

# McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

## Sixth Edition

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On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meteorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. (Image copyright © Dr. Luann Becker. Reproduced with permission.)

Over the six editions of the Dictionary, material has been drawn from the following references: G. M. Garrity et al., *Taxonomic Outline of the Prokaryotes*, Release 2, Springer-Verlag, January 2002; D. W. Linzey, *Vertebrate Biology*, McGraw-Hill, 2001; J. A. Pechenik, *Biology of the Invertebrates*, 4th ed., McGraw-Hill, 2000; *U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, Department of Defense, 1967; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, National Aeronautics and Space Administration, 1965; *Glossary of Stingo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *ADP Glossary*, Department of the Navy, NAVSO P-3097; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology*, White Sands Missile Range, New Mexico, National Bureau of Standards, AD 467-424; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission.

**McGraw-Hill Dictionary of Scientific and Technical Terms,  
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**Grüneisen constant** [SOLID STATE] Three times the bulk modulus of a solid times its linear expansion coefficient, divided by its specific heat per unit volume; it is reasonably constant for most cubic crystals. Also known as Grüneisen gamma. { 'grü-nîz-ən, 'kîn-stənt }

**Grüneisen gamma** See Grüneisen constant. { 'grü-nîz-ən, 'gam-ə }

**Grüneisen relation** [SOLID STATE] The relation stating that the electrical resistivity of a very pure metal is proportional to a mathematical function which depends on the ratio of the temperature to a characteristic temperature. { 'grü-nîz-ən rî-lā-shən }

**grunerite** [MINERAL] (Mg,Fe)<sub>3</sub>Si<sub>8</sub>O<sub>22</sub>(OH)<sub>2</sub> Variety of amphibole; forms monoclinic crystals. { 'grün-ə,rit }

**grus** See gruss. { 'grüs }

**Grus** [ASTRON] A constellation, right ascension 22 hours, declination 45°S. Also known as Crane. { 'grüs }

**gruss** [GEOL] A loose accumulation of fragmental products formed from the weathering of granite. Also spelled grus. { 'grüs }

**GRWP theory** [QUANT MECH] A theory that attempts to resolve the quantum measurement paradox by postulating the existence of new laws whose corrections to quantum mechanics become significant over time periods of  $t_0/N$ , where  $t_0$  is a characteristic time of the order of the age of the universe and  $N$  is the number of particles in the system in question. Derived from Ghirardi-Rimini-Weber-Pearle theory. { 'jē-lār-dōb-əl,yū'pē,thē-ə-rē }

**gr wt** See gross weight.

**gryke** See grike. { 'grik }

**Gryllidae** [INV ZOO] The true crickets, a family of orthopteran insects in which individuals are dark-colored and chunky with long antennae and long, cylindrical ovipositors. { 'gril-ə,dē }

**Grylloblattidae** [INV ZOO] A monogeneric family of crickets in the order Orthoptera; members are small, slender, wingless insects with hindlegs not adapted for jumping. { 'gril-ō'blad-ə,dē }

**Gryllotalpidae** [INV ZOO] A family of North American insects in the order Orthoptera which live in sand or mud; they eat the roots of seedlings growing in moist, light soils. { 'gril-ō'tal-pə,dē }

**Gs** See stimulatory G protein.

**GSC** See gas-solid chromatography.

**G scan** See G scope. { 'jē,skan }

**G scope** [ELECTR] A cathode-ray scope on which a single signal appears as a spot on which wings grow as the distance to the target is decreased, with bearing error as the horizontal coordinate and elevation angle error as the vertical coordinate. Also known as G indicator; G scan. { 'jē,sköp }

**GSE** See ground support equipment.

**g service** [COMMUN] A Federal Aviation Administration service pertaining to aural and visual monitoring of radio aids to air navigation and of the landlines and radio communications systems, to detect faulty operation. { 'jē,sər-vəs }

**GSM** [COMMUN] A digital cellular telephone technology that is based on time-division multiple access; it operates on the 900-megahertz and 1.8-gigahertz bands in Europe, where it is the predominant cellular system, and on the 1.9-gigahertz band in the United States. Derived from global system for mobile communications.

