

**Absolute humidity.** The actual amount of the water vapor in a mixture of air and water.

**Absolute pressure.** Equal to gauge pressure plus atmospheric pressure. Also known as psia.

**Absolute temperature.** Temperature measured relative to absolute zero. Absolute temperature scales include Kelvin and Rankine.

**Acceleration due to gravity.** The acceleration of an object caused by gravity. On earth, it is measured as 32.2 feet per second per second (32.2 fps/s).

**Addition.** The process in which the value of one number is added to the value of another.

**Advisory Circulars (AC).** Issued to inform the aviation public in a systematic way of nonregulatory material. An AC is issued to provide guidance and information in a designated subject area or to show a method acceptable to the Administrator for complying with a related 14 CFR part.

**Aircraft Specifications.** FAA recordkeeping documents issued for both type-certificated and non-type-certificated products which have been found eligible for U.S. airworthiness certification.

**Airfoil.** Any device that creates a force, or lift, based on Bernoulli's principles or Newton's laws, when air is caused to flow over the surface of the device.

**Airworthiness certificate.** A document required to be onboard an aircraft that indicates the aircraft conforms to type design and is in condition for safe operation.

**Airworthiness directive (AD).** Issued by the FAA in response to deficiencies and/or unsafe conditions found in aircraft, engines, propellers, or other aircraft parts. Compliance with an AD is mandatory.

**Alclad aluminum.** Used to designate sheets that consist of an aluminum alloy core coated with a layer of pure aluminum to a depth of approximately 5½ percent on each side.

**Algebra.** The branch of mathematics that uses letters or symbols to represent numbers in formulas and equations.

**Allowance.** The difference of the upper and lower variation of a part.

**Alodizing.** A simple chemical treatment for all aluminum alloys to increase their corrosion resistance and to improve their paint bonding qualities.

**Alteration.** A change or modification to an aircraft from its previous state

**Alternating current.** An electric current that reverses direction in a circuit at regular intervals.

**Ammeter.** An instrument for measuring electric current in amperes.

**Ampere.** A unit of measure of the rate of electron flow or current in an electrical conductor. One ampere of current represents one coulomb of electrical charge ( $6.24 \times 10^{18}$  charge carriers) moving past a specific point in one second.

**Annealing.** The process of heating a metal to a prescribed temperature, holding it there for a specified length of time, and then cooling the metal back to room temperature.

**Annual inspection.** An inspection required by the FAA once every 12 calendar months if other suitable inspections do not occur within that timeframe. An A&P technician with inspection authorization must perform this inspection.

**Anodizing.** The most common surface treatment of nonclad aluminum alloy surfaces. The aluminum alloy sheet or casting is the positive pole in an electrolytic bath in which chromic acid or other oxidizing agent produces an aluminum oxide film on the metal surface. Aluminum oxide is naturally protective, and anodizing merely increases the thickness and density of the natural oxide film.

**Apparent power.** That power apparently available for use in an AC circuit containing a reactive component. It is the product of effective voltage times the effective current, expressed in volt-amperes.

**Archimedes' principle.** The buoyant force that a fluid exerts upon a submerged body is equal to the weight of the fluid the body displaces.

**Area.** A measurement of the amount of surface inside a two-dimensional object.

**Arm.** The horizontal distance that a part of the aircraft or a piece of equipment is located from the datum.

**Armature.** The rotating part of an electric generator or motor.

**Aspect ratio.** The relationship of the length (wingtip to wingtip), or span, of an airfoil to its width, or chord.

**Assembly drawing.** A description of an object made up of two or more parts.

**Atom.** The smallest particle composed of a nucleus that contains protons, neutrons, and electrons, which revolve around the nucleus.

**Ballast.** A weight installed or carried in an aircraft to move the center of gravity to a location within its allowable limits.

**Base.** In mathematics, used to refer to a particular mathematical object that is used as a building block. A base-*a* system is one that uses *a* as a new unit from which point counting starts again. (See decimal system.) In the mathematical expression  $a^n$ , read as “*a* to the *n*th power,” *a* is the base.

**Basic empty weight.** Standard empty weight plus optional equipment.

**Bernoulli’s principle.** Equivalent to the principle of conservation of energy, this principle states that the static pressure of a fluid (liquid or gas) decreases at points where the velocity of the fluid increases, provided no energy is added to or taken away from the fluid.

