

**Absolute humidity:** Amount of moisture in the air, indicated in grains per ft<sup>3</sup>.

**Absolute pressure:** Gauge pressure plus atmospheric pressure (14.7 psi).

**Absolute temperature:** Temperature measured from absolute zero.

**Absolute zero temperature:** Temperature at which all molecular motion ceases (-460F and -273C).

**Absorbent:** The ability to soak up another substance.

**Absorber:** A solution or surface that is capable of soaking up (taking in) another substance or energy form.

**Absorption:** The process of taking or soaking up into a substance.

**Absorption chiller:** A chiller that uses a brine solution and water to provide refrigeration without the aid of a compressor.

**Absorption refrigerator:** Refrigerator that creates low temperatures by using the cooling effect formed when a refrigerant is absorbed by chemical substance.

**Accessible hermetic:** Assembly of motor and compressor inside a single bolted housing unit.

**Accumulator:** Storage tank that receives liquid refrigerant from the evaporator and prevents it from flowing into the suction line before vaporizing.

**Acid condition in system:** Condition in which refrigerant or oil in system is mixed with acidic fluids.

**ACR tubing:** Tubing used in air conditioning and refrigeration. Ends are sealed to keep tubing clean and dry.

**Activated alumina:** A chemical that is a form of aluminum oxide. It is used as a drier or desiccant.

**Activated carbon:** Specially processed carbon used as a filter-drier; commonly used to clean air.

**Active solar heating system:** A system in which solar energy is absorbed in a collector, stored, and distributed by an auxiliary circulating system.

**Actuator:** That portion of a regulating valve that converts mechanical fluid, thermal energy, or electrical energy into mechanical motion to open or close valve seats.

**Adiabatic compression:** Compressing refrigerant gas without removing or adding heat.

**Adsorbent:** Substance with the property to hold molecules of fluids without causing a chemical or physical change.

**Adsorption:** The adhesion of a thin layer of molecules of a gas or liquid to a solid object.

**Aeration:** Act of combining a substance with air.

**Agitator:** Device used to cause motion in confined fluid.

**Air:** An invisible, odorless, and tasteless mixture of gases that surrounds the earth.

**Air break:** An inverted opening placed in the chimney of a gas furnace to prevent back pressure from outside wind from reaching the furnace flame or pilot.

**Air cleaner:** Device used for removal of airborne impurities.

**Air coil:** Coil on some types of heat pumps used either as an evaporator or a condenser.

**Air conditioner:** Device used to control temperature, humidity, cleanliness, and movement of air in conditioned space.

**Air conditioning:** Control of the temperature, humidity, air movement, and cleaning of air in a confined space.

**Air-cooled condenser:** Heat of compression is transferred from condensing coils to surrounding air. This may be done either by convection or by a fan or blower.

**Air cooler:** Mechanism designed to lower temperature of air passing through it.

**Air core solenoid:** A solenoid that has a hollow core instead of a solid core.

**Air curtain:** A system in which a blower is activated when a door is opened to blow across the open area, preventing the transfer of air between outdoors and indoors.

**Air defrosting:** Evaporator defrosting that occurs as evaporator warms when the compressor is not running.

**Air diffuser:** Air distribution outlet or grille designed to direct airflow into desired patterns.

**Air gap:** The space between magnetic poles or between rotating and stationary assemblies in a motor or generator.

**Air handler:** Fan-blower, heat transfer coil, filter, and housing parts of a system.

**Airtight:** Sealed to prevent the passage of gas.

**Air-to-air heat pump:** A heat pump that uses outdoor air, as opposed to a geothermal heat pump.

**Air vent:** Valve used to remove air from the highest point of a coil or piping assembly.

**Air washer:** Device used to clean air while changing its humidity.

**Alcohol brine:** Water and alcohol solution that remains a liquid below 32F (0).

**Algae:** Low form of plant life, found floating free in water.

**Allen-type screw:** Screw with recessed, hex-shaped head.

**Allen wrench:** Hexagonal (6-point) tip used to fit socket head screws or setscrews.

**Alternating current (ac):** Electric current in which direction of flow alternates (reverses). In 60-cycle (Hertz) current, direction of flow reverses every 1/20th of a second.

**Altitude:** The height at a point above a reference level, sea level, or the earth's surface.

**Ambient compensator:** An electronic device that provides a small amount of heat to the refrigeration compartment to ensure that the machinery continues to cycle when ambient temperatures are low.

