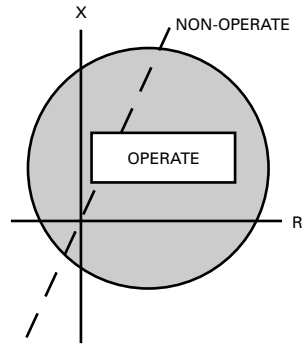
reverse gate voltage (thyristor) The voltage between the gate terminal and the terminal of an adjacent region resulting from reverse gate current. *See also:* principal voltage-current characteristic. (ED) [46]

reverse host busy data available phase When the peripheral has data to transmit. (C/MM) 1284-1994

reverse host busy data not available phase When the peripheral has no more data to transmit. (C/MM) 1284-1994

reverse leading In photocomposition, the ability of some phototypesetting equipment to allow reverse movement of the photographic medium. *Note:* This technique permits the setting of side-by-side columns of text on the composed page. *See also:* leading. (C) 610.2-1987

reverse offset mho characteristic A modification of a mho characteristic to make it nondirectional so as to encompass the intersection of the *R-X* axes. See figure below.



reverse offset mho characteristic
(SWG/PE) C37.100-1992

reverse period (rectifier circuits) (rectifier circuit element) The part of an alternating-voltage cycle during which the current flows in the reverse direction. *See also:* blocking period; rectifier circuit element. (IA) [62]

reverse-phase or phase-balance current relay (power system device function numbers) A relay that functions when the polyphase currents are unbalanced or contain negative phase-sequence components above a given amount. (PE/SUB) C37.2-1979s

reverse Polish notation *See:* postfix notation.

reverse position (device) The opposite of the normal position. (EEC/PE) [119]

reverse power dissipation (semiconductor) The power dissipation resulting from reverse current. (IA) [12]

reverse power loss (semiconductor rectifiers) The power loss resulting from the flow of reverse current. *See also:* rectification; semiconductor rectifier stack. (IA) [12]

reverse printer *See:* bidirectional printer.

reverser A switching device for interchanging electric circuits to reverse the direction of motor rotation. *See also:* multiple-unit control. (EEC/PE) [119]

(2) (A) The portion of the master controller used to change the commanded direction of train movement. **(B)** A circuit device used to change motor connections in order to change the direction of motor rotation and thus train movement. (VT) 1475-1999

reverse recovery current (semiconductor rectifiers) The transient component of reverse current associated with a change from ON state conduction to reserve voltage. *See also:* rectification. (IA) [12]

reverse recovery interval (thyristor) The interval between the instant when the principal ON-state current flowing through a semiconductor passes through zero, and the instant when the reverse current has decayed to 10 percent of the peak reverse value. (IA/IPC) 428-1981w

reverse recovery time (reverse-blocking thyristor or semiconductor diode) The time required for the principal current or voltage to recover to a specified value after instantaneous switching from an ON state to a reverse-voltage or current. *See also:* principal voltage-current characteristic; rectification. (ED) [46]

reverse resistance (metallic rectifier) The resistance measured at a specified reverse voltage or a specified reverse current. *See also:* rectification. (EEC/PE) [119]

reverse scrolling In word processing, the process of moving the text across the display screen in the reverse direction from the normal reading direction. *See also:* scrolling. (C) 610.2-1987

reverse voltage (1) (rectifier) Voltage of that polarity that produces the smaller current. *See also:* rectification; principal voltage-current characteristic. (PE/EEC) [119]

(2) (reverse-blocking or reverse-conducting thyristor) (semiconductor) A negative anode-to-cathode voltage. (IA) [12]

reverse or OFF-state voltage dividers (1) (thyristor) (or OFF-state) Devices employed to assure satisfactory division of reverse or OFF-state voltage among series-connected semiconductor devices under transient or steady state conditions, or both. (IA/IPC) 428-1981w

(2) Devices employed to assure satisfactory division of reverse voltage among series-connected semiconductor rectifier diodes. Transformers, bleeder resistors, capacitors, or combinations of these may be employed. (IA) [62]

reverse wave *See:* reflected wave.

reversibility (Hall generator) The ratio of the change in absolute magnitude of the Hall voltage to the mean absolute magnitude of the Hall voltage, when the control current is kept constant and the magnetic field is changed from a given magnitude of one polarity to the same magnitude of the opposite polarity. (MAG) 296-1969w

reversible capacitance (nonlinear capacitor) The limit, as the amplitude of an applied sinusoidal capacitor voltage approaches zero, of the ratio of the amplitude of the resulting in-phase fundamental-frequency component of transferred charge to the amplitude of the applied voltage, for a given constant bias voltage superimposed on the sinusoidal voltage. *See also:* nonlinear capacitor. (ED) [46]

reversible-capacitance characteristic (nonlinear capacitor) The function relating the reversible capacitance to the bias voltage. *See also:* nonlinear capacitor. (ED) [46]

reversible counter A counter that can be incremented or decremented by a certain amount upon receipt of an appropriate signal. (C) 610.10-1994w

reversible dark current increase (diode-type camera tube) That increase of the target dark current which results from electron bombardment of the charge storage target by the scanning electron beam. This is manifested as a dark current increase which is reversible. (ED) 503-1978w

reversible execution A debugging technique in which a history of program execution is recorded and then replayed under the user's control, in either the forward or backward direction. *Synonyms:* reverse execution; playback; backward execution; replay. (C) 610.12-1990

reversible motor A motor whose direction of rotation can be selected by change in electric connections or by mechanical means but the motor will run in the selected direction only if it is at a standstill or rotating below a particular speed when the change is initiated. *See also:* asynchronous machine; direct-current commutating machine. (EEC/PE) [119]

reversible permeability The limit of the incremental permeability as the incremental change in magnetizing force approaches zero. *Note:* In anisotropic media, reversible permeability becomes a matrix. (Std100) 270-1966w

reversible permittivity The change in displacement per unit field when a very small relatively high-frequency alternating signal is applied to a ferroelectric at any point of a hysteresis loop. *See also:* ferroelectric domain. (UFFC) 180w

reversible potential *See:* equilibrium potential.

reversible power converter (1) An equipment containing thyristor converter assemblies connected in such a way that energy transfer is possible from the alternating-current side to the direct-current side and from the direct-current side to the alternating-current side with or without reversing the current in the direct-current circuit. *See also:* power rectifier. (IA/SPC) [62]

(2) (thyristor converter) A converter in which the transfer of energy is possible both from the ac side to the dc side and vice versa. (IA/IPC) 444-1973w

reversible process An electrochemical reaction that takes place reversibly at the equilibrium electrode potential. *See also:* electrochemistry. (EEC/PE) [119]

reversible target dark current increase (diode-type camera tube) That increase in dark current and dark current nonuniformity and monitoring and is not permanent. It is removable through target operation under special operating procedures or with a nonoperating rest period. (ED) 503-1978w

reversible turbine (power operations) A hydraulic turbine, normally installed in a pumped-storage station, that can be used alternately as a pump or as a prime mover. (PE/PSE) 858-1987s, 346-1973w

reversing The control function of changing motor rotation from one direction to the opposite direction. *See also:* electric drive. (IA/ICTL/IAC) [60]

reversing change-over selector A change-over selector that connects one or the other end of the tap winding to the main winding. (PE/TR) C57.131-1995

reversing device (power system device function numbers) A device that is used for the purpose of reversing a machine field or for performing any other reversing functions. (PE/SUB) C37.2-1979s

reversing motor One the torque and hence direction of rotation of which can be reversed by change in electric connections or by other means. These means may be initiated while the motor is running at full speed, upon which the motor will come to a stop, reverse, and attain full speed in the opposite direction. *See also:* asynchronous machine. (EEC/PE) [119]

reversing starter An electric controller for accelerating a motor from rest to normal speed in either direction of rotation. *See also:* starter; electric controller. (IA/ICTL/IAC) [60]

reversing switch A switch intended to reverse the connections of one part of a circuit. *See also:* switch. (IA/IAC) [60]

reverting call (telephone switching systems) A call between two stations on the same party line. (COM) 312-1977w

reverting-call tone (telephone switching systems) A tone that indicates to a calling customer that the called party is on the same line. (COM) 312-1977w

revertive pulsing (telephone switching systems) A means of pulsing for controlling distant selections whereby the near end receives signals from the far end. (COM) 312-1977w

review (1) (software) A process or meeting during which a work product, or set of work products, is presented to project personnel, managers, users, customers, or other interested parties for comment or approval. Types include code review, design review, formal qualification review, requirements review, test readiness review. (C/SE) 610.12-1990, 1058.1-1987s

(2) A process or meeting during which a software product is presented to project personnel, managers, users, customers, user representatives, or other interested parties for comment or approval. (C/SE) 1028-1997

revision A controlled item with the same functional capabilities as the original plus changes, error resolution, or enhancements. (C/SE) 1074-1995s

revolver track *See:* regenerative track.

rewind (1) (test, measurement, and diagnostic equipment) To return a tape to its beginning or a passed location. (MIL) [2]

(2) To bring a magnetic tape or paper tape back to the beginning of the recording area. (C) 610.10-1994w

rework (nuclear power quality assurance) The process by which an item is made to conform to original requirements by completion or correction. (PE/NP) [124]

rewrite (A) To write again. **(B)** In a destructive-read storage device, to return the data to the state it had prior to reading. *See also:* regenerate. (C) 162-1963, 610.10-1994

REXX A command language used primarily in the IBM VM/CMS environment. *Note:* Supersedes EXEC and EXEC2. (C) 610.13-1993w

Reynolds number A nondimensional number equal to air velocity (V_w) times conductor diameter ($D/_{12}$) divided by kinematic viscosity (μ_f/ρ_f). (T&D/PE) 738-1993

RF *See:* radio frequency.

RF link *See:* radio frequency link.

RH *See:* relative humidity.

RGB display device *See:* red, green, blue display device.

rheobase (medical electronics) The intensity of the steady cathodal current of adequate duration that when suddenly applied just suffices to excite a tissue. (EMB) [47]

rheostat (1) An adjustable resistor so constructed that its resistance may be changed without opening the circuit in which it may be connected. (Std100) 270-1966w
(2) (power system device function numbers) A variable resistance device used in an electric circuit, which is electrically operated or has other electrical accessories, such as auxiliary, position, or limit switches. (SUB/PE) C37.2-1979s

rheostatic brake A form of dynamic brake in which the electrical energy generated by braking is dissipated as heat in onboard resistors during the braking cycle. (VT) 1475-1999

rheostatic braking A form of dynamic braking in which electric energy generated by the traction motors is controlled and dissipated by means of a resistor whose value of resistance may be varied. *See also:* electric drive; dynamic braking. (IA/ICTL/IAC) [60]

rheostatic control (elevators) A system of control that is accomplished by varying resistance and.or reactance in the armature and.or field circuit of the driving-machine motor. *See also:* control. (EEC/PE) [119]

rheostatic-type regulator (rotating machinery) A regulator that accomplishes the regulating function by mechanically varying a resistance. *Note:* Historically, rheostatic-type regulators have been further defined as direct acting and indirect acting. An indirect-acting-type regulator is a rheostatic type that controls the excitation of the exciter by acting on an intermediate device which is not considered part of the regulator or exciter. A direct-acting-type regulator is a rheostatic type that directly controls the excitation of an exciter by varying the input to the exciter field circuit. (PE/EDPG) [9], 421-1972s

rheostat loss (synchronous machines) The I^2R loss in the rheostat controlling the field current. (REM) [115]

rheostriction *See:* pinch effect.