**Binary number system.** The binary number system is a number system that has only two digits, 0 (zero) and 1. Binary numbers are made from a series of zeros and ones. An example of an 8-bit binary number is 11010010. The prefix “bi” in the word binary is a Latin root for the word “two.”

**Block diagrams.** Used to show a simplified relationship of a more complex system of components.

**Borescope.** A device that enables the inspector to see inside areas that could not otherwise be inspected without disassembly.

**Boyle’s law.** States that the volume of an enclosed dry gas varies inversely with its absolute pressure, provided the temperature remains constant.

**Break lines.** Line on a drawing indicating that a portion of the object is not shown on the drawing.

**British thermal unit (Btu).** The amount of heat required to change the temperature of 1 pound of water by 1 degree Fahrenheit.

**Buoyancy.** The upward force that any fluid exerts on a body submerged in it.

**Buttock line (BL).** The longitudinal axis of the aircraft that serves as the reference location for positions to the left and right of center. The positions are usually dimensioned in inches.

**Calorie.** The amount of heat required to change the temperature of 1 gram of water by 1 degree Centigrade.

**Camber.** The curvature of a wing as viewed by cross section. A wing has upper camber on its top surface and lower camber on its bottom surface. The upper camber is more pronounced; the lower camber is comparatively flat. This causes the velocity of the airflow immediately above the wing to be much higher than that below the wing.

**Capacitance (C).** The property of an electric conductor that characterizes its ability to store an electric charge.

**Capacitive reactance ( $X_c$ ).** The measure of a capacitor’s opposition to alternating current.

**Capacitor.** An electrical component that stores an electric charge.

**Case hardening.** A process in which the surface of a metal is changed chemically by introducing a high carbide or nitride content. Case hardening produces a hard, wear-resistant surface, or case, over a strong, tough core.

**Center of gravity (CG).** The point about which the nose-heavy and tail-heavy moments are exactly equal in magnitude.

**Center of gravity range.** The center of gravity range for an aircraft is the limits within which the aircraft must balance. It is identified as a forward-most limit (arm) and an aft-most limit (arm).

**Centrifugal force.** The apparent force occurring in curvilinear motion acting to deflect objects outward from the axis of rotation. For instance, when pulling out of a dive, it is the force pushing the pilot down in his or her seat.

**Centripetal force.** The force in curvilinear motion acting toward the axis of rotation. For instance, when pulling out of a dive, it is the force that the seat exerts on the pilot to offset the centrifugal force.

**Charles' Law.** States that all gases expand and contract in direct proportion to the change in the absolute temperature, provided the pressure is held constant.

**Chemical energy.** Energy released from chemical reactions.

**Circular magnetization.** The induction of a magnetic field consisting of concentric circles of force about and within a part, which is achieved by passing electric current through the part.

**Circumference (of a circle).** The linear measurement of the distance around a circle. The circumference is calculated by multiplying the diameter of the circle by 3.1416.

**Code of Federal Regulations (CFR).** Established by law to provide for the safe and orderly conduct of flight operations and to prescribe airmen privileges and limitations.

**Compression ratio.** The ratio of the volume of a cylinder with the piston at the bottom of its stroke to the volume of the cylinder with the piston at the top of its stroke.

**Computer aided design (CAD).** Using a computer in the design of a product.

**Computer aided design drafting (CADD).** Using a computer in the design and drafting process.

**Computer aided engineering (CAE).** Using a computer in the engineering of a product.

**Computer aided manufacturing (CAM).** Using a computer in the manufacturing of a product.

**Computer graphics.** Drawing with the use of a computer.

**Conduction.** The transfer of heat which requires physical contact between an object that has a large amount of heat energy and one that has a smaller amount of heat energy.

**Conductor.** A material that will carry electric current.

**Convection.** The process by which heat is transferred by movement of a heated fluid (gas or liquid).

**Corrosion.** The deterioration of metal by chemical or electrochemical attack.

**Cosine (cos).** A trigonometric function comparing two sides of a right triangle as follows:

$$\text{Cos} = \frac{\text{adjacent side}}{\text{hypotenuse}}$$

**Coulomb.** A measure of electrical output. One coulomb is  $6.24 \times 10^{18}$  electrons.

**Countersink.** A tool that cuts a cone-shaped depression around a hole in order to allow a rivet or screw to set flush with the surface of the material.