**Ambient temperature:** Temperature of a fluid (usually air) that surrounds an object.

**American Standard Pipe Thread:** Type of screw thread commonly used on pipe and fittings to ensure a tight seal.

**Ammeter:** Electric meter used to measure current.

**Ammonia:** Chemical combination of nitrogen and hydrogen (NH<sub>3</sub>). Ammonia refrigerant is identified as R-117.

**Amperage:** Electron or current flow past a given point in a circuit.

**Ampere:** Unit of electric current equivalent to flow of one coulomb per second.

**Ampere-turns:** Term used to measure magnetic force. Represents product of amperes times number to turns in coil of electromagnet.

**Amplifier:** Electrical device that increases electron flow in a circuit.

**Anemometer:** Instrument for measuring the rate of airflow.

**Angle valve:** Type of globe valve design, having pipe openings at right angles to each other. Usually, one opening is in the horizontal plane and one is in the vertical plane.

**Annealing:** Cooling a metal slowly from a high temperature to make the metal soft.

**Annual Fuel Utilization Efficiency (AFUE) rating:** A rating system for furnaces that compares energy input and energy output.

**Anode:** Positive terminal of electrolytic cell.

**Anticipator:** A device used with a start-stop control to reduce the control differential.

**Arcing:** Band of sparks formed when an electrical discharge from a conductor jumps to another conductor.

**ARI:** Air-Conditioning and Refrigeration Institute.

**Armature:** Part of an electric motor, generator, or other device moved by magnetism.

**Articulated connection rods:** Short connecting rods in a compressor.

**ASA:** Formerly, abbreviation for American Standards Association. Now known as American National Standards Institute (ANSI).

**Asbestos:** Strong, fire-resistant, cancer-causing silicate.

**ASME Code:** Standard specifications issued by the American Society of Mechanical Engineers Boiler for the construction of boilers and pressure vessels.

**Aspect ratio:** Ratio of length to width of a rectangular air grille or duct.

**Aspirating psychrometer:** Device that draws a sample of air through it to measure the humidity.

**Aspiration:** Movement produced by suction.

**ASTM Standards:** Standards issued by the American Society for Testing and Materials.

**Atmospheric Dust Spot Efficiency:** Measurement of a device's ability to remove atmospheric air from test air.

**Atmospheric pressure:** Pressure that gases in air exert upon the earth (14.7 psi).

**Atom:** Smallest unit of an element that can exist alone or in combination.

**Atomize:** Process of changing a liquid to minute particles or a fine spray.

**Auger:** Device with a helical shaft that, when rotated, can be used to move material.

**Automatic control:** Valve action reached through self-operated or self-actuated means, not requiring manual adjustment.

**Automatic defrost:** System of removing ice and frost from evaporators automatically.

**Automatic expansion valve (AEV):** Pressure-controlled valve that reduces high-pressure liquid refrigerant and low-pressure refrigerant.

**Automatic ice cube maker:** Refrigerating mechanism designed to automatically produce ice cubes in quantities.

**Autotransformer:** Transformer in which both primary and secondary coils have turns in common. Step-up or step-down of voltage is accomplished by taps on common winding.

**Auxiliary evaporator:** Small evaporator consisting of coils of tinned tubing below the shelves in a display case.

**Azeotropic mixture:** A liquid mixture having constant maximum and minimum boiling points. Refrigerants comprising the azeotropic mixture do not combine chemically, yet the mixture provides constant characteristics.

**Back pressure:** Pressure in low side of refrigerating systems; also called suction pressure or low-side pressure.

**Back seating:** Fluid opening/closing such as a gauge opening; to seat the joint where the valve stem goes through the valve body.

**Bacteria:** A form of unicellular microorganisms.

**Baffle:** Plate or vane used to direct movement of a fluid within a confined area.

**Balance point:** The point at which the heating capacity of a heat pumps equal to the heat losses of the structure it is heating.

**Ball valve:** A check valve that uses a ball to permit flow in one direction only.

**Bar:** Unit of pressure. One bar equals .9869 atmosphere (approximately one atmosphere, 14.51 psi).

**Barometer:** Instrument for measuring atmospheric pressure.

**Bath:** Liquid solution used for cleaning, plating, or maintaining a specified temperature.

**Battery:** Electricity-producing cells that use interaction of metals and chemicals to create electrical current flow.

**Baudelot cooler:** Heat exchanger in which water flows by gravity over the outside of tubes or plates.

**Bearing:** Low-friction device for supporting and aligning a moving part.

**Bellows:** Corrugated cylindrical container that moves as pressures change, or provides a seal during movement of parts.