RHI *See:* range-height indicator.

rhombic antenna An antenna composed of long wire radiators arranged in such a manner that they form the sides of a rhombus. *Note:* The antenna usually is terminated in a resistance. The length of the sides of the rhombus, the angle between the sides, the elevation above ground, and the value of the termination resistance are proportioned to give the desired radiation properties. (AP/ANT) 145-1993

rho rho (navigation aids) A generic term referring to navigation systems based on the measurement of two distances for determination of position. (AES/GCS) 172-1983w

rho theta (navigation aids) A generic term referring to polar coordinate navigation systems for determination of position of a vehicle through measurement of distance and direction. (AES/GCS) 172-1983w

rhumbatron (electron tube) (microwave tubes) A resonator, usually in the form of a torus. *See also:* velocity-modulated tube. (ED) [45], [84]

rhumbline (navigation aids) A line on the surface of the earth making the same oblique angle with all meridians. (AES/GCS) 172-1983w

rhythmic light (illuminating engineering) A light which, when observed from a fixed point, has a luminous intensity which changes periodically. (EEC/IE) [126]

ribbon microphone A moving-conductor microphone in which the moving conductor is in the form of a ribbon that is directly driven by the sound waves. *See also:* microphone. (EEC/PE) [119]

ribbon transducer (mechanical recording) A moving-conductor transducer in which the movable conductor is in the form of a thin ribbon. (SP) [32]

Richardson-Dushmann equation (thermionics) An equation representing the saturation current of a metallic thermionic cathode in the saturation-current state:

$$J = A_0(1 - r)T^2 \exp\left(-\frac{b}{T}\right)$$

where
J = density of the saturation current
T = absolute temperature
A_0 = universal constant equal to 120 amperes per centimeter^2 kelvin^2
b = absolute temperature equivalent to the work function
r = reflection coefficient, which allows for the irregularities of the surface.

See also: electron emission; work function. (ED) [45], [84]

Richardson effect *See:* thermionic emission.

ride-through capability The ability of equipment to withstand momentary interruptions or sags. (T&D/PE) 1250-1995

ridged horn (antenna) A horn antenna in which the waveguide section is ridged. (AP/ANT) 145-1993

ridge-pin cover *See:* insulator cover.

rider structure *See:* crossing structure.

ridge waveguide A waveguide with interior projections extending along the length and in contact with the boundary wall. *See also:* waveguide. (AP/ANT) [35]

Rieke diagram (oscillator performance) A chart showing contours of constant power output and constant frequency drawn on a polar diagram whose coordinates represent the components of the complex reflection coefficient at the oscillator load. *See also:* load-impedance diagram; oscillatory circuit. (ED) 161-1971w, [45]

RIF *See:* radio-influence field; routing information field.

rigging An assembly of material used to manipulate or support various tools and equipment in both energized and de-energized line-work. (T&D/PE) 516-1995

right-hand polarization of a field vector *See:* sense of polarization.

right-hand polarization of a plane wave *See:* sense of polarization.

right-hand polarized wave A circularly or an elliptically polarized electromagnetic wave for which the electric field vector, when viewed with the wave approaching the observer, rotates counter-clockwise in space. *Notes:* 1. This definition is consistent with observing a clockwise rotation when the electric field vector is viewed in the direction of propagation. 2. A right-handed helical antenna radiates a right-hand polarized wave. (AP/PROP) 211-1997

right-hand rule Positive rotation is clockwise when viewed toward the positive direction along the axis of rotation. (DIS/C) 1278.1-1995

right justification In text formatting, justification of text such that the right margin is aligned. *Contrast:* ragged right margin. (C) 610.2-1987

right of access (nuclear power quality assurance) The right of a purchaser or designated representative to enter the premises of a supplier for the purpose of inspection, surveillance, or quality assurance audit. (PE/NP) [124]

right-threaded tree A threaded tree in which the right link field in each terminal node is made to point to its successors with respect to a particular order of traversal. *Contrast:* left-threaded tree. (C) 610.5-1990w

rigid-bus structure A bus structure comprised of rigid conductors supported by rigid insulators. (PE/SUB) 605-1998

rigid equipment Equipment, structures, and components whose lowest resonant frequency is greater than the cutoff frequency on the response spectrum. (PE/SUB/NP) 693-1997, 344-1987r

rigid metal conduit A raceway specially constructed for the purpose of the pulling in or the withdrawing of wires or cables after the conduit is in place and made of metal pipe of standard weight and thickness permitting the cutting of standard threads. *See also:* raceway. (EEC/PE) [119]

rigid tower A tower that depends only upon its own structural members to withstand the load that may be placed upon it. *See also:* angle tower; dead-end tower; flexible tower; tower. (T&D/PE) [10]

RII *See:* routing information indicator.

rim (rotating machinery) (spider rim) The outermost part of a spider. A rotating yoke. *See also:* rotor. (PE) [9]

ring (1) (plug) A ring-shaped contacting part, usually placed in back of the tip but insulated therefrom. (EEC/PE) [119]
(2) (data management) *See also:* circularly-linked list. (C) 610.5-1990w
(3) A signal transmitted on a telephone line to indicate an incoming call. (C) 610.7-1995

ring around (A) The undesired triggering of a transponder or repeater by its own transmitter. **(B)** The ring-type (constant-radius echo) presentation on a plan-position indicator (PPI) display that occurs from a very large radar cross section target when the radar has high azimuth sidelobes. (AES) 686-1997

ring array *See:* circular array.

ringback signal (telephone switching systems) A signal initiated by an operator at the called end of an established connection to recall the originating operator. (COM) 312-1977w

ringback tone (telephone switching systems) A tone that indicates to a caller that a ringing signal is being applied to a destination outlet. (COM) 312-1977w

ring circuit (waveguide practice) A hybrid T having the physical configuration of a ring with radial branches. *See also:* waveguide. (PE/EEC) [119]

ring counter A re-entrant multistable circuit consisting of any number of stages arranged in a circle so that a unique condition is present in one stage, and each input pulse causes this condition to transfer one unit around the circle. *See also:* trigger circuit. (EEC/PE) [119]

ringdown In telephone operation, a method of signaling to gain the attention of an operator. (C) 610.10-1994w

ringdown signaling (1) (telephone switching systems) A method of alerting an operator in which ringing is sent over the line to operate a device or circuit to produce a steady indication (normally a visual signal). (COM) 312-1977w
(2) (data transmission) The application of a signal to the line for the purpose of bringing in a line signal or supervisory signal at a switchboard or ringing a user's instrument. (Historically, this was a low frequency signal of about 20 Hz from the user on the line for calling the operator or for disconnect). (PE) 599-1985w

ringer *See:* telephone ringer.

ringer box *See:* bell box.

ring error monitor (REM) A function that collects ring error data from ring stations. The REM may log the received errors, or it may analyze this data and record statistics on the errors. (C/LM) 8802-5-1998

ring feeder *See:* loop-service feeder.

ring head (electroacoustics) A magnetic head in which the magnetic material forms an enclosure with one or more air gaps. The magnetic recording medium bridges one of these gaps and is in contact with or in close proximity to the pole pieces on one side only. (SP) [32]

ring heater, induction *See:* induction ring heater.

ring in A port that receives signals from the main ring path on the trunk cable and transmits signals to the backup path on the trunk cable, and provides connectivity to the immediate upstream ring out port. (C/LM) 8802-5-1998

ringing (1) (pulse transformers) (first transition ringing) (ARI) The maximum amount by which the instantaneous pulse value deviates from the straight-line segment fitted to the top of the pulse in determining AM in the pulse top region following rolloff, or overshoot, or both. It is expressed in amplitude units or as a percentage of AM. (PEL/ET) 390-1987r
(2) (data transmission) The production of an audible or visible signal at a station or switchboard by means of an alternating or pulsating current, or a damped oscillation occurring in the output signal of a system, as a result of a sudden change in input signal. (PE) 599-1985w
(3) (telephone switching systems) An alternating or pulsing current primarily intended to produce a signal at a station or switchboard. (COM) 312-1977w
(4) (facsimile) *See also:* facsimile transient. (IM/WM&A) 194-1977w
(5) (pulse terminology) A distortion in the form of a superimposed damped oscillatory waveform which, when present, usually follows a major transition. *See also:* preshoot. (IM/WM&A) 194-1977w

ringing cycle (telephone switching systems) A recurring sequence made up of ringing signals and the intervals between them. (COM) 312-1977w

ringing key A key whose operation sends ringing current over the circuit to which the key is connected. (EEC/PE) [119]

ring latency In a token ring, the time (measured in bit times) it takes for a signal to propagate once around the ring. The ring latency time includes the signal propagation delay through the ring medium plus the sum of the propagation delays through each station or other element in the data path connected to the token ring. (C/LM) 8802-5-1998

ringless-type meter socket A meter socket that has no provision for a socket sealing ring but has other means of holding a detachable watthour meter in place, such as a cover that is secured in place by a latch. (ELM) C12.7-1993

ringlet (1) The closed path formed by the connection that provides feedback from the output link of a node to its input link. This connection may include other nodes or switch elements. (C/MM) 1596-1992
(2) The concept of RamLink is based on a point-to-point connection of devices circularly connected, starting and ending at a controller, thus forming a ring. Rings are more effective when small, hence the diminutive *ringlet* is emphasized in this standard. (C/MM) 1596.4-1996

RingLink A physical signaling model, consisting of point-to-point connections between nodes in a ring, that supports the RamLink logical protocols. RingLink is optimized for robust longer-distance single-board as well as cross-board communications. (C/MM) 1596.4-1996

ring oscillator An arrangement of two or more pairs of tubes operating as push-pull oscillators around a ring, usually with alternate successive pairs of grids and plates connected to tank circuits. Adjacent tubes around the ring operate in phase opposition. The load is supplied by coupling to the plate circuits. *See also:* oscillatory circuit. (AP/BT/ANT) 145-1983s, 182-1961w

ring out A port that transmits the output signals to the main ring path on the trunk cable and receives from the backup ring path on the trunk cable, and provides connectivity to the immediate downstream ring in port. (C/LM) 8802-5-1998

ring parameter server (RPS) A function that is responsible for initializing a set of operational parameters in ring stations on a particular ring. (C/LM) 8802-5-1998

ring segment A section of transmission path bounded by repeaters or converters. Ring segment boundaries are critical for determining the transmission limits that apply to the devices within the segment. (C/LM) 8802-5-1998

ring shift *See:* circular shift.