**Current.** The flow of electrical charge.

**Dalton's Law.** States that a mixture of several gases which do not react chemically exerts a pressure equal to the sum of the pressures which the several gases would exert separately if each were allowed to occupy the entire space alone at the given temperature.

**Datum.** An imaginary vertical plane or line from which all measurements of arm are taken. The datum is established by the manufacturer. Once the datum has been selected, all moment arms and the location of CG range are measured from this point.

**Debonding.** Separation of the bond between the skin laminates and the core of a composite structure.

**Decibels.** The unit for measuring sound intensity. One decibel is the smallest change in sound intensity the human ear can detect.

**Decimal system.** The number system, also called the base-ten system, based on the number 10. Consisting of ten symbols, or digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), the main principle is that 10 is considered as a new unit from which point counting starts again.

**Degradation.** The alteration of material properties (e.g., strength, modulus, coefficient of expansion) which may result from deviations in manufacturing or from repeated loading and/or environmental exposure.

**Delamination.** Separation of the bond between the individual plies of a laminated composite structure.

**Denominator.** The lower part of a fraction (represented by the letter D in  $\frac{N}{D}$ ), the quantity by which the numerator is divided.

**Density.** The weight of a substance per unit volume.

**Detail drawing.** A description of a single part, given in such a manner as to describe by lines, notes, and symbols the specifications for size, shape, material, and methods of manufacture to be used in making the part.

**Detailed inspection.** A thorough examination of an item including disassembly. The overhaul of a component is considered to be a detailed inspection.

**Detonation.** Uncontrolled burning of fuel in the cylinder of a reciprocating engine. Detonation causes explosive burning of the fuel which creates an increased cylinder pressure, excessive cylinder head temperature, and decreased engine performance.

**Dew point.** The temperature to which humid air must be cooled at constant pressure to become saturated.

**Dial indicator.** Measures variations in a surface by using an accurately machined probe mechanically linked to a circular hand whose movement indicates thousandths of an inch, or is displayed on a liquid crystal display (LCD) screen.

**Diameter (circle).** The length of a line passing directly through the center of a circle. Twice the radius of the circle.

**Die.** Used for cutting external threads on round stock.

**Difference.** The answer to a subtraction problem.

**Direct current (DC).** Electricity that flows in one direction at all times.

**Directional stability.** Stability about the vertical axis of an aircraft, whereby an aircraft tends to return, on its own, to flight aligned with the relative wind when disturbed from the equilibrium state.

**Discontinuity.** An interruption in the normal physical structure or configuration of a part, such as a crack, forging lap, seam, inclusion, porosity, and the like. A discontinuity may or may not affect the usefulness of a part.

**Dissimilar metal corrosion.** Caused by contact between dissimilar metal parts in the presence of a conductor.

**Dividend.** In a division problem, the number to be divided by the divisor. In  $6 \div 2 = 3$ , the dividend is 6.

**Division.** The process of finding how many times one number (the divisor) is contained in another number (the dividend).

**Divisor.** In a division problem, the number by which dividend is to be divided. In  $6 \div 2 = 3$ , the divisor is 2.

**Doping.** The process by which small amounts of additives called impurities are added to the semiconductor material to increase their current flow by adding a few electrons or a few holes.

**Dynamic stability.** The property of an aircraft that causes it, when disturbed from straight-and level flight, to develop forces or moments that restore the original condition of straight and level.

**Eddy current inspection.** An inspection method where eddy currents are induced into the material to be tested. In aircraft manufacturing plants, eddy current is used to inspect castings, stampings, machine parts, forgings, and extrusions.

**Electrical energy.** Electrical energy is converted to heat energy when an electric current flows through any form of resistance such as an electric iron, electric light, or an electric blanket.

**Electromotive force (EMF).** The pressure or force that causes electrons to flow in an electrical circuit.

**Electrostatic field.** A field of force that exists around a charged body.

**Empennage.** The section of the airplane that consists of the vertical stabilizer, the horizontal stabilizer, and the associated control surfaces.

**Empty-weight center of gravity range.** The distance between the allowable forward and aft empty-weight CG limits.

**Empty-weight center of gravity.** The center of gravity of an aircraft when it contains only the items specified in the aircraft empty weight.