**G space** [MATH] A topological space  $X$  together with a topological group  $G$  and a continuous function on the cartesian product of  $X$  and  $G$  to  $X$  such that if the values of this function at  $(x,g)$  are denoted by  $xg$ , then  $x(g_1g_2) = (xg_1)g_2$  and  $xe = x$  where  $e$  is the identity in  $G$  and  $g_1,g_2$  are elements in  $G$ . { 'jē,spās }

**GST** See Greenwich sidereal time.

**G star** [ASTRON] A star of spectral type G; many metallic lines are seen in the spectra, with hydrogen and potassium being strong; G stars are yellow stars, with surface temperatures of 4200–5500 K for giants, 5000–6000 K for dwarfs. { 'jē,star }

**G string** See field waveguide. { 'jē,striŋ }

**g suit** [ENG] A suit that exerts pressure on the abdomen and lower parts of the body to prevent or retard the collection of blood below the chest under positive acceleration. Also known as anti-g suit. { 'jē,suît }

**GTP** [CELL MOL] See guanosine 5'-triphosphate.

**GTPase** [CELL MOL] One of a family of monomeric GTP-binding proteins. { 'jē,tē,pās }

**GTP-binding protein** [CELL MOL] One of a large family of heterotrimeric or monomeric proteins that bind GTP (guanosine 5'-triphosphate) as intermediaries in intracellular signaling pathways. Also known as G protein. { 'jē,tē,pē 'bîn-dīŋ,prō,tēn }

**Guadalupian** [GEOL] A North American provincial series in the Lower and Upper Permian, above the Leonardian and below the Ochoan. { 'gwād-əl,ū-pē-ən }

**gualac** [MATER] A resin obtained from the trees *Guaiacum santum* and *G. officinale*; soluble in alcohol, ether, and chloroform; used in medicine and varnish. { 'gwī,ak }

**gualacol** [ORG CHEM] C<sub>6</sub>H<sub>4</sub>(OH)OCH<sub>3</sub> A colorless, crystalline compound, soluble in water; used as a reagent to determine the presence of such substances as lignin, narceine, and nitrous acid. { 'gwī-ə,kōl }

**gualazulene** [PHARM] C<sub>15</sub>H<sub>18</sub> A blue oil with a boiling point of 165–170°C; used as an anti-inflammatory drug. { 'gwī-az-ə,lēn }

**guanajuatite** [MINERAL] Bi<sub>2</sub>Se<sub>3</sub> Bluish-gray mineral composed of bismuth selenide, occurring in crystals or masses. { 'gwān-ə'hwā,tīt }

**guanidine** [BIOCHEM] CH<sub>5</sub>N<sub>2</sub> Aminomethanamide, a product of protein metabolism found in urine. { 'gwān-ə,dēn }

**guanidine-acetic acid** See glycocyamine. { 'gwān-ə,dēn ə'sēd-ik 'as-əd }

**guanine** [BIOCHEM] C<sub>5</sub>H<sub>5</sub>ON<sub>2</sub> A purine base; occurs naturally as a fundamental component of nucleic acids. { 'gwān,ēn }

**guano** [MATER] Phosphate- and nitrogen-rich, partially decomposed excrement of seabirds; used as a fertilizer. { 'gwān-ō }

**guanophore** See iridocyte. { 'gwān-ə,fōr }

**guanosine** [BIOCHEM] C<sub>10</sub>H<sub>13</sub>O<sub>6</sub>N<sub>5</sub> Guanine riboside, a nucleoside composed of guanine and ribose. Also known as vermine. { 'gwān-ə,sēn }