**Bellows seal:** Method of sealing the valve stem. The ends of the sealing material are fastened to the bonnet and to the stem. Seal expands and contracts with the stem level.

**Belt:** A rubber-like, continuous loop placed between two or more pulleys to transfer rotary motion.

**Bending spring:** Coil spring that is placed on inside or outside of tubing to keep it from collapsing while bending.

**Bernoulli's Theorem:** In stream of liquid, the sum of elevation head, pressure head, and velocity remains constant along any line of flow, provided no work is done by or upon liquid on course of its flow; decreases in proportion to energy lost in flow.

**Bimetal strip:** Temperature regulating or indicating device that works on the principle that two dissimilar metals with unequal expansion rates, welded together, will bend as temperatures change.

**Bioaerosals:** Airborne microorganisms derived from viruses, bacteria, fungi, protozoa, mites, and pollen.

**Blast freezer:** Low-temperature evaporator that uses a fan to force air over that evaporator surface.

**Bleeding:** Slowly reducing the pressure of liquid or gas from a system by opening a valve slightly.

**Bleed valve:** Valve with small opening inside that permits a minimum fluid flow when valve is closed.

**Blend:** A mixture of various refrigerants.

**Blown:** With respect to fuses, a fuse that has been melted, breaking the electric circuit and preventing overload.

**Boiler:** Closed container in which a liquid may be heated and vaporized.

**Boiler, high-pressure:** A boiler operating with water temperature and water pressure above low-pressure boiler ratings.

**Boiler horsepower:** Seldom-used term equivalent to a heating capacity of 33,475 Btu/hr. (9804 watts).

**Boiler, low-pressure:** A boiler operating with up to 250F (121C) water temperature and 160 psi water pressure or less.

**Boiling point:** The temperature of a liquid at which it changes to a gas under a pressure of 14.7 psia (101.3 kPa).

**Boiling temperature:** Temperature at which a fluid changes form a liquid to a gas.

**Bonnet:** In a furnace, the sheet metal chamber where heat collects before being distributed.

**Booster:** Common term applied to the use of a compressor as the first stage in a cascade refrigerating system.

**Bore:** Diameter of a hole. Inside diameter of a cylinder.

**Bourdon tube:** Thin-walled tube of elastic metal flattened and bent into a circular shape that tends to straighten as inside pressure is increased. Used in pressure gauges.

**Boyle's Law:** Law of Physics: The volume and pressure of a gas vary inversely if the temperature remains the same. Example: If the pressure is doubled on a quantity of gas, its volume is reduced one-half. If the volume is doubled, gas has its pressure reduced by one-half.

**Brazing:** Method of joining metals with nonferrous (without iron) filler using heat between 800F (427C) and the melting point of base metals.

**Breaker strip:** Strip of wood or plastic used to cover the joint between the outside case and inside liner of the refrigerator.

**Breeching:** Space in hot water or steam boilers between the end of the tubing and the jacket.

**Brine:** Water saturated with a chemical such as salt.

**British thermal unit (Btu):** Quantity of heat required to raise temperature of one pound of water one degree Fahrenheit.

**Building Related Illness (BRI):** An illness caused by an airborne virus in a building.

**Built-up terminal:** Electrical terminal attached to a compressor dome.

**Bulb, sensitive:** Part of sealed fluid device that reacts to temperature. Used to measure temperature or to control a mechanism.

**Bunker:** Space where ice or cooling element is placed in commercial installations.

**Burner:** Device in which burning of fuel takes place.

**Butane:** Liquid hydrocarbon (C<sub>4</sub>H<sub>10</sub>) commonly used as fuel for heating purposes.

**Bypass:** Passage around a regular passage.

**Bypass cycle:** A cycle using a bypass line with either hot gas or liquid used to defrost an evaporator or for low pressure control.

**Cabinet:** The housing of a refrigerator.

**Cabinet volume:** The volume of the interior cabinet dimensions.

**Calcium sulfate:** Chemical compound (CaSO<sub>4</sub>) that is used as a drying agent or desiccant in liquid line driers.

**Calibrate:** Position indicators to determine accurate measurements.

**Callback:** A service call to repair a problem that had been improperly repaired.

**Calorie:** Two different calorie units are used by scientists. The calorie used by medical science is a small heat unit. It equals the heat

required to raise the temperature of one gram of water one degree Celsius (C). The calorie used by engineering science is a larger heat unit (see Kilocalories).