**Empty weight.** See standard empty weight.

**Energy.** The capacity of a physical system to perform work. There are two types of energy, kinetic and potential.

**Exploded view drawing.** A pictorial drawing of two or more parts that fit together as an assembly. The view shows the individual parts and their relative position to the other parts before they are assembled.

**Exponent (power).** A shorthand method of indicating how many times a number, called the base, is multiplied by itself. For example, in the number  $4^3$ , the 3 is the power or exponent and 4 is the base. That is,  $4^3$  is equal to  $4 \times 4 \times 4 = 64$ .

**Extension lines.** Used to extend the line showing the side or edge of a figure for the purpose of placing a dimension to that side or edge.

**FAA Form 337.** This form must be completed when a major repair or alteration is accomplished.

**Ferrous metals.** Metals having iron as their principal constituent.

**Force.** The intensity of an impetus, or the intensity of an input.

**Foreign object damage (FOD).** Any damage caused by any loose object to aircraft, personnel, or equipment. These loose objects can be anything from broken runway concrete to shop towels and safety wire.

**Fraction.** A number written in the form  $\frac{N}{D}$  in which N is the numerator and D is the denominator. For example,  $\frac{5}{16}$  is a fraction.

**Frequency.** The number of cycles (on/off) completed per unit of time. Usually expressed in Hertz.

**Fretting corrosion.** Occurs when two mating surfaces, normally at rest with respect to one another, are subject to slight relative motion.

**Friction.** The opposition to movement between objects.

**Fuel grade.** The rating system used for aviation gasoline. It rates fuel according to its antidetonation characteristics.

**Fuse.** A protective device containing a special wire that melts when current exceeds the rated value for a definite period.

**Fuselage stations (FS).** Reference locations, usually given in inches, used to determine forward and aft positions on an aircraft. FS - 0 is the datum.

**Heat.** The total kinetic energy of the molecules of any substance.

**Henry.** The basic unit of inductance, symbolized with the letter H. An electric circuit has an inductance of one henry when current changing at the rate of one ampere per second induces a voltage of one volt into the circuit.

**Hermaphrodite caliper.** Generally used as a marking gauge in layout work. It should not be used for precision measurement.

**Hidden lines.** Indicates invisible edges or contours.

**Horsepower.** A measure of power equal to 550 foot-pounds per second or 33,000 foot-pounds per minute and 746 Watts.

**Hot start.** Occurs when the engine starts, but the exhaust gas temperature exceeds specified limits. This is usually caused by an excessively rich fuel/air mixture entering the combustion chamber.

**Humidity.** The amount of water vapor in the air.

**Hung start.** Occurs when the engine starts normally, but the rpm remains at some low value rather than increasing to the normal starting rpm. This is often the result of insufficient power to the starter, or the starter cutting off before the engine starts self-accelerating.

**Hydrometer.** A device used for measuring the specific gravity of liquids.

**Hydrometer.** An instrument for determining the specific gravity of liquids.

**Hypotenuse.** The side of a right triangle that is opposite the right angle. The hypotenuse is the longest side of a right triangle.

**Improper fraction.** A fraction with the numerator equal to or greater than the denominator.

**Inside calipers.** Calipers with outward curved legs for measuring inside diameters, such as diameters of holes.

**Installation drawing.** A drawing that includes all necessary information for a part or an assembly in the final installed position in the aircraft.

**Intergranular corrosion.** An attack along the grain boundaries of an alloy that commonly results from a lack of uniformity in the alloy structure.

**Inductance.** The ability of a coil or conductor to oppose a change in current flow.

**Inductive reactance.** The opposition to the flow of current which inductances put in a circuit.

**Inductor.** A coil of wire that produces inductance in an electrical circuit.

**Insulator.** A material that does not conduct electrical current very well or not at all. Examples are glass, ceramic, and plastic.

**Ion.** An atom or group of atoms in which the number of electrons is different from the number of protons. It is a positive ion if the number of electrons is less than the number of protons, and a negative ion if the number of electrons is greater than the number of protons.

**Isometric drawings.** A drawing that uses a combination of the views of an orthographic projection and tilts the object forward so that portions of all three views can be seen in one view.