ring time The time during which the indicated output of an echo box remains above a specified signal-to-noise ratio. The ring time is used in measuring the performance of radar equipment. (AES/RS) 686-1990

ring topology A topology in which stations are attached to repeaters in a ring fashion. *Note:* Every station has a predecessor and a successor for network transmissions. *Synonym:* loop topology. *See also:* star topology; bus-ring topology; star-ring topology; star-bus topology; tree topology; bus topology. (C) 610.7-1995

ring-type meter socket A meter socket that has a socket rim. (ELM) C12.7-1993

ring wave (100 kHz ring wave). An open-circuit voltage wave characterized by a rapid rise to a defined peak value, followed by a damped oscillation. (SPD/PE) C62.62-2000

R interface The interface provided at the R reference point to allow the connection of non-ISDN terminals using, for example, CCITT V-series, or CCITT X-series interfaces. (LM/C/COM) 8802-9-1996

riometer *See:* relative ionospheric opacity meter.

ripple (1) The alternating-current component from a direct-current power supply arising from sources within the power supply. *Notes:* 1. Unless specified separately, ripple includes unclassified noise. 2. In electrical-conversion technology, ripple is expressed in peak, peak-to-peak, root-mean-square volts, or as percent root-mean-square. 3. Unless otherwise specified, percent ripple is the ratio of the root-mean-square value of the ripple voltage to the absolute value of the total voltage, expressed in percent. *See also:* percent ripple. (Std100) 270-1966w

(2) (high voltage testing) Ripple is the periodic deviation from the arithmetic mean value of the voltage. The amplitude of the ripple is defined as half the difference between the maximum and minimum values. The ripple factor is the ratio of the ripple amplitude to the arithmetic mean value. (PE/PSIM) 4-1978s

ripple amplitude (1) The maximum value of the instantaneous difference between the average and instantaneous value of a pulsating unidirectional wave. *See also:* rectification; power rectifier. (IA/PEL/PCON/CEM/ET) [62], [58], 388-1992r

(2) The fine variations on a frequency plot of an impedance function or of a transfer function are called ripple. The ripple amplitude is the difference between the maximum and the minimum value of the function. (CAS) [13]

ripple content (converter characteristics) (self-commutated converters) The periodic ac (alternating current) function that may be superimposed on a steady zero-frequency (dc) (direct current) voltage or current. (IA/SPC) 936-1987w

ripple current The total harmonic current content superimposed on the dc current. For specific engineering purposes, it is essential to define the harmonic spectrum of the ripple current in terms of amplitude and frequency. For general purposes, the ripple current can be expressed as the root-mean-square (rms) value of the harmonic current at any level of dc current; including the continuous rated dc current. (PE/TR) 1277-2000

ripple factor The ratio of the ripple magnitude to the arithmetic mean value of the voltage. *See also:* radio receiver; interference; power pack. (PE/PSIM) 4-1978s, [55]

ripple filter A low-pass filter designed to reduce the ripple current, while freely passing the direct current, from a rectifier or generator. *See also:* filter. (PE) 599-1985w

ripple voltage (rectifier or generator) The alternating-voltage component of the unidirectional voltage from a direct-current power supply arising from sources within the power supply. *See also:* rectifier; interference. (AP/BT/ANT) 145-1983s, 182A-1964w

ripple voltage or current The alternating component whose instantaneous values are the difference between the average and instantaneous values of a pulsating unidirectional voltage or current. *See also:* rectification. (IA/EEC/PCON) 59-1962w, [110]

RISC *See:* reduced instruction set computer.

rise *See:* travel.

rise-and-fall pendant A pendant, the height of which can be regulated by means of a cord adjuster. (EEC/PE) [119]

riser cable (communication practice) The vertical portion of a house cable extending from one floor to another. In addition, the term is sometimes applied to other vertical sections of cable. *See also:* cable. (PE/EEC) [119]

riser pole type arrester An arrester for pole mounting most often used to protect underground distribution cable and equipment. (SPD/PE) C62.22-1997, C62.11-1999

rise time (1) (pulse transformers) (first transition duration) (t_r) The time interval of the leading edge between the instants at which the instantaneous value first reaches the specified lower and upper limits of 10% and 90% of A_M. Limits other than 10% and 90% may be specified in special cases. (PEL/ET) 390-1987r

(2) The time required for the output of a system (other than first-order) to make the change from a small specified percentage (often 5 or 10) of the steady-state increment to a large specified percentage (often 90 or 95), either before overshoot or in the absence of overshoot. *Note:* If the term is unqualified, response to a step change is understood: otherwise the pattern and magnitude of the stimulus should be specified. *See also:* feedback control system. (IA/ICTL/IAC) [60]

(3) (A) The time required for a voltage or current pulse to increase from 10% to 90% of its maximum value. *Contrast:* fall time. **(B)** In digital logic, the time required to transition from a low state to a high state. (C) 610.10-1994

(4) The interval between the instants at which the instantaneous value first reaches specified lower and upper limits, namely 10 and 90% of the peak pulse value. (NI/NPS) 309-1999

rise time, fall time (amplitude, frequency, and pulse modulation) The time for the light intensity to increase from the 10 to 90% intensity points. The fall time is the time for the light intensity to fall from the 90 to 10 % intensity points. (UFFC) [17]

rise time, pulse *See:* pulse rise time.

rise time tr (of a pulse). The interval on the first transition between the 10% and 90% points, with respect to peak height, unless other levels are specified. *See also:* transition. (NPS) 325-1996

rising edge (1) (test access port and boundary-scan architecture) A transition from a low to a high logic level. In positive logic, a change from logic 0 to logic 1. (TT/C) 1149.1-1990

(2) A transition from a logic zero to a logic one. (TT/C) 1149.5-1995

rising slope *See:* initial slope.

rising-sun magnetron A multicavity magnetron in which resonators of two different resonance frequencies are arranged alternately for the purpose of mode separation. *See also:* magnetron. (ED) 161-1971w

risk (1) (reliability analysis of nuclear power generating station safety systems) A measure of the probability and severity of undesired effects. Often taken as the simple product of probability and consequence. (PE/NP) 352-1987r

(2) (overhead power lines) A measure of the probability of experiencing harm from one or more hazards (e.g., accidents, toxic chemicals). (T&D/PE) 539-1990

(3) The potential for loss (such as the compromising of data confidentiality or data integrity or the denial of service to users) that could result from threats to the system, exploiting vulnerabilities in the system. *See also:* threat. (C/BA) 896.3-1993w

(4) A measure that combines both the likelihood that a system hazard will cause an accident and the severity of that accident. (C/SE) 1228-1994

(5) The combination of the probability of an abnormal event or failure and the consequence(s) of that event or failure to a system's components, operators, users, or environment. (DEI) 1221-1993w

(6) (nuclear power generating station) The expected detriment per unit time to a person or population from a given cause. (PE/NP) 933-1999, 577-1976r

risk analysis A procedure to develop probability estimates of occurrence of each specific hazard. (DEI) 1221-1993w

risk assessment The process and procedures of identifying, characterizing, quantifying, and evaluating risks and their significance. (DEI) 1221-1993w

risk management The activities associated with risk management preparation, risk assessment, risk handling option assessment, and risk control. (C/SE) 1220-1994s

RIV (radio influence voltage) *See:* radio-influence voltage.

RJ-11 A six-pin modular telephone plug. *Notes:* 1. Also called a permissive connection, an RJ-11 plug is generally used on two-wire circuits, but can be used on four-wire circuits. 2. This definition reflects colloquial usage. Standards referencing this term should point to the precise standardized connector specification. (C) 610.7-1995

RJ-45 A eight-pin modular telephone plug. *Notes:* 1. Also called a programmable connection, an RJ-45 plug is generally used on four-wire circuits, but can be used on eight-wire circuits. 2. This definition reflects colloquial usage. Standards referencing this term should point to the precise standardized connector specification. (C) 610.7-1995

RJE *See:* remote job entry.

RLC circuit *See:* simple series circuit.

rlogin *See:* remote login.

RMAC *See:* remote MAC.

RMI *See:* radio magnetic indicator.

r/min Revolutions per minute. (T&D/PE) 957-1987s

rms *See:* root-mean-square value.

rms (effective) burst magnitude *See:* root-mean-square (effective) burst magnitude.

rms detector *See:* root-mean-square detector.

rms deviation *See:* root-mean-square deviation.

rms field The horizontal component of the root-mean-square (rms) field strength in the far field of an array, scaled to an effective value at 1 km. *Synonym:* effective field. (T&D/PE) 1260-1996

rms (effective) pulse amplitude *See:* root-mean-square (effective) pulse amplitude.

rms pulse broadening *See:* root-mean-square pulse broadening.

rms pulse duration *See:* root-mean-square pulse duration.

rms reverse-voltage rating *See:* root-mean-square reverse-voltage rating.

rms ripple *See:* root-mean-square ripple.

rms sensing A term commonly used to indicate the sensing of root-mean-square (rms) value current rather than instantaneous or peak values, as by a circuit-breaker trip unit. (IA/PSP) 1015-1997

rms spectral width The optical wavelength range as measured by ANSI/EIA/TIA 455-127-1991 (FOTP-127). (C/LM) 802.3-1998

rms value *See:* root-mean-square value.