**guanosine 5'-triphosphate** [CELL MOL] A nucleoside triphosphate that is instrumental in many cellular processes, including microtubule assembly, protein synthesis, and cell signaling, due to the energy it releases upon removal of its terminal phosphate group (producing guanosine 5'-diphosphate). Abbreviated GTP. { 'gwān-ə,sēn 'trī-fās,fāt }

**guanosine tetraphosphate** [BIOCHEM] A nucleotide which participates in the regulation of gene transcription in bacteria by turning off the synthesis of ribosomal ribonucleic acid. { 'gwān-ə,sēn tē-trā'fās,fāt }

**guanylic acid** [BIOCHEM] A nucleotide composed of guanine, a pentose sugar, and phosphoric acid and formed during the hydrolysis of nucleic acid. Abbreviated GMP. Also known as guanosine monophosphate; guanosine phosphoric acid. { 'gwā'nīl-ik 'as-əd }

**guar** [AGR] *Cyanopsis tetragonoloba*. A leguminous crop adapted to semiarid regions of the southwestern United States and Mexico. Also known as cluster bean. { 'gwār }

**guard** [ENG] A shield or other fixture designed to protect against injury. [MIN ENG] A support in front of a roll train to guide the bar into the groove. { 'gārd }

**guard ammunition** [ORD] Ammunition specifically designed for use by guards, usually containing a reduced propelling charge. { 'gārd,am-yə'nīsh-ən }

**guard arm** [ELEC] 1. Crossarm placed across and in line with a cable to prevent damage to the cable. 2. Crossarm located over wires to prevent foreign wires from falling into them. { 'gārd,ārm }

**guard band** [ELECTR] A narrow frequency band provided between adjacent channels in certain portions of the radio spectrum to prevent interference between stations. { 'gārd,band }

**guard cell** [BOT] Either of two specialized cells surrounding each stoma in the epidermis of plants; functions in regulating stoma size. { 'gārd,sel }

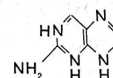
**guard circle** [DES ENG] The closed loop at the end of a grooved record. { 'gārd,sər-kol }

**guarded command** [COMPUT SCI] A program statement within a group of such statements that determines whether the other statements will be executed by the computer. { 'gārd-əd kə'mənd }

## GRYLLIDAE

Grass cricket (*Nemobius fasciatus*).

## GUANINE



Structural formula of guanine.

**guard-electrode system** [PETRO ENG] System of extra electrodes used during electrical logging of reservoir formations to confine the surveying current from the measuring electrode to a generally horizontal path. { 'gärd 'lɛk, 'rɔd, 'sɪs-təm }

**guarding** [ELEC] A method of eliminating surface-leakage effects from measurements of electrical resistance which employs a low-resistance conductor in the vicinity of one of the terminals or a portion of the measuring circuit. { 'gärd-ɪŋ }

**guard lock** [CIV ENG] See entrance lock. [ENG] An auxiliary lock that must be opened before the key can be turned in a main lock. { 'gärd, 'lɔk }

**guard magnet** [MIN ENG] A magnet employed in a crushing system to remove or arrest tramp iron ahead of the machinery. { 'gärd, 'mæɡ-nət }

**guardrail** [CIV ENG] 1. A handrail. 2. A rail made of posts and a metal strip used on a road as a divider between lines of traffic in opposite directions or used as a safety barrier on curves. 3. A rail fixed close to the outside of the inner rail on railway curves to hold the inner wheels of a railway car on the rail. Also known as check rail; safety rail; slide rail. { 'gärd, 'reɪl }

**guard relay** [ELEC] Used in the linefinder circuit to make sure that only one linefinder can be connected to any line circuit when two or more line relays are operated simultaneously. { 'gärd, 'reɪl }