**Joule.** The amount of work done by a force of one newton when it acts through a distance of one meter.

**Kinetic energy.** Energy due to motion, defined as one half mass times velocity squared.

**Kirchhoff's Law (voltage).** A basic law of electrical currents stating that the algebraic sum of the applied voltage and the voltage drop around any closed circuit is zero.

**Lateral stability.** The stability about the longitudinal axis of an aircraft; the rolling stability, or the ability of an airplane to return to level flight due to a disturbance that causes one of the wings to drop.

**Lever.** The simplest machine. There are three basic parts in all levers: the fulcrum "F," a force or effort "E," and a resistance "R."

**Load cell.** A component in an electronic weighing system that is placed between the jack and the jack pad on the aircraft. The load cell contains strain gauges whose resistance changes with the weight on the cell.

**Longitudinal magnetization.** The magnetic field is produced in a direction parallel to the long axis of the part. This is accomplished by placing the part in a solenoid excited by electric current.

**Longitudinal stability.** The tendency for an aircraft nose to pitch up or pitch down, rotating around the lateral axis (wingtip to wingtip).

**Magnetic particle inspection.** A method of detecting invisible cracks and other defects in ferromagnetic materials such as iron and steel. The inspection process consists of magnetizing the part and then applying ferromagnetic particles to the surface area to be inspected.

**Maintenance.** This includes inspection, overhaul, repair, preservation, and the replacement of parts, but excludes preventive maintenance.

**Major alteration.** An alteration not listed in the aircraft, aircraft engine, or propeller specifications: (1) that might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or (2) that is not done according to accepted practices or cannot be done by elementary operations.

**Major repairs.** A repair that (1) if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness, or (2) is not done according to accepted practices, or cannot be done by elementary operations.

**Malfunction or Defect Report.** A report (FAA Form 8010-4) providing the FAA and industry with a very essential service record of mechanical difficulties encountered in aircraft operations. Such reports contribute to the correction of conditions or situations which otherwise will continue to prove costly and/or adversely affect the airworthiness of aircraft.

**Manufacturer's maintenance manual.** A manual provided by an aircraft manufacturer that outlines the methods, techniques, and practices prescribed for each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance.

**Mass.** A measure of the quantity of matter in an object.

**Matter.** Any substance that has mass and takes up space.

**Maximum landing weight.** The heaviest weight an aircraft can have when it lands. For large wide body commercial airplanes, it can be 100,000 pounds less than maximum takeoff weight, or even more.

**Maximum ramp weight.** The heaviest weight to which an aircraft can be loaded while it is sitting on the ground, sometimes referred to as the maximum taxi weight.

**Maximum takeoff weight.** The heaviest weight an aircraft can have when it starts the takeoff roll. The difference between this weight and the maximum ramp weight would equal the weight of the fuel that would be consumed prior to takeoff.

**Maximum weight.** The maximum authorized weight of the aircraft and its contents, and is indicated in the Aircraft Specifications or Type Certificate Data Sheet.

**Maximum zero fuel weight.** The heaviest weight an aircraft can be loaded to without having any usable fuel in the fuel tanks. Any weight loaded above this value must be in the form of fuel.

**Mean aerodynamic chord (MAC).** The average distance from the leading edge to the trailing edge of the wing.

**Mechanical advantage.** A ratio of the resistance force to the effort force.

**Mechanical energy.** This includes all methods of producing increased motion of molecules such as friction, impact of bodies, or compression of gases.

**METO horsepower.** The maximum power allowed to be continuously produced by an engine. Takeoff power is usually limited to a given amount of time, such as 1 minute or 5 minutes.

**Mixed number.** A combination of a whole number and a fraction. For example,  $5\frac{3}{8}$  is a mixed number.

**Molecule.** The smallest particle of an element or compound that retains the chemical properties of the element or compound.

**Moment.** In determining weight and balance, the moment is the product of a weight multiplied by its arm.

**MS flareless fittings.** Designed primarily for high-pressure (3,000 psi) hydraulic systems that may be subjected to severe vibration or fluctuating pressure. Using this type of fitting eliminates all tube flaring, yet provides a safe and strong, dependable tube connection. The fitting consists of three parts: a body, a sleeve, and a nut.

**Multiplication.** The process of repeated addition.

**Negative number.** A number that is less than zero.

**Nomogram.** A graph that usually consists of three sets of data. Knowledge of any two sets of data enables the reader to determine the third set.