RMW cycle *See:* read-modify-write cycle.

roadband interference (measurement) A disturbance that has a spectral energy distribution sufficiently broad, so that the response of the measuring receiver in use does not vary significantly when tuned over a specified number of receiver bandwidths. *See also:* electromagnetic compatibility. (EMC) [53]

road map A high-level process outline. (C/PA) 1003.23-1998

roadside equipment (RSE) Equipment located at a fixed position along the road transport network, providing communication and data exchange with the onboard equipment (OBE). (SCC32) 1455-1999

roadway The portion of highway, including shoulders, for vehicular use. *Note:* A divided highway has two or more roadways. *See also:* shoulder; traveled way. (NESC/T&D) C2-1997, C2.2-1960

roadway element (track element) That portion of the roadway apparatus associated with automatic train stop, train control, or cab signal systems, such as a ramp, trip arm, magnet, inductor, or electric circuit, to which the locomotive apparatus is directly responsive. *See also:* automatic train control. (EEC/PE) [119]

robbed bit signaling A scheme in which the signaling bits for each channel are assigned to the least significant bit (bit 8) of frames 6 and 12 of superframe format, or frames 6, 12, 18, and 24 of extended superframe format. When a frame is used for signaling, bits 1−7 are used for channel transmission. (COM/TA) 1007-1991r

robot A mechanical device that can be programmed to perform some task of manipulation or locomotion under automatic control. (C) 610.10-1994w

robustness (1) (software) The degree to which a system or component can function correctly in the presence of invalid inputs or stressful environmental conditions. *See also:* fault tolerance; error tolerance. (C) 610.12-1990

(2) A statistical result that is not significantly affected by small changes in parameters, models, or assumptions. (PE/NP) 933-1999

ROC curves *See:* receiver operating characteristic curves.

rock-dust distributor *See:* rock duster.

rock duster (rock-dust distributor) A machine that distributes rock dust over the interior surfaces of a coal mine by means of air from a blower or pipe line or by means of a mechanical contrivance, to prevent coal dust explosions. (PE/EEC) [119]

rock socket A hole drilled in good rock for installing either expanding or grouted guy anchors. (T&D/PE) 751-1990

rodding a duct *See:* duct rodding.

rod, ground *See:* ground rod.

rods (illuminating engineering) Retinal receptors which respond at low levels of luminance even down below the threshold for cones. At these levels there is no basis for perceiving differences in hue and saturation. No rods are found in the center of the fovea. (EEC/IE) [126]

rod storage A type of storage consisting of wires, coated with a nickel-iron alloy, which are cut in such a way as to form stacks of rods. (C) 610.10-1994w

Roebel transposition (rotating machinery) An arrangement of strands occupying two heightwise tiers in a bar (half coil), wherein at regular intervals through the core length, one top strand and one bottom strand cross over to the other tier in such a way that each strand occupies every vertical position in each tier so as to equalize the voltage induced in each of the strands, thereby eliminating current that would otherwise circulate among the strands. Looking from one end of the slot, the strands are seen to progress in a clockwise direction through the core length through what may be interpreted as an angle of 360° so that the strands occupy the same position at both ends of the core. There are several variations of the Roebel transposition in use. In a bar having four tiers of copper, the two pairs of tiers would each have a Roebel transposition. The uninsulated bar, then, would be assembled as two Roebel-transposed bars, side-by-side. In order to transpose against voltages induced by end-winding flux, various modifications of the transposition in the slot, and extension of the Roebel transposition into the end winding have been used. *See also:* rotor; stator. (PE) [9]

roff A text-formatting language. (C) 610.13-1993w

rogue module An unauthorized module introduced into the system to perform malicious activities, or an authorized module corrupted by malicious hardware or software. (C/BA) 896.3-1993w

role The context in which an operation is executed. The utilities in this standard require the ability to perform operations on more than one system, perhaps by more than one person. These operations are separted into distinct roles including developer, packager, manager, source, target, and client. (C/PA) 1387.2-1995

role name (A) A name that more specifically names the nature of a related value class or state class. For a relationship, a role name is a name given to a class in a relationship to clarify

the participation of that class in the relationship, i.e., connote the role played by a related instance. For an attribute, a role name is a name used to clarify the sense of the value class in the context of the class for which it is a property. **(B)** A name assigned to a foreign key attribute to represent the use of the foreign key in the entity. (C/SE) 1320.2-1998

roll angle *See:* roll attitude.

roll attitude (navigation aid terms) The angle between the horizontal and the lateral axis of the craft. *Synonym:* roll angle. *See also:* bank. (AES/GCS) 172-1983w

roll back (1) (telecommunications) The procedure by which a central processing unit recovers automatically from a fault that has led to a system malfunction. The complexity of the procedure, and the resulting temporary effect on the service of the system, depend on the nature of the fault. The procedure will usually involve the process of reinitialization. The time required to accomplish roll back is a measure of switching system performance. (COM/TA) 973-1990w

(2) (data management) Backward recovery of a database in which recently applied changes to the current version of a database are reversed. *Note:* A journal or checkpoint file is used to determine which changes must be reversed. *Synonym:* back out. *Contrast:* rollforward. (C) 610.5-1990w

roller *See:* sheave.

roller bearing (rotating machinery) A bearing incorporating a peripheral assembly of rollers. *See also:* bearing. (PE) [9]

roller, hold-down *See:* hold-down block.

roller, uplift *See:* uplift roller.

rollforward Forward recovery of a database in which all or part of a database is restored using data from a backup or snapshot of the database. Changes since the backup are reapplied to the database to restore it to some recently existing state. *Contrast:* roll back. (C) 610.5-1990w

roll in (1) (software) To transfer data or computer program segments from auxiliary storage to main storage. *Contrast:* roll out. *See also:* swap. (C) 610.12-1990

(2) To restore to main storage the sets of data that were previously rolled out. *Contrast:* roll out. (C) 610.10-1994w

rolling contacts A contact arrangement in which one cooperating member rolls on the other. *See also:* contactor. (IA/ICTL/IAC) [60], [84]

rolling interval An interval of time, the beginning of which progresses in steps of sub-intervals and where the interval length is equal to an integral multiple of sub-intervals. (ELM) C12.15-1990

rolling sphere method A simplified technique for applying the electrogeometric theory to the shielding of substations. The technique involves rolling an imaginary sphere of prescribed radius over the surface of a substation. The sphere rolls up and over (and is supported by) lightning masts, shield wires, fences, and other grounded metal objects intended for lightning shielding. A piece of equipment is protected from a direct stroke if it remains below the curved surface of the sphere by virtue of the sphere being elevated by shield wires or other devices. Equipment that touches the sphere or penetrates its surface is not protected. (SUB/PE) 998-1996

rolling transposition A transposition in which the conductors of an open wire circuit are physically rotated in a substantially helical manner. With two wires a complete transposition is usually executed in two consecutive spans. *See also:* open wiring. (EEC/PE) [119]

roll-in-jewel error Error caused by the pivot rolling up the side of the jewel and then falling to a lower position when tapped. This effect is not present when instruments are mounted with the axis of the moving element in a vertical position. (Roll-in-jewel error includes pivot-friction error that is small compared to the roll-in-jewel error.) (EEC/AII) [102]

rolloff (rounding after first transition), A_{RO} (pulse transformers) The amount by which the instantaneous pulse value is less than A_M at the point in time of the intersection of straight-line segments used to determine A_M. It is expressed in amplitude units or as a percentage of A_M. (PEL/ET) 390-1987r

roll out To transfer sets of data, such as files or computer programs of various sizes, from main storage to auxiliary storage for the purpose of freeing main storage for another use. *Contrast:* roll in. *See also:* swap. (C) 610.10-1994w, 610.12-1990

roll-out A movement process by which a snaphook or carabiner unintentionally disengages from another connector or object to which it is coupled. (T&D/PE) 1307-1996

roll over angle (conductor stringing equipment) For tangent stringing, the sum of the vertical angles between the conductor and the horizontal on both sides of the traveler. Resultants of these angles must be considered when stringing through line angles. Under some stringing conditions, such as stringing large diameter conductor, excessive roll over angles can cause premature failure of a conductor splice if it is allowed to pass over the travelers. (T&D/PE) 524-1980s

ROM (1) An abbreviation for read-only memory. The ROM data is maintained through losses of power. In some implementations ROM may actually be writeable, using (normally disabled) vendor-dependent protocols. (C/MM) 1212-1991s

(2) Read-only memory. (C/BA) 14536-1995

(3) *See also:* read-only memory. (C) 610.10-1994w

roof bushing A bushing intended primarily to carry a circuit through the roof, or other grounded barriers of a building, in a substantially vertical position. Both ends must be suitable for operating in air. At least one end must be suitable for outdoor operation. *See also:* bushing. 49-1948w

roof conductor The portion of the conductor above the eaves running along the ridge, parapet, or other portion of the roof. (EEC/PE) [119]

room air velocity The average sustained residual air velocity in the occupied area in the conditioned space. (IA/PSE) 241-1990r

room ambient temperature (electrical insulation tests) 20°C ± 5° (68°F ± 9°). (AES/ENSY) 135-1969w

room bonding point (health care facilities) A grounding terminal or group of terminals which serves as a collection point for grounding exposed metal or conductive building surfaces in a room. (NESC/NEC) [86]

room cavity ratio (illuminating engineering) For a cavity formed by a plane of the luminaires, the work-plane, and the wall surfaces between these two planes, the RCR is computed by using the distance from the work-plane to the plane of the luminaires (hr) as the cavity height in the equations given in the definition for **cavity ratio.** (EEC/IE) [126]

room coefficient, K† (illuminating engineering) A number computed from wall and floor areas. *Note:* The room coefficient is computed from

$$K_r = \frac{\text{height} \times (\text{length} + \text{width})}{2 \times \text{length} \times \text{width}}$$

(This term is retained for reference and literature searches). (EEC/IE) [126]

† Obsolete.

room index† (illuminating engineering) A letter designation for a range of room ratios. (This term is retained for reference and literature searches). (EEC/IE) [126]

† Obsolete.

room ratio† (illuminating engineering) A number indicating room proportions, calculated from the length, width, and ceiling height (or luminaire mounting height) above the work plane. It is used to simplify lighting design tables by expressing the equivalence of room shapes with respect to the utilization of direct or interreflected light. (This term is retained for reference and literature searches). (EEC/IE) [126]

† Obsolete.

room surface dirt depreciation (rsdd) (illuminating engineering) The fractional loss of task illuminance due to dirt on the room surface. (IE/EEC) [126]

room utilization factor (illuminating engineering) The ratio of the luminous flux (lumens) received on the work-plane to that emitted by the luminaire. *Note:* This ratio sometimes is called interflectance. Room utilization factor is based on the flux emitted by a complete luminaire, whereas coefficent of utilization is based on the rated flux generated by the lamps in a luminaire. (EEC/IE) [126]

Root An instance of a subclass of `IEEE1451_Root`. (IM/ST) 1451.1-1999

root *See:* root node.

root arrow segment The arrow segment of a junction from which other arrow segments branch or to which other arrow segments join. *Synonyms:* root; root segment. (C/SE) 1320.1-1998

root cause The underlying or physical cause of problem/failure. (PE/NP) 933-1999

root compiler (software) A compiler whose output is a machine independent, intermediate-level representation of a program. A root compiler, when combined with a code generator, comprises a full compiler. (C) 610.12-1990

root directory (1) A directory, associated with a process, that is used in pathname resolution for pathnames that begin with a slash. (C/PA) 9945-1-1996, 9945-2-1993, 1003.5-1999 **(2)** A region in read-only memory (ROM) specified in ISO/IEC 13213: 1994 whose size is identified in the first location of the root directory and whose contents include ROM entries that may be identified using the ROM key. (C/BA) 896.2-1991w, 896.10-1997

rooted tree *See:* tree.

root locus (1) (control system feedback) (for a closed loop whose characteristic equation is $KG(s)H(s) + 1 = 0$) A plot in the s plane of all those values of s that make $G(s)H(s)$ a negative real number: those points that make the loop transfer function $KG(s)H(s) = -1$ are roots. *Note:* The locus is conveniently sketched from the factored form of $KG(s)H(s)$: each branch starts at a pole of that function with $K = 0$. With increasing K, the locus proceeds along its several branches toward a zero of that function and, often asymptotic to one of several equiangular radial lines, toward infinity. Roots lie at points on the locus for which (1) the sum of the phase angles of component $G(s)H(s)$ vectors totals 180 degrees, and for which (2) $1/K = |G(s)H(s)|$. Critical damping of the closed loop occurs when the locus breaks away from the real axis: instability when it crosses the imaginary axis. *See also:* feedback control system. (PE/EDPG) [3]
(2) (excitation systems) Consider a linear, stationary, system with closed loop transfer function C(S)/R(S) where R(S) is the Laplace Transform of the excitation (input) driving function of the closed loop system and C(S) is the Laplace Transform of the response (output) function of the closed loop system. When C(S)/R(S) is a function of the gain, K, of one element in either the forward or reverse signal path, the poles of C(S)/R(S) in the S-plane will in general be a function of K. A plot in the S-plane of the loci of poles of the closed loop transfer function as K varies is known as a root locus. (PE/EDPG) 421A-1978s

root-mean-square (rms) The effective value, or the value associated with joule heating, of a periodic electromagnetic wave. The rms value is obtained by taking the square root of the mean of the squared value of a function. (NIR) C95.1-1999

root-mean-square bandwidth The root-mean-square (rms) deviation of the power spectrum of the received signal relative to zero frequency or the spectral center, in units of r/s. This bandwidth, β, is defined as the square root of

$$\beta^2 = \frac{\int_{-\infty}^{\infty} [2\pi(f - f_0)^2]|S(f)|^2 df}{\int_{-\infty}^{\infty} |S(f)|^2 df}$$

where
$S(f)$ = the Fourier transform of the signal.
$s(t - \tau_0)$ with true time delay τ_0 and f_0 is the center frequency of the spectrum.

Note: β^2 is the normalized second moment of the spectrum $|S(f)|^2$ about the mean, and β is sometimes called effective bandwidth. (AES) 686-1997

root-mean-square (effective) burst magnitude (audio and electroacoustics) The square root of the average square of the instantaneous magnitude of the voltage or current taken over the burst duration. See the figure attached to the definition of burst duration. *Synonym:* rms (effective) burst magnitude. *See also:* burst.

root-mean-square detector A detector, the output voltage of which is the rms value of an applied signal or noise. *Note:* The instrument manufacturer must specify a "crest factor" to go along with the rms detector function. Typical crest factors on rms detectors are 20 dB to 26 dB, some are as high as 36 dB, and in rare cases an instrument may have a crest factor as high as 40 dB. *Synonym:* rms detector. (T&D/PE) 539-1990

root-mean-square deviation (fiber optics) A single quantity characterizing a function given, for $f(x)$, by

$$\sigma_{\text{rms}} = [1/M_0 \int_{-\infty}^{\infty} (x - M_1)^2 f(x) dx]^{1/2}$$

where

$$M_0 = \int_{-\infty}^{\infty} f(x) dx$$

$$M_1 = 1/M_0 \int_{-\infty}^{\infty} x f(x) dx$$

Note: The term rms deviation is also used in probability and statistics, where the normalization, M_0, is unity. Here, the term is used in a more general sense. *Synonym:* rms deviation. *See also:* spectral width; impulse response; root-mean-square pulse duration; root-mean-square pulse broadening.

root-mean-square (effective) pulse amplitude The square root of the average of the square of the instantaneous amplitude taken over the pulse duration. *Synonym:* rms (effective) pulse amplitude. (IM) 194-1977w

root-mean-square pulse broadening (fiber optics) The temporal rms deviation of the impulse response of a system. *Synonym:* rms pulse broadening. *See also:* root-mean-square pulse duration.

root-mean-square pulse duration (fiber optics) A special case of root-mean-square deviation where the independent variable is time and $f(t)$ is pulse waveform. *Synonym:* rms pulse duration. *See also:* root-mean-square deviation.

root-mean-square reverse-voltage rating (rectifier device) The maximum sinusoidal root-mean-square reverse voltage permitted by the manufacturer under stated conditions. *Synonym:* rms reverse-voltage rating. *See also:* average forward current rating. (IA) 59-1962w, [12]

root-mean-square ripple The effective value of the instantaneous difference between the average and instantaneous values of a pulsating unidirectional wave integrated over a complete cycle. *Note:* The root-mean-square ripple is expressed in percent or per unit referred to the average value of the wave. *Synonym:* rms ripple. *See also:* rectification. (IA/EEC/PCON) [62], [110]

root-mean-square value (1)

$$Y_{\text{rms}} = \left[\frac{1}{T}\int_a^{a+T} y^2 \mathrm{d}t\right]^{1/2}$$

where y_{rms} is the root-mean-square (rms) value of y, y is an instantaneous value of a period function, a is any instant of time, and T is the period. The rms value of a periodic waveform may also be expressed as the square root of the sum of the squares of the Fourier components of y.

where A_1, A_2, A_n, are the rms values of the fundamental component, second harmonic, and nth harmonic, respectively. (PE/PSIM) 120-1989r

(2) (periodic function) (effective value) The square root of the average of the square of the value of the function taken throughout one period. Thus, if y is a periodic function of t

$$Y_{rms} = \left[\frac{1}{T}\int_a^{a+T} y^2 dt\right]^{1/2}$$

where Y_{rms} is the root-mean-square value of y, a is any value of time, and T is the period. If a periodic function is represented by a Fourier series, then:

$$= \frac{1}{(2)^{1/2}}\left(\frac{1}{2}A_0^2 + A_1^2 + A_2^2 + \ \ldots \right.$$
$$\left. + B_n^2 + B_2^2 + \ \ldots\ \right)^{1/2}$$

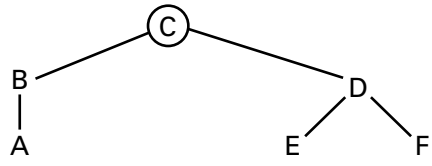
$$= \frac{1}{(2)^{1/2}}\left(\frac{1}{2}A_0^2 + C_1^2 + C_2^2 + \ \ldots\ + C_n^2\right)^{1/2}$$

Note: The use of root-mean-square in terms of effective value is deprecated. (Std100) 270-1966w

(3) (high voltage testing) The root mean square value of an alternating voltage is the square root of the mean value of the square of the voltage values during a complete cycle. (PE/PSIM) 4-1978s

root-mean-square (rms) value of alternating voltage The square root of the mean value of the square of the voltage values during a complete cycle. (PE/PSIM) 4-1995

root node In a tree, the single node that is not a member of any subtree. *Note:* All other nodes are descendent nodes of the root node. *Synonym:* root. *See also:* nonterminal node; terminal node.



Node C is the root node

root node

(C) 610.5-1990w

(2) The device node that is the root of the device tree. (C/BA) 1275-1994

root repeater (local area networks) The level 1 (topmost) repeater in a cascade. (C) 8802-12-1998

root segment (1) A segment that is the root node in a database. *Contrast:* child segment; dependent segment. *See also:* path; parent; database record. (C) 610.5-1990w

(2) *See also:* root arrow segment. (C/SE) 1320.1-1998

root-sum-square The square root of the sum of the squares. *Note:* Commonly used to express the total harmonic distortion. *See also:* radio receiver. 188-1952w

root_directory A term used to describe the directory at the top level of the hierarchical ROM directory structure. (C/MM) 1212-1991s

rope block A device designed with one or more sheaves, a shell, and an attachment hook or shackle, commonly used in pairs with a rope reeved through the sheaves. The primary purpose of this device is to provide mechanical advantage so as to lift or move equipment *Synonym:* block and tackle. (T&D/PE) 516-1995

rope connector A special high strength steel link used to join two lengths of pulling rope by means of the eye splice at each end. Although designed to pass easily through the grooves of the bullwheels on the puller, it should not be passed under full load. *Synonym:* peanut. (T&D/PE) 524-1992r

roped-hydraulic driving machine (elevators) A machine in which the energy is applied by a piston, connected to the car with wire ropes, that operates in a cylinder under hydraulic pressure. It includes the cylinder, the piston, and the multiplying sheaves if any and their guides. *See also:* roped-hydraulic elevator; driving machine. (EEC/PE) [119]

roped-hydraulic elevator A hydraulic elevator having its piston connected to the car with wire ropes. *See also:* elevator; roped-hydraulic driving machine. (EEC/PE) [119]

rope grab A device which travels on a lifeline and automatically frictionally engages the lifeline and locks so as to arrest the fall of an worker. (T&D/PE) 1307-1996

rope ladder A ladder having vertical synthetic or manila suspension members and wood, fiberglass, or metal rungs. The ladder is suspended from the arm or bridge of a structure to enable workers to work at the conductor level, hang travelers, perform clipping-in operations, etc. *Synonym:* Jacob's ladder. (T&D/PE) 524-1992r

rope-lay conductor or cable A cable composed of a central core surrounded by one or more layers of helically laid groups of wires. *Note:* This kind of cable differs from a concentric-lay conductor in that the main strands are themselves stranded. In the most common type of rope-lay conductor or cable, all wires are of the same size and the central core is a concentric-lay conductor. *See also:* conductor. (T&D/PE) [10]

rosette An enclosure of porcelain or other insulating material, fitted with terminals and intended for connecting the flexible cord carrying apendant to the permanent wiring. *See also:* cabinet. (EEC/PE) [119]

rotary attenuator A variable attenuator in circular waveguide having absorbing vanes fixed diametrically across one section: the attenuation is varied by rotation of this section about the common axis. *See also:* waveguide. (AP/ANT) [35]

rotary converter A machine that combines both motor and generator action in one armature winding connected to both a commutator and slip rings, and is excited by one magnetic field. It is normally used to change alternating-current power to direct-current power. (PE) [9]

rotary dial (telephone switching systems) A type of calling device used in automatic switching that generates pulses by manual rotation and release of a dial, the number of pulses being determined by how far the dial is rotated before being released. (COM) 312-1977w

rotary generator (induction heating) An alternating-current generator adapted to be rotated by a motor or prime mover. (IA) 54-1955w, 169-1955w

rotary hunt An arrangement allowing calls placed to seek an idle circuit in a prearranged multichannel group. (C) 610.7-1995

rotary inverter A machine that combines both motor and generator action in one armature winding. It is excited by one magnetic field and changes direct-current power to alternating-current power. (Usually it has no amortisseur winding.) (PE) [9]

rotary joint (waveguide components) A coupling for efficient transmission of electromagnetic energy between two waveguide or transmission line structures designed to permit unlimited mechanical rotation of one structure. (MTT) 147-1979w

rotary phase changer (waveguide) A phase changer that alters the phase of a transmitted wave in proportion to the rotation of one of its waveguide sections. *Synonym:* rotary phase shifter. (AP/ANT) [35], [84]

rotary phase shifter *See:* rotary phase changer.