**Calorimeter:** Device used to measure quantities of heat or determine specific heats.

**Cam:** Oblong mechanical component that produces a reciprocating motion when rotated.

**Capacitance (C):** Property of a nonconductor (condenser or capacitor) that permits storage of electrical energy in an electrostatic field.

**Capacitive reactance:** The opposition, or resistance, to an alternating current as a result of capacitance; expressed in ohms.

**Capacitor:** Electrical storage device used to start and run circuits on many electric motors.

**Capacitor-start motor:** A motor with a capacitor in the starting circuit.

**Capacity:** Refrigeration rating system. Usually measured in Btu per hour or watts.

**Capillary tube system:** A refrigerant control system in which pressure difference is maintained through the use of a thin capillary tube.

**Carbon dioxide (CO<sub>2</sub>):** Compound of carbon and oxygen that is sometimes used as a refrigerant. Refrigerant number is R-744.

**Carbon dioxide indicator:** Instrument used to indicate the percentage of carbon dioxide in stack gases.

**Carbon filter:** Air filter using activated carbon as an air cleansing agent.

**Carbon monoxide (CO):** Colorless, odorless, and poisonous gas produced when carbon fuels are burned with too little air.

**Carbon tetrachloride (CCl<sub>4</sub>):** Colorless, nonflammable, and toxic liquid used as a solvent.

**Carrene:** Refrigerant in Group A1 (R-11). Chemical combination of carbon, chlorine, and fluorine.

**Cascade systems:** Arrangement in which two or more refrigerating systems are used in series; uses evaporator of one machine to cool condenser of other machine. Produces ultra-low temperatures.

**Cathode:** Negative terminal of an electrical device. Electrons leave at this terminal.

**Cavitation:** Localized gaseous condition within a liquid stream.

**Celsius temperature scale:** Temperature scale used in metric system. Freezing point of is 0C, boiling point is 100C.

**Centigrade temperature scale:** See Celsius temperature scale.

**Centimeter:** Metric unit of linear measurement, equal to 0.3937.

**Central air conditioning:** A system capable of providing heating, cooling, humidifying, and dehumidifying.

**Centralized computer control:** Energy control device centrally located, that makes control decisions based on operating data, programmed information, and stored data. Can be used to optimize energy consumption of many devices throughout a building.

**Central station:** Central location of condensing unit with either wet or air-cooled condenser. Evaporator located as needed and connected to the central condensing unit.

**Centrifugal compressor:** Pump that compresses gaseous refrigerants by centrifugal force.

**Centrifugal force:** Force that pushes a rotating object away from the center of its rotation.

**Centrifugal switch:** An electrical switch that is opened and closed by centrifugal force.

**Ceramic ignitor:** Electric ignition system used in a water glycol solution, forced-air furnace. Electrically heated to create ignition of the gas-air mixture in combustion chamber.

**Change of state:** Condition in which a substance changes from one state (solid, liquid, or gas) to another.

**Charge:** Amount of refrigerant placed in a refrigerating unit.

**Charging board:** Specially designed panel or cabinet fitted with gauges, valves, and refrigerant cylinders used for charging refrigerant and oil into refrigerating mechanisms.

**Charles' Law:** A law stating, that at a constant pressure, mass and temperature of a gas are inversely proportional.

**Check valve:** Device which permits fluid flow in only one direction.

**Chemical refrigeration:** System of cooling using a disposable refrigerant. Also called expendable refrigerant system.

**Chiller:** Air conditioning system that circulates chilled water to various cooling coils in an installation.

**Chill factor:** Calculated number, based on temperature and wind velocity, that indicates chill effect.

**Chimney:** Vertical shaft enclosing one or more flues for carrying flue gases to the outside atmosphere.

**Chimney connector:** Conduit (pipe) connecting the furnace to the vertical flue.

**Chimney effect:** Tendency of gas to rise when heated.

**Chimney flue:** Flue gas passageway in a chimney.

**Chlorofluorocarbons (CFCs):** Refrigerants that are composed of chlorine, fluorine, and a hydrocarbon (methane). CFCs deplete the ozone layer.

**Choke tube:** Throttling device used to maintain correct pressure difference between high-side and low-side in refrigerating mechanism. Capillary tubes are sometimes called choke tubes.

**Circuit:** Tubing, piping, or electrical wire installation that permits flow to and from an energy source.

**Circuit breaker:** Safety device that automatically opens an electrical circuit if overloaded.

**Circuit, parallel:** Arrangement of electrical devices in which the current divides and travels through two or more paths and then returns through a common path.

**Circuit, pilot:** Secondary circuit used to control a main circuit or a device in the main circuit.

**Circuit, series:** Electrical path (circuit) in which electricity to operate a second device must pass through first; Current flow travels, in turn, through all devices connected together.

**Clean room:** A room in which special efforts are made to eliminate dust and other contaminants.

**Clearance space:** Small space in a cylinder from which compressed gas is not completely expelled. For effective operation, compressors are designed to have as small a clearance space as possible.

**Climate:** The average weather conditions for a region.

**Climate control:** Devices used to maintain an ideal climate in a space.

**Closed circuit:** Electrical circuit in which electrons are flowing.

**Clutch, magnetic:** Clutch built into automobile compressor flywheel, operated magnetically, which allows a pulley to revolve without

driving the compressor when refrigeration is not required.

**Code installation:** Refrigeration or air conditioning installation that conforms to the applicable codes.

**Coefficient of conductivity:** Measure of the relative rate at which different materials conduct heat. A good conductor of heat has a high coefficient of conductivity.

**Coefficient of expansion:** A measure of the change in size of a material as the temperature changes.

**Coefficient of performance (COP):** Ratio of the work performed to the energy used.

**Cogeneration:** Using waste energy as a primary heat source. Example: The use of waste heat from an electrical energy generation system to heat a building.

**Cold:** The absence of heat; a temperature considerably below normal.

**Cold ban:** A plastic trim piece used to reduce heat flow between the outer and inner shell of a refrigerator door.

**Cold junction:** That part of a thermoelectric system which absorbs heat as the system operates.

**Cold wall:** Refrigerator construction that has the inner lining of the refrigerator serving as the cooling surface.

**Collector:** Semiconductor section of a transistor, connected to the same polarity as the base.

**Colloids:** Miniature cells peculiar to meats, fish, and poultry which, if disrupted, cause food to become rancid. Low temperatures minimize this action.

**Combined Annual Efficiency (CAE) ratio:** Rating system used for combined heating systems, which heat both air and water.

**Combustible liquids:** Liquid having a flash point above 140F (60C); known as Class 3 liquids.

**Combustion:** The process of igniting and burning.

**Comfort chart:** Chart used in air conditioning to show the dry bulb temperature, humidity, and air movement for human comfort.

**Comfort cooler:** System used to reduce the Temperature in the living space in homes. These systems are not complete air conditioners as they do not provide complete control of heating, humidifying, dehumidification, and air circulation.

**Comfort zone:** Area on psychrometric chart that shows conditions of temperature, humidity, and sometimes air movement in which most people are comfortable.

**Commercial system:** A refrigeration or air conditioning unit that is used in commercial buildings.

**Commutator:** The part of the rotor in an electric motor which conveys electric current to the rotor windings.

**Complaint:** Statement of dissatisfaction with regards to a service.

**Compound gauge:** Instrument for measuring pressure.

**Compound pump:** A rotary pump that has two rotors in series.

**Compound refrigerating systems:** A system that has several compressors or compressor cylinders in series. The system is used to pump low-pressure vapors to condensing pressures.

**Compound wound:** Winding used in motors that run on dc current.

**Compression:** Term used to denote increase of pressure on a fluid by using mechanical energy.

**Compression chiller:** A chiller that achieves the required pressure difference through the use of a compressor.

**Compression gauge:** Instrument used to measure positive pressures (pressures above atmospheric pressures) only. Gauge dial usually runs from 0 to 300 psig (101.3-2200kPa).

**Compression ratio:** Ratio of the volume of the clearance space to the total volume of the cylinder. In refrigeration it is also used as the ratio of the absolute low-side pressure to the absolute high-side pressure.

**Compression ring:** Upper piston ring.

**Compressor:** Pump of a refrigerating mechanism that draws a low-pressure on cooling side of refrigerant cycle and squeezes or compresses the gas into the high-pressure or condensing side of the cycle.

**Compressor, external drive:** See Compressor, open type.

**Compressor, hermetic:** A compressor in which the driving motor is sealed in the same dome or housing as the compressor.

**Compressor, multiple-stage:** A compressor having two or more compressive steps. Discharge from each step is the intake pressure of the next in series.

**Compressor, open:** A compressor in which the crankshaft extends through the crankcase and is driven by an outside motor. Commonly called an external drive compressor.

**Compressor, reciprocating