**Normalizing.** The process of heating the part to the proper temperature, holding it at that temperature until it is uniformly heated, and then cooling it in still air.

**Nuclear energy.** Energy stored in the nucleus of atoms is released during the process of nuclear fission in a nuclear reactor or atomic explosion.

**Numerator.** The upper part of a fraction (represented by the letter N in  $\frac{N}{D}$ ).

**Oblique view.** A view that is similar to an isometric view except with two of the three drawing axes always at right angles to each other.

**Ohm's Law.** Explains the relationship between voltage, current, and resistance in an electrical circuit, and states that current flow in an electrical circuit is directly proportional to the amount of voltage applied to the circuit.

**Ohmmeter.** A current measuring instrument that provides its own source (self-excited) of power.

**Ohm.** The standard unit used to measure resistance.

**One-hundred-hour inspection.** A complete inspection that is required for all aircraft operated for hire every 100 hours. An annual inspection must be conducted by an A&P mechanic with Inspection Authorization.

**Operating center of gravity range.** The center of gravity for an aircraft loaded and ready for flight.

**Orthographic projection.** A method of showing all six possible views of an object: front, top, bottom, rear, right side, and left side.

**Outside calipers.** Used for measuring outside dimensions, such as the diameter of a piece of round stock.

**Parallel circuit.** A circuit in which two or more electrical resistances or loads are connected across the same voltage source.

**Pascal's Law.** The law that states that pressure applied anywhere to a body of fluid causes a force to be transmitted equally in all directions; the force acts at right angles to any surface in contact with the fluid.

**Percentage.** Used to express a number as a fraction of 100. Using the percentage sign, %, 90 percent is expressed as 90%.

**Permeability.** Used to refer to the ease with which a magnetic flux can be established in a given magnetic circuit.

**Perspective view.** A drawing that shows a three-dimensional object (portraying height, width, and depth) as it appears to an observer. It most closely resembles the way an object would look in a photograph.

**Phantom line.** Composed of one long and two short evenly spaced dashes, indicates an alternate position of parts of the object or the relative position of a missing part.

**Pictorial drawing.** A drawing that is similar to a photograph. It shows an object as it appears to the eye, but it is not satisfactory for showing complex forms and shapes.

**Pitch.** Term used to describe the frequency of a sound.

**Plumb bob.** A heavy metal object, cylinder- or cone-shaped, with a sharp point at one end that is suspended by a string to produce a vertical reference line useful in aircraft measurements.

**Positive number.** A number that is greater than zero.

**Potential difference.** A difference in electrical pressure.

**Potential energy.** Energy that is stored.

**Potentiometer.** A variable tapped resistor that can be used as a voltage divider.

**Power (exponent).** A shorthand method of indicating how many times a number, called the base, is multiplied by itself. For example, in the number  $4^3$ , 3 is the power, or exponent, and 4 is the base. That is,  $4^3$  is equal to  $4 \times 4 \times 4 = 64$ .

**Power.** Power is the time rate at which work is done or energy is transferred.

**Powers of ten.** Also called scientific notation. It is a shorthand method of depicting very large or very small numbers.

**Pressure.** The amount of force acting on a specific amount of surface area, typically measured in pounds per square inch or psi.

**Preventive maintenance.** Simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

**Product.** The result of multiplication.

**Progressive inspection.** Breaking down the large task of conducting a major inspection into smaller tasks which can be accomplished periodically without taking the aircraft out of service for an extended period of time.

**Proportion.** A proportion is a statement of equality between two or more ratios. The example of A is to B as C is to D can be represented  $A:B = C:D$  or  $A/B = C/D$ .

**Pythagorean Theorem.** An equation used to find the length of a third side of any right triangle when the lengths of two sides are known. The Pythagorean Theorem states that  $a^2 + b^2 = c^2$ . The square of the hypotenuse (side opposite the right angle) is equal to the sum of the squares of the other two sides (a and b).

**Quenching.** The rapid cooling of metal in the heat treatment process.

**Quotient.** The result of dividing two numbers.

**Radiant energy.** Electromagnetic waves of certain frequencies produce heat when they are absorbed by the bodies they strike such as x-rays, light rays, and infrared rays.

**Radiation.** The continuous emission of energy from the surface of all bodies.

**Radical sign.** The symbol  $\sqrt{\quad}$ , used to indicate the root of a number.

**Radiographic inspection.** Inspection using radiography to locate defects or flaws in airframe structures or engines with little or no disassembly.