**guard ring** [ELEC] A ring-shaped auxiliary electrode surrounding one of the plates of a parallel-plate capacitor to reduce edge effects. [ELECTR] A ring-shaped auxiliary electrode used in an electron tube or other device to modify the electric field or reduce insulator leakage; in a counter tube or ionization chamber a guard ring may also serve to define the sensitive volume. [THERMO] A device used in heat flow experiments to ensure an even distribution of heat, consisting of a ring that surrounds the specimen and is made of a similar material. { 'gärd, 'rɪŋ }

**guard screen** See oversize control screen. { 'gärd, 'skrɛn }

**guard shield** [ELECTR] Internal floating shield that surrounds the entire input section of an amplifier; effective shielding is achieved only when the absolute potential of the guard is stabilized with respect to the incoming signal. { 'gärd, 'ʃɪld }

**guard signal** [COMPUT SCI] A signal used in digital-to-analog converters, analog-to-digital converters, or other converters which permits values to be read or converted only when the values are not changing, usually to avoid ambiguity error. { 'gärd, 'sɪɡ-nəl }

**guard wire** [ELEC] A grounded conductor placed beneath an overhead transmission line in order to ground the line, in case it breaks, before reaching the ground. { 'gärd, 'waɪr }

**guar gum** [MATER] A mucilage formed from seeds of the guar plant; light-gray powder dispersible in water; used as a thickening agent in paper, foods, pharmaceuticals, and cosmetics. { 'ɡwä, 'ɡəm }

**Guarnieri body** [PATH] Eosinophilic cytoplasmic inclusion bodies found in the epidermal cells of patients with smallpox or chickenpox. { 'ɡwä, 'nɪr-ē, 'bɔd-ē }

**guava** [BOT] *Psidium guajava*. A shrub or low tree of tropical America belonging to the family Myrtaceae; produces an edible, aromatic, sweet, juicy berry. { 'ɡwä, 'və }

**guayule** [BOT] *Parthenium argentatum*. A subshrub of the family Compositae that is native to Mexico and the southwestern United States; it has been cultivated as a source of rubber. { wɪ'yuːl-ē }

**guba** [METEOROL] In New Guinea, a rain squall on the sea. { 'ɡu-bä }

**gubernaculum** [ANAT] A guiding structure, as the fibrous cord extending from the fetal testes to the scrotal swellings. [INV ZOO] 1. A posterior flagellum of certain protozoans. 2. A sclerotized structure associated with the copulatory spicules of certain nematodes. { 'ɡü-bər-'näk-yə-təm }

**Gudden-Pohl effect** [ELECTR] The momentary illumination produced when an electric field is applied to a phosphor previously excited by ultraviolet radiation. { 'ɡüd-ən 'pɔl-ē, 'fekt }

**Gudermannian** [MATH] The function  $y$  of the variable  $x$  satisfying  $\tan y = \sinh x$  or  $\sin y = \tanh x$ ; written  $\operatorname{gd} x$ . { 'ɡüd-ər-'mān-ē-ən }

**gudgeon** [ENG] 1. A pivot. 2. A pin for fastening stone blocks. [NAV ARCH] Metal fittings on the sternpost of a boat

or on the rudderpost of a ship on which the rudder is hung; the gudgeon forms the pivot point. { 'ɡɔːdʒ-ən }

**gudmundite** [MINERAL] FeSbS. A silver-white to steel-gray orthorhombic mineral composed of a sulfide and antimony of iron. { 'ɡüd-'mān-'dɪt }

**Guerbet reaction** [ORG CHEM] A condensation of alcohols at high temperatures through the action of sodium alkoxides. { ,ɡer-'bä, 'rɛ, 'ak-'ʃən }

**guerrilla warfare** [ORD] Operations carried on by independent or semi-independent forces in the rear of the enemy; these operations usually are conducted by irregular forces acting either separately from, or in conjunction with, regular forces but may at times be conducted entirely with regular troops. { ɡə'rɪl-ə 'wä, 'fɛr }