rotary relay (A) A relay whose armature moves in rotation to close the gap between two or more pole faces (usually with a balanced armature). **(B)** Sometimes used for stepping relay. *See also:* relay. (EEC/REE) [87]

rotary solenoid relay A relay in which the linear motion of the plunger is converted mechanically into rotary motion. *See also:* relay. (EEC/REE) [87]

rotary switch A bank-and-wiper switch whose wipers or brushes move only on the arc of a circle. *See also:* switch. (EEC/PE) [119]

rotary system An automatic telephone switching system that is generally characterized by the following features: The selecting mechanisms are rotary switches. The switching pulses are received and stored by controlling mechanisms that govern the subsequent operations necessary in establishing a telephone connection. (EEC/PE) [119]

rotatable frame (rotating machinery) A stator frame that can be rotated by a limited amount about the axis of the machine shaft. *See also:* stator. (PE) [9]

rotatable phase-adjusting transformer (phase-shifting transformer) A transformer in which the secondary voltage may be adjusted to have any desired phase relation with the primary voltage by mechanically orienting the secondary winding with respect to the primary. The primary winding of such a transformer usually consists of a distributed symmetrical polyphase winding and is energized from a polyphase circuit. *See also:* auxiliary device to an instrument. (PE/EEC) [119]

rotate *See:* circular shift.

rotating amplifier (excitation systems for synchronous machines) An electric machine in which a small energy change in the field is amplified to a large energy change at the armature terminals. (PE/EDPG) 421.1-1986r

rotating-anode tube (x-ray) An x-ray tube in which the anode rotates. *Note:* The rotation continually brings a fresh area of its surface into the beam of electrons, allowing greater output without melting the target. (ED) [45]

rotating control assembly (rotating machinery) The complete control circuits for a brushless exciter mounted to permit rotation. *See also:* rotor. (PE) [9]

rotating field A variable vector field that appears to rotate with time. (Std100) 270-1966w

rotating-insulator switch A switch in which the opening and closing travel of the blade is accomplished by the rotation of one or more insulators supporting the conducting parts of the switch. (SWG/PE) C37.100-1992

rotating joint (waveguides) A coupling for transmission of electromagnetic energy between two waveguide structures designed to permit mechanical rotation of one structure. *See also:* waveguide.

rotating machinery *See:* electric machine.

rotational position sensing The process of locating a given sector, a desired track, and a specific record by continually comparing the read/write head position with appropriate synchronization signals. (C) 610.10-1994w

rotating storage device A storage device that employs a circular medium that must be rotated in order to access the data. (C) 610.10-1994w

rotation The displacement of one or more display elements about an axis, changing its angular orientation. (C) 610.6-1991w

rotational delay (A) The delay caused by waiting for the read/write head of a rotating storage device such as a disk drive to be positioned over the appropriate storage location on the disk. *Synonym:* latency. *See also:* search time. **(B)** The part of access time that is attributed to the delay as in definition (A). (C) 610.10-1994

rotation plate (rotating machinery) A plaque showing the proper direction of rotor rotation. *See also:* rotor. (PE) [9]

rotation test (rotating machinery) A test to determine that the rotor rotates in the specified direction when the voltage applied agrees with the terminal markings. *See also:* asynchronous machine. (PE) [9]

rotor (1) (watthour meter) That part of the meter that is directly driven by electromagnetic action. (ELM) C12.1-1982s

(2) (rotating machinery) The rotating member of a machine, with shaft. *Note:* In a direct-current machine with stationary field poles, universal, alternating-current series, and repulsion-type motors, it is commonly called the armature. (PE) [9]

rotor angular momentum (gyros) The product of spin angular velocity and rotor moment of inertia about its spin axis. (AES/GYAC) 528-1994

rotor bar (rotating machinery) A solid conductor that constitutes an element of the slot section of a squirrel-cage winding. *See also:* rotor. (PE) [9]

rotor bushing (rotating machinery) A ventilated or nonventilated piece or assembly used for mounting onto a shaft, an assembled rotor core whose inside opening is larger than the shaft. *See also:* rotor. (PE) [9]

rotor coil (rotating machinery) A unit of a rotor winding of a machine. *See also:* rotor. (PE) [9]

rotor core (rotating machinery) That part of the magnetic circuit that is integral with, or mounted on, the rotor shaft. It frequently consists of an assembly of laminations. (PE) [9]

rotor-core assembly (rotating machinery) The rotor core with a squirrel-cage or insulated-conductor winding, put together as an assembly. *See also:* rotor. (PE) [9]

rotor core lamination (rotating machinery) A sheet of magnetic material, containing teeth, slots, or other perforations dictated by design, which forms the rotor core when assembled with other identical or similar laminations. (PE) [9]

rotor displacement angle (rotating machinery) (load angle) The displacement caused by load between the terminal voltage and the armature voltage generated by that component of flux produced by the field current. *See also:* rotor. (PE) [9]

rotor end plate (rotating machinery) An annular disk (ring) fitted at the outer end of the retaining ring. (PE) [9]

rotor end ring (rotating machinery) The conducting structure of a squirrel-cage or amortisseur (damper) winding that short-circuits all of the rotor bars at one end. *See also:* rotor. (PE) [9]

rotor moment-of-inertia (gyros) The moment of inertia of a gyro rotor about its spin axis. (AES/GYAC) 528-1994

rotor-resistance starting (rotating machinery) The process of starting a wound-rotor induction motor by connecting the rotor initially in series with starting resistors that are short-circuited for the running operation. *See also:* asynchronous machine. (PE) [9]

rotor rotation detector (gyros) A device that produces a signal output as a function of the speed of the rotor. (AES/GYAC) 528-1994

rotor slot armor (rotating machinery) (cylindrical-rotor synchronous machine) Main ground insulation surrounding the slot or core portions of a field coil assembled on a slotted rotor. *See also:* rotor. (PE) [9]

rotor-speed sensitivity (dynamically tuned gyro) The change in in-phase spring rate due to a change in gyro rotor speed. (AES/GYAC) 528-1994

rotor spider *See:* spider.

rotor winding (rotating machinery) A winding on the rotor of a machine. *See also:* rotor. (PE) [9]

roughness (navigational system display) (navigation aids) Irregularities resembluing scalloping, but distinguished by their random, noncyclic nature. *Synonym:* course roughness. (AES/GCS) 172-1983w

rough surface An irregular surface separating two media. *See also:* Rayleigh criterion. (AP/PROP) 211-1997

round To delete or omit one or more of the least significant digits in a representation of a number and to adjust the remaining digits according to some specified rule. *Contrast:* truncate. *See also:* round up; round off; round down. (C) 610.5-1990w, 1084-1986w

round conductor Either a solid or stranded conductor of which the cross section is substantially circular. *See also:* conductor. (T&D/PE) [10]

round down To round a number, making no adjustment to the numeral that is retained. For example, the decimal numeral 5.6789, when rounded down to two decimal places, becomes 5.67. *Synonym:* truncate. (C) 610.5-1990w, 1084-1986w

rounding *See:* pulse distortion.

rounding error (1) (test, measurement, and diagnostic equipment) The error resulting from deleting the less significant digits of a quantity and applying some rule of correction to the part retained. A common round-off rule is to take the quantity to the nearest digit. Thus, the value of π, 3.14159265. . ., rounded to four decimals is 3.1416. (MIL) [2]

(2) (mathematics) The error introduced by rounding a number. *Synonym:* round-off error. (C) 1084-1986w

round off (1) To delete the least-significant digit or digits of a numeral and to adjust the part retained in accordance with some rule. (MIL/C) [2], [85], [20]

(2) (A) (data management) To round, adjusting the part of the numeral that is retained by rounding down any digit less than 5, rounding up any digit greater than 5, and rounding 5 up or down to the even digit. For example, 5.5 would be rounded off to 6, and 4.5 rounds off to 4. **(B) (data management)** To round, adjusting the part of the numeral that is retained by rounding down any digit less than 5, rounding up any digit equal or greater than 5. For example, 5.5 rounds off to 6, 4.5 rounds off to 5. (C) 610.5-1990

(3) (mathematics of computing) *See also:* round. (C) 1084-1986w

round-off error *See:* rounding error.

round-power test *See:* circulating-power test.

round robin (1) A bus allocation rule whereby, after a module acquires and uses the bus, it will not be granted use of the bus again until all other modules currently requesting the bus at the same priority level have had a chance to use the bus. (C/BA) 1014.1-1994w

(2) A bus allocation rule where, after a module acquires and uses the bus, it will not be granted use of the bus again until all other modules currently requesting the bus at the same priority level have had control of the bus. (C/BA) 10857-1994, 896.3-1993w, 896.4-1993w

round rotor (rotating machinery) (cyclindrical rotor) A rotor of cylindrical shape in which the coil sides of the winding are contained in axial slots. *See also:* rotor. (PE) [9]

round-trip delay The sum of the absolute delays on an outgoing path and return path. Different methods of measuring round-trip delay may produce somewhat different results. (COM/TA) 743-1995

round-trip envelope delay The sum of the outgoing envelope delay and return path envelope delay, where provision has been made at the far end of the circuit to either loopback or remodulate the envelope delay test signal back to the transmitting measuring set. (COM/TA) 743-1995

round trip time The total time taken for a single packet or datagram to leave one device, reach the other, and return. (C) 610.7-1995, 610.10-1994w

round up To round a number, adjusting the numeral that is retained by adding 1 to its least significant digit and executing any carries required. For example, the decimal numeral 5.6789 when rounded up to two decimal places becomes 5.68. (C) 610.5-1990w, 1084-1986w

route (1) (telephone switching systems) A particular order of a set of switching entities through which call connections may be established. (COM) 312-1977w

(2) Denotes the information employed to generate routing information. It becomes a routing_information parameter when placed in the MAC primitive. The route explicitly describes the path a frame takes through a bridged network. (C/LM/CC) 8802-2-1998

route locking Locking effective when a train passes a signal and adapted to prevent manipulation of levers that would endanger the train while it is within the limits of the route entered. It may be so arranged that a train in clearing each section of the route releases the locking affecting that section. *See also:* interlocking. (EEC/PE) [119]

route query (RQ) An RDE PDU used to explore possible paths between two stations developing a data link. The route query consists of a command PDU (RQC) and a response PDU (RQR). (C/LM/CC) 8802-2-1998

router (1) A functional unit that interconnects two computer networks that use a single Network Layer procedure but may use different Data Link Layer and Physical Layer procedures. (LM/C) 8802-6-1994

(2) In networking, a device that interconnects two networks using the network layer (layer 3) address. *Note:* Routers are protocol dependent because they must be able to identify the address field within a specific network layer protocol. *See also:* hub; gateway; bridge. (C) 610.7-1995

(3) A layer 3 interconnection device that appears as a Media Access Control (MAC) to a CSMA/CD collision domain. (C/LM) 802.3-1998

route selected (RS) An RDE PDU used to announce the selection of a path between two stations developing a data link. (C/LM/CC) 8802-2-1998

route table The list of group addresses recognized by an SI for passing operations to its far-side segment. (NID) 960-1993

route tracing mode A mode of SI operation that generates an error diagnostic response instead of the normal passing of an operation. (NID) 960-1993

routine (software) A subprogram that is called by other programs and subprograms. *Note:* The terms "routine," "subprogram," and "subroutine" are defined and used differently in different programming languages; the preceding definition is advanced as a proposed standard. *See also:* subroutine; coroutine. (C) 610.12-1990

routine entry point (1) (computers) Any place to which control can be passed. (C) [20], [85]

(2) (test, measurement, and diagnostic equipment) One of a set of points in an automatic test equipment program where the test conditions are completely stated and are not dependent on previous tests or setups in any way. Such points are the only ones at which it is permissible to begin part of the complete test program. *See also:* rerun point. (MIL) [2]

(3) (software) A point in a software module at which execution of the module can begin. *Synonyms:* entrance; entry. *Contrast:* exit. *See also:* reentry point. (C) 610.12-1990

routine measurements Radioassays performed on samples by established, validated, verified, and controlled procedures. (NI) N42.23-1995

routine test (1) A test that is carried out by the manufacturer of the heating cable on all cables during or after the production process. (BT/IA/AV/PC) 152-1953s, 515.1-1995

(2) (rotating electric machinery) A test showing that each machine has been run and found to be sound electrically and mechanically, and is essentially identical with those that have been type tested. (PE/EM) 11-1980r

(3) A test made on each completed LTC to establish that the LTC is without manufacturing defects, with the design having been verified by a design test. (PE/TR) C57.131-1995

(4) A test that is carried out by the manufacturer prior to shipment to verify conformance to the manufacturer's specifications. (IA) 515-1997

routine tests (1) (surge arresters) (metal-oxide surge arresters for ac power circuits) Tests made for quality control by the manufacturer on every device or representative samples, or on parts or materials as required to verify during production that the product meets the design specifications. (PE/TR) [57], C57.12.80-1978r, 270-1966w

(2) (rotating machinery) The tests applied to a machine to show that it has been constructed and assembled correctly, is able to withstand the appropriate high-voltage tests, is in

sound working order both electrically and mechanically, and has the proper electrical characteristics. *See also:* asynchronous machine. (PE) [9]

(3) Tests made by the manufacturer on every device or representative samples, or on parts or materials, as required, to verify that the product meets the design specifications. (SPD/PE) C62.11-1999, C62.62-2000

(4) (switchgear) *See also:* production tests. (SWG/PE) C37.100-1992

routing (A) In data communications, a path by which a message reaches its destination. **(B)** A path that network traffic takes from its source to its destination. *See also:* static routing; adaptive routing; stochastic routing; fixed routing. (C) 610.7-1995

routing code (telephone switching systems) A digit or combination of digits used to direct a call towards its destination. (COM) 312-1977w

routing indicator A coded indicator preceding a message showing the transmission routing of the message. (C) 610.7-1995

routing information (1) A field, carried in a frame, used by source routing transparent bridges that provides source routing operation in a bridged LAN. (C/LM) 8802-5-1998

(2) The data that explicitly describes the route a frame takes through a bridged network. The routing_information parameter is included in the MA_UNITDATA request and MA_UNITDATA indication MAC primitives. (C/LM/CC) 8802-2-1998

routing information field (RIF) Denotes the routing information field of the source-routed frame format. (C/LM/CC) 8802-2-1998

routing information indicator (RII) An indication that the frame format contains a routing information field (RIF). (C/LM/CC) 8802-2-1998

routing function Inside a switch, this is function which determines to which numbered node interface a packet is to be sent, based on the information contained in the packet destination. *See also:* switch. (C/BA) 1355-1995

routing pattern (telephone switching systems) The implementation of a routing plan with reference to an individual automatic exchange. (COM) 312-1977w

routing plan (telephone switching systems) A plan for directing calls through a configuration of switching entities. (COM) 312-1977w

roving (rotating machinery) A loose assemblage of fibers drawn or rubbed into a single strand with very little twist. In spun yarn systems, the product of the stage or stages just prior to spinning. (PE) [9]

row (1) (metal nitrite oxide semiconductor arrays) A group of memory cells having a common internal address line. (ED) 641-1987w

(2) (test pattern language) A group of words or bits in a memory, identified by a common X-address. (TT/C) 660-1986w

(3) (data management) A horizontally corresponding set of entries in a table. *Contrast:* column. *See also:* tuple. (C) 610.5-1990w

(4) A horizontal arrangement of characters or other expressions. *See also:* card row; tape row. (C) 610.10-1994w

(5) In a Physical Design Exchange Format (PDEF) datapath cluster, a cluster of cell, spare_cell, and/or cluster instances placed or contstrained to be placed in the vertical (*Y*-axis) direction. *See also:* column; datapath. (C/DA) 1481-1999

row arrangement Circuit-breaker pole units that are installed in a consecutive mode, thus physically forming a continuous line. The natural expansion of the substation would normally continue in the direction of the row. Arrangements can have two, three, four, or more rows in parallel configuration. (SWG/PE/SUB) C37.100-1992, C37.122-1983s

row binary (1) Pertaining to the binary representation of data on punched cards in which adjacent positions in a row correspond to adjacent bits of data, for example, each row in an 80-column card may be used to represent 80 consecutive bits of two 40-bit words. (C) [20], [85]

(2) (mathematics of computing) Pertaining to the binary representation of data in which adjacent positions in a row correspond to adjacent binary digits. For example, each row in an 80-column card may be used to represent 80 consecutive bits of a binary word. *Contrast:* column binary. *See also:* binary card. (C) 610.10-1994w, 1084-1986w

row enable (semiconductor memory) The input used to strobe in the row address in multiplexed address random access memories (RAM). (TT/C) 662-1980s

row-major order A method for storing the elements of a matrix in computer memory, in which the elements are ordered in a row-by-row manner—that is, all elements of row 1, followed by all elements of row 2, etc. *Contrast:* column-major order. (C) 610.5-1990w

row pitch The distance between corresponding points of adjacent rows measured along a track. (C) 610.10-1994w

row select gate Sometimes called the select gate. The transistor, controlled by the word-line, that isolates the memory transistor from the bit-line so that individual bytes may be altered. (ED) 1005-1998

row select line The line, determined by the row addresses (output of the X decoder), that is used to access the appropriate rows and, when present, the byte select transistors during a read or write. (ED) 1005-1998

row select transistor Sometimes called the select transistor or select gate. The transistor, controlled by the row select line, that isolates the memory transistor from the bit-line so that individual bits are isolated from voltages on the bit-line. (ED) 1005-1998

row vector A matrix with only one row. That is, a matrix of size 1-by-*n*. *Contrast:* column vector. (C) 610.5-1990w

RPE *See:* radial probable error; circular probable error.

RPROM *See:* reprogrammable read-only memory; reprogrammable memory, programmable read-only memory.

RPS *See:* ring parameter server.

RQ *See:* route query.

rrrv *See:* rate-of-rise of restriking voltage.

***r* register** One of the integer registers. (C/MM) 1754-1994

RRS *See:* required response spectrum.

RS (cable systems in power generating stations) Rigid steel conduit. (PE/EDPG) 422-1977

RS-232 *See:* EIA/TIA-232-E.

RS-232-C (1) An EIA/TIA standard, officially known and published as EIA/TIA-232-E. *See also:* EIA/TIA-232-E. (C) 610.7-1995

(2) An EIA standard for asynchronous serial data communications between terminal devices, such as printers; computers; and communications equipment, such as modems. *Note:* This standard defines a 25-pin connector and certain signal characteristics for interfacing computer equipment. Also known as EIA 232-D. (C) 610.10-1994w

RS-422-A (1) An EIA standard, officially known and published as EIA-422-A. *See also:* EIA-422-A. (C) 610.7-1995

(2) An EIA standard that specifies electrical characteristics for balanced transmission in which each of the main circuits has its own ground lead. Also known as EIA 422-A. (C) 610.10-1994w

RS-423-A (1) An EIA standard, officially known and published as EIA-423A. *See also:* EIA-423-A. (C) 610.7-1995

(2) An EIA standard that specifies electrical characteristics for unbalanced circuits using common or shared grounding techniques. Also known as EIA 423-A. (C) 610.10-1994w

RS-449 (1) An EIA standard that has been rescinded. This standard has been replaced by EIA/TIA-530-A. *See also:* EIA/TIA-530-A. (C) 610.7-1995

(2) An EIA standard that specifies cabling and connectors for RS-422-A and RS-423-A interfaces. Where RS-232-C was all inclusive, RS-449 is the equivalent connector and cabling specification. It references, in turn, RS-422-A and RS-423-A

to specify voltage levels. *Note:* Within RS-449, control signals are typically transmitted at RS-423-A levels, and clocks and data at RS-422-A. At lower speeds, RS-423-A may be substituted for RS-422-A for the clocks and data. (C) 610.10-1994w

RSAP *See:* remote SAP.

R scan *See:* R-display.

R-scope A cathode-ray oscilloscope arranged to present an R-display. (AES/RS) 686-1990

R-S flip-flop A flip-flop that has two level-sensitive data inputs; R and S. *Note:* The R input is used to make the output a logical zero (false) and the S input is used to make the output a logical one (true). (C) 610.10-1994w

rs1, rs2, rd The register operands of an instruction. *rs1* and *rs2* are the source registers; *rd* is the destination register. (C/MM) 1754-1994

$\mathbf{R_{sig}}$ Signal etch resistance. (C/BA) 896.2-1991w

$\mathbf{R_{term}}$ Terminator resistance (shall be placed on the backplane). (C/BA) 896.2-1991w

RTOK *See:* Re Test Okay.

RTL *See:* resistor-transistor logic; register transfer language.

RTT (Round Trip Time) *See:* round trip time.

rubber banding A technique that consists of the real-time display of a line with one endpoint fixed and the location of the other endpoint being controlled by a graphical input device. The displayed line will "stretch" to maintain its connections. (C) 610.6-1991w

rubber tape A tape composed of rubber or rubberlike compounds that provides insulation for joints. (EEC/PE) [119]

rub-out character *See:* delete character.

rudder-angle-indicator system A system consisting of an indicator (usually in the wheel house) so controlled by a transmitter connected to the rudder stock as to show continually the angle of the rudder relative to the center line of the ship. (EEC/PE) [119]

rule (A) A series of steps or activities with a single known or anticipated result. **(B)** A guideline for acting or planning action. (PE/NP) 1082-1997

Rule and Constraint Language A declarative specification language that is used to express the realization of responsibilities and to state queries. (C/SE) 1320.2-1998

rule-based language A nonprocedural language that permits the user to state a set of rules and to express queries or problems that use these rules. *See also:* declarative language; interactive language; command language. (C) 610.12-1990, 610.13-1993w

ruling span A calculated span length that will have the same changes in conductor tension due to changes of temperature and conductor loading as will be found in a series of spans of varying lengths between deadends. (T&D/PE) 524-1992r

rumble (electroacoustics) Low-frequency vibration of the recording or reproducing drive mechanism superimposed on the reproduced signal. *See also:* phonograph pickup. (SP) [32]

rumble, turntable *See:* turntable rumble.

run (1) (A) (software) In software engineering, a single, usually continuous, execution of a computer program. *See also:* run time. **(B) (software)** To execute a computer program. (C) 610.12-1990

(2) (image processing and pattern recognition) In image processing, a sequence of consecutive pixels that all have the same gray level. (C) 610.4-1990w

(3) (data management) In sorting, two or more successive items in a set that are in the proper order according to the specified sorting criteria. (C) 610.5-1990w

(4) (computers) A single, continuous performance of a computer routine. (MIL/C) [2], [85], [20]

(5) A single and continuous execution of a program by a computer. (C) 610.10-1994w

runaway pipeline temperature (electrical heating systems) The highest equilibrium temperature on the pipeline or the vessel that can occur when the heating system is continuously energized in the maximum ambient temperature. *Synonym:* runaway vessel temperature. (IA/PC) 844-1991

runaway pipe temperature (electrical heat tracing for industrial applications) The highest equilibrium pipe temperature that occurs when the heating cable is continuously energized at the maximum ambient temperature. (IA/BT/AV) 515-1997, 152-1953s

runaway speed The maximum speed obtained when a turbine-generator is operated unloaded with wicket gates fully open at maximum head. (PE/EDPG) 1020-1988r

runaway vessel temperature *See:* runaway pipe temperature.

runback The control of a dc system to reduce power to match loss of generation on the ac network. (PE/SUB) 1378-1997

RUNBIST *See:* run built-in self-test.

run built-in self-test (RUNBIST) A defined instruction for the test logic defined by IEEE Std 1149.1-1990. (TT/C) 1149.1-1990

run-down time (gyros) The time interval required for the gyro rotor to reach a specified speed, or during which the gyro exhibits specified performance, after removal of rotor excitation at a specified speed. (AES/GYAC) 528-1994

run/halt switch (RH) A switch normally operated by the run/halt switch activator bar on crate segments and on the ATC on cable segments which stops bus traffic so that it may be possible to insert or remove modules without affecting other modules on the segment. (NID) 960-1993

run length (1) The number of pixels in a run. (C) 610.4-1990w

(2) The maximum number of successive bits of the same value which can occur in the coded bit stream. (C/BA) 1355-1995

(3) The number of consecutive identical bits in a code-group. For example, the pattern 0011111010 has a run length of five. (C/LM) 802.3-1998

run length encoding An image compression technique in which the rows of an image are represented as sequences of runs, each with a given run length and gray level. (C) 610.4-1990w

run-length-limited code Any transmission code that has limited run-length for its transmission. (C/LM) 802.3-1998

runnable process A process that is capable of being a running process, but for which no processor is available. (C/PA) 1003.1b-1993s

runnable thread A thread that is capable of being a running thread, but for which no processor is available. (C/PA) 9945-1-1996

runner The rotating element of a turbine, which converts hydraulic energy into mechanical energy. (PE/EDPG) 1020-1988r

running board (conductor stringing equipment) A pulling device designed to permit stringing more than one conductor simultaneously with a single pulling line. For distribution stringing, it is usually made of lightweight tubing with the forward end curved gently upward to provide smooth transition over pole crossarm rollers. For transmission stringing, the device is either made of sections hinged transversely to the direction of pull or of a hard nose rigid design, both having a flexible pendulum tail suspended from the rear. This configuration stops the conductors from twisting together and permits smooth transition over the sheaves of bundle travelers. *Synonyms:* sled; bird; monkey tail; birdie; alligator. (T&D/PE) 524-1992r

running circuit breaker (power system device function numbers) A device whose principal function is to connect a machine to its source or running or operating voltage. This function may also be used for a device, such as a contactor, that is used in series with a circuit breaker or other fault protecting

means, primarily for frequent opening and closing of the circuit. (SUB/PE) C37.2-1979s

running disparity (1) The cumulative sum of the disparities of characters transmitted from the start of operation of the link up to the present time. A link has two running disparities, one for each direction. (C/BA) 1355-1995
(2) A binary parameter having a value of + or −, representing the imbalance between the number of ones and zeros in a sequence of 8B/10B code-groups. (C/LM) 802.3-1998

running footer In text formatting, a line of text that is automatically placed at the bottom of each page of a document. *Synonym:* footer. *Contrast:* running header. (C) 610.2-1987

running ground (conductor stringing equipment) A portable device designed to connect a moving conductor or wire rope, or both, to an electrical ground. These devices are normally placed on the conductor or wire rope adjacent to the pulling and tensioning equipment located at either end of a sag section. It is primarily used to provide safety for personnel during construction or reconstruction operations. *Synonym:* ground roller. (T&D/PE) 524a-1993r, 524-1992r, 1048-1990

running header In text formatting, a line of text that is automatically placed at the top of each page of a document. *Synonym:* header. *Contrast:* running footer. (C) 610.2-1987

running-light-indicator panel (telltale) A panel in the wheelhouse providing audible and visible indication of the failure of any running light connected thereto. (EEC/PE) [119]

running lights Lanterns constructed and located as required by navigation laws, to permit the heading and approximate course of a vessel to be determined by an observer on a nearby vessel. *Note:* Usual running lights are port side, starboard side, mast-head, range, and stern lights. (EEC/PE) [119]

running open-phase protection The effect of a device operative on the loss of current in one phase of a polyphase circuit to cause and maintain the interruption of power in the circuit. (IA/ICTL/IAC) [60]

running operation (A) (single-phase motor) (for a motor employing a starting switch or relay) Operation at speeds above that corresponding to the switching operation. **(B) (single-phase motor)** (for a motor not employing a starting switch or relay) Operation in the range of speed that includes breakdown-torque speed and above. *See also:* asynchronous machine. (PE) [9]

running process A process currently executing on a processor. There may be more than one such process in a system at a time in a system with multiple processors. (C/PA) 1003.1b-1993s

running state A node state that is reflected by the value of 0 in the STATE_CLEAR.state field. The running state is the normal operational state in which access to all of the node's CSRs are defined. (C/MM) 1212-1991s

running task The task currently being executed by a processor. (C) 1003.5-1999

running tension control A control function that maintains tension in the material at operating speeds. *See also:* feedback control system. (IA/ICTL/IAC/APP) [60], [75]

running thread A thread currently executing on a processor. There may be more than one such thread in a system at a time in a system with multiple processors. (C/PA) 9945-1-1996

running time *See:* execution time.

run-of-river plant One utilizing stream flow as it occurs and with little or no storage at the project site. (PE/EDPG) 1020-1988r

run-of-river station (power operations) A hydroelectric generating station utilizing limited pondage or the flow of the stream as it occurs. (PE/PSE) 858-1987s, 346-1973w

runout rate The velocity at which the error in register accumulates. (IA/ICTL/CEM) [58]

run stream *See:* job stream.

run time (A) (software) The instant at which a computer program begins to execute. **(B) (software)** The period of time during which a computer program is executing. *See also:* execution time. (C) 610.12-1990, 610.10-1994

run-time test object (RTO) Contains the procedures utilized and data necessary to execute a test on a test subject within a specified context. (SCC20) 1226-1998

run time variable (test, measurement, and diagnostic equipment) An application program condition in which the stimuli is varied under system control based on a measurement result. (MIL) [2]

run-up time (gyros) The time interval required for the gyro rotor to reach a specified speed from standstill. (AES/GYAC) 528-1994

runway alignment indicator (illuminating engineering) A group of aeronautical ground lights arranged and located to provide early direction and roll guidance on the approach to a runway. (EEC/IE) [126]

runway centerline lights (illuminating engineering) Runway lights installed in the surface of the runway along the centerline indicating the location and direction of the runway centerline and are of particular value in conditions of very poor visibility. (EEC/IE) [126]

runway-edge lights (illuminating engineering) Lights installed along the edges of a runway marking its lateral limits and indicating its direction. (EEC/IE) [126]

runway-end identification light (illuminating engineering) A pair of flashing aeronautical ground lights symmetrically disposed on each side of the runway at the threshold to provide additional threshold conspicuity. (EEC/IE) [126]

runway-exit lights (illuminating engineering) Lights placed on the surface of a runway to indicate a path of the taxiway centerline. (EEC/IE) [126]

runway lights (illuminating engineering) Aeronautical ground lights arranged along or on a runway. (EEC/IE) [126]

runway threshold *See:* approach-light beacon.

runway visibility (illuminating engineering) The meteorological visibility along an identified runway. Where a transmissometer is used for measurement, the instrument is calibrated in terms of a human observer; that is, the sighting of dark objects against the horizon sky during daylight and the sighting of moderately intense unfocused lights of the order of 25 candelas at night. (EEC/IE) [126]

runway visual range (1) (navigation aids) The forward distance a human pilot can see along the runway during an approach to landing; this distance is derived from electro-optical instruments operated on the ground and it is improved (increased) by the use of lights (such as high-intensity runway lights). (AES/GCS) 172-1983w
(2) (illuminating engineering in the United States) An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end; it is based on the sighting of either high intensity runway lights or on the visual contrast of other targets—whichever yields the greater visual range. (IE/EEC) [126]

rural districts All places not urban. This may include thinly settled areas within city limits. (NESC) C2-1997

rural line A line serving one or more subscribers in a rural area. (EEC/PE) [119]

rust A corrosion product consisting primarily of hydrated iron oxide. *Note:* This term is properly applied only to iron and ferrous alloys. (IA) [59]

rust-resistant So constructed, protected or treated that rust will not exceed a specified limit when subjected to a specified rust resistance test. (PE/TR) C57.12.80-1978r

RVR *See:* runway visual range.

RWM *See:* read/write memory.

RWP *See:* recommended wearing position.

Rytov approximation A mathematical approximation for a scalar wave propagating through an inhomogeneous medium in which the unknown field is expressed as $\exp\{X(r)\}$ and various levels of approximation are developed; the lowest order one is based on an assumed slow spatial variability of $X(r)$ (i.e., *grad*[X] = 0). (AP/PROP) 211-1997

***R-X* diagram** A graphic presentation of the characteristics of a relay unit in terms of the ratio of voltage to current and the phase angle between them. *Note:* For example, if a relay just operates with 10 V and 10 A in phase, one point on the operating curve of the relay would be plotted as 1 Ω on the R axis (i.e., $R = 1, X = 0$, where R is the abscissa and X is the ordinate). (SWG/PE) C37.100-1992

***R–X* plot (protective relaying)** A graphical method of showing the characteristics of a relay element in terms of the ratio of voltage to current and the angle between them. For example, if a relay barely operates with 10 V and 10 A in phase, one point on the operating curve of the relay would be plotted as 1 Ω on the R axis (that is, $R = 1, X = 0$).

RZ(NP) *See:* non-polarized return-to-zero recording.

RZ(P) *See:* polarized return-to-zero recording.