**Radius (circle).** Equal to one-half the diameter of a circle.

**Ratio.** The comparison of two numbers or quantities.

**Reamers.** Tools made of either carbon tool steel or high-speed steel that are used to smooth and enlarge holes to exact size.

**Rectifier.** A device for converting alternating current to direct current.

**Relative humidity.** The ratio of the amount of water vapor actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure.

**Remainder.** The leftover number in the process of division.

**Repair.** The restoration of an aircraft component to its previous state.

**Repair station.** A maintenance facility certificated under 14 CFR part 145 to perform maintenance functions.

**Resistance.** The opposition a device or material offers to the flow or current.

**Resonance.** The increase in amplitude of vibrations of an electric or mechanical system exposed to a periodic force whose frequency is equal or very close to the natural frequency of the system.

**Retentivity.** The ability of a material to hold its magnetism after the magnetizing field has been removed.

**Rheostat.** A variable resistor used to vary the amount of current flowing in a circuit.

**Root.** A number that when multiplied by itself a specified number of times will produce a given number. The two most commonly used roots are the square root and the cube root.

**Routine inspection.** A visual examination or check of an item in which no disassembly is required.

**Schematic diagram.** A diagram that locates components with respect to each other within a system.

**Scientific notation.** Used as a type of shorthand to express very large or very small numbers. For example, to express 1,250,000,000,000 in scientific notation is  $1.25 \times 10^{12}$ .

**Sea level pressure.** The atmospheric pressure at sea level. Average sea level pressure is 29.92 inches of mercury, or 1013.25 millibars.

**Sectional view.** A view obtained by cutting away part of an object to show the shape and construction at the cutting plane.

**Semiconductor.** Any device based on either preferred conduction through a solid in one direction, as in rectifiers, or on a variation in conduction characteristics through a partially conductive material, as in a transistor.

**Series circuit.** The most basic electrical circuit in which there is only one possible path for current to flow. Current must pass through the circuit components, the battery and the resistor, one after the other, or “in series.”

**Series-parallel DC circuits.** A grouping of parallel resistors connected in series with other resistors.

**Signed numbers.** A signed number can be either a positive or negative number. A positive number is a number that is greater than zero. A negative number is a number that is less than zero.

**Sine.** A trigonometric function comparing two sides of a right triangle as follows:

$$\text{Sine} = \frac{\text{opposite side}}{\text{hypotenuse}}$$

**Sine wave.** A continuous waveform with a constant frequency and amplitude.

**Sketch.** A simple rough drawing that is made rapidly and without much detail.

**Slide caliper.** Often used to measure the length of an object. It provides greater accuracy than a ruler.

**Solenoid.** A loop of wire, often wrapped around a metal core, which produces a magnetic field when an electrical current is passed through it.

**Specific gravity.** The ratio of the mass of a solid or liquid to the mass of an equal volume of water.

**Specific heat.** The quantity of heat necessary to increase the temperature of a unit of the mass of a substance 1 °C. The specific heat of a substance is the ratio of its specific heat capacity to the specific heat capacity of water.

**Speed of sound.** The speed of sound at sea level under standard temperature and pressure conditions is 1,108 feet per second or 658 knots.

**Spirit level.** A leveling instrument placed on or against a specified place on the aircraft. Spirit levels have vials that are full of liquid, except for a small air bubble. When the air bubble is centered between the two black lines, a level condition is indicated.

**Square root.** A non-negative number that must be multiplied by itself to equal a given number.

**Standard empty weight.** The weight of the airframe, engines, all permanently installed equipment, and unusable fuel. Depending upon the part of the Federal regulations under which the aircraft was certificated, either the undrainable oil or full reservoir of oil is included.

**Standard weights.** Values used in weight and balance calculations if specific weight for an item is unknown. The following are examples:

- Aviation gasoline 6 pounds per gallon
- Crew and passengers 170 pounds per person
- Lubricating oil 7.5 pounds per gallon
- Turbine fuel 6.7 pounds per gallon
- Water 8.35 pounds per gallon

**Static stability.** The initial response that an airplane displays after its equilibrium is disrupted.

**Strain.** A deformity or change in an object due to stress.

**Stress corrosion.** Occurs as the result of the combined effect of sustained tensile stresses and a corrosive environment.

**Stress.** The internal resistance of an object to external forces attempting to strain or deform that object. Measured in pounds per square foot or pounds per square inch (psi).

**Subtraction.** The process where the value of one number is taken from the value of another.

**Sum.** The resulting answer in the addition process.

**Supplemental Type Certificates (STC).** A document issued by the FAA approving a product (aircraft, engine, or propeller) modification.

**Surface corrosion.** Caused by either direct chemical or electrochemical attack, it appears as a general roughening, etching, or pitting of the surface of a metal, frequently accompanied by a powdery deposit of corrosion products.

**Swaged Fittings.** These fittings create a permanent connection that is virtually maintenance free. Swaged fittings are used to join hydraulic lines in areas where routine disconnections are not required and are often used with titanium and corrosion resistant steel tubing.

**Tangent (tan).** A trigonometric function comparing two sides of a right triangle as follows:

$$\text{Tan} = \frac{\text{opposite side}}{\text{adjacent side}}$$

**Tap.** Instrument used to cut threads on the inside of a hole.

**Tare weight.** The weight of any chocks or devices used to hold an aircraft on scales when it is weighed. The tare weight must be subtracted from the scale reading to get the net weight of the aircraft.

**Tempering.** Process that reduces the brittleness imparted by hardening and produces definite physical properties within the steel. Tempering always follows, never precedes, the hardening operation.

**Thermal expansion.** The increase in size of a material as temperature increases.

**Tolerance.** The sum of the plus and minus allowance figures.

**Torque.** The tendency of a force to cause or change rotational motion of a body.

**Transformer.** A device that changes electrical energy of a given voltage into electrical energy at a different voltage level. It consists of two coils that are not electrically connected, but arranged so that the magnetic field surrounding one coil cuts through the other coil.

**Transistor.** A three-terminal device primarily used to amplify signals and control current within a circuit.

**Trapezoid.** A four-sided figure with one pair of parallel sides.

**True power.** The power dissipated in the resistance of a circuit, or the power actually used in the circuit.

**Triangle.** A three-sided figure in which the sum of the three angles equal 180°.

**Trigonometry.** The study of the relationships between the angles and sides of a triangle.

**Type Certificate Data Sheet (TCDS).** The FAA issues a type certificate when a new aircraft, engine, propeller, etc., is found to meet safety standards set forth by the FAA. The TCDS lists the specifications, conditions and limitations under which airworthiness requirements were met for the specified product, such as engine make and model, fuel type, engine limits, airspeed limits, maximum weight, minimum crew, etc.

**Ultrasonic inspection.** Uses high frequency sound energy to conduct examinations and make measurements. Ultrasonic inspection can be used for flaw detection/evaluation, dimensional measurements, and material characterization.

**Useful load.** Fuel, any other fluids that are not part of empty weight, passengers, baggage, pilot, copilot, and crewmembers. It is determined by subtracting the empty weight from the maximum allowable gross weight.

**Vapor pressure.** The portion of atmospheric pressure that is exerted by the moisture in the air (expressed in tenths of an inch of mercury).

**Volt.** The basic unit of electrical potential or electromotive force. A potential of one volt appears across a resistance of one ohm when a current of one ampere flows through that resistance.

**Voltmeter.** A current-measuring instrument, designed to indicate voltage by measuring the current flow through a resistance of known value.

**Volume.** The amount of space within a three-dimensional solid.

**Waterline (WL).** A horizontal reference plane used to locate vertical positions on an aircraft. Positions are usually given in inches above or below the waterline.

**Watt.** A unit of power equal to one joule per second.

**Weighing points.** Locations on an aircraft that the manufacturer designates for the placement of scales when weighing aircraft.

**Weight.** A measure of the pull of gravity acting on the mass of an object.

**Whole numbers.** The numbers: 0, 1, 2, 3, 4, 5, and so on.

**Wiring diagrams.** A diagram that shows the electrical wiring and circuitry, coded for identification, of all the electrical appliances and devices used on aircraft.

**Work.** The amount of energy transferred by a force.

**Zero fuel weight.** The weight of an aircraft without fuel.

**Zone numbers.** On drawings, these are similar to the numbers and letters printed on the borders of a map, used for locating a particular point in the drawing.