**guess-warp** [NAV ARCH] A line used in conjunction with a Jacob's ladder on the thimble of which boat crews reeve their bowlines. { 'ɡes, 'wä, 'p }

**guest** [CHEM] Cationic, anionic, or neutral organic, inorganic, or biological substance, bound by means of various interactions (electrostatic, hydrogen bonding, van der Waals, donor-acceptor) within a crystalline or molecular structure. Also known as guest molecule; guest substance. { 'ɡest }

**guest computer** [COMPUT SCI] A computer that operates under the control of another computer (the host). { 'ɡest kəm-'pyüt-ər }

**guest element** See trace element. { 'ɡest, 'el-ə-'mənt }

**guest molecule** See guest. { 'ɡest, 'möl-ə-'kyül }

**guest substance** See guest. { 'ɡest, 'səb-'stəns }

**Guest unit** [BIOL] A unit for the standardization of plasmin. { 'ɡest, 'yü-'nɪt }

**Guggenheim process** [CIV ENG] A method of chemical precipitation which employs ferric chloride and aeration to prepare sludge for filtration. { 'ɡüɡ-'ən-'hɪm, 'prɛs-'əs }

**GUI** See graphical user interface. { 'ɡü, 'ɛ or 'jɛlyuɪ }

**Guiana Current** [OCEANOGR] A current flowing northward along the northeastern coast of South America. { 'ɡi-'an-ə, 'kɔ-'rənt }

**guidance** [NAV] The process of directing the movements of any vehicle, especially an aeronautical vehicle or space vehicle, with particular reference to the selection of a course or flight path. { 'ɡɪd-'əns }

**guidance site** [ENG] Specific location of high-order geodetic accuracy containing equipment and structures necessary to provide guidance services or a given launch rate; it may be an integrated part of a launch site, or it may be a remote facility. { 'ɡɪd-'əns, 'saɪt }

**guidance station equipment** [ENG] The ground-based portion of the missile guidance system necessary to provide guidance during missile flight; it specifically includes the tracking radar, the rate measuring equipment, the data link equipment, and the computer, test, and maintenance equipment integral to these items. { 'ɡɪd-'əns, 'sta-'ʃən, 'i, 'kwɪp-'mənt }

**guidance system** [AERO ENG] The control devices used in guidance of an aircraft or spacecraft. [NAV] Apparatus for generating and detecting the path along which a vehicle or craft is guided, often remotely and automatically. { 'ɡɪd-'əns, 'sɪs-təm }

**guide bearing** [MECH ENG] A plain bearing used to guide a machine element in its lengthwise motion, usually without rotation of the element. { 'ɡɪd, 'ber-ɪŋ }

**guide bracket** [MIN ENG] A steel bracket fixed to a buntion to secure rigid guides in a shaft. { 'ɡɪd, 'bræk-ət }

**guide coat** [MATER] A thin coat of paint applied to a surface over a sealer or filler to indicate the locations of bumps or imperfections and thereby to serve as a guide for removing them. { 'ɡɪd, 'kɔt }

**guide coupling** [MIN ENG] A short coupling with a projecting reamer guide or pup to which is attached a reaming bit, which it couples to a reaming barrel. { 'ɡɪd, 'kɔp-'lɪŋ }

**guided bend test** [MET] A bend test in which the specimen is bent to a predetermined shape. { 'ɡɪd-'əd, 'bend, 'test }

**guided bomb** [ORD] An aerial bomb that is guided in range or azimuth, or both, during its drop. { 'ɡɪd-'əd, 'bɔm }

**guided missile** [ORD] An uncrewed self-propelled vehicle, with or without a warhead, which is designed to move in a trajectory or flight path all or partially above the earth's surface and whose trajectory or, course, while in flight, is capable of being directed by remote control, by homing systems, or by inertial or programmed guidance from within; excludes drones.

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GUAVA



*Psidium guajava*, showing a branch with leaves and two berries and a berry cut in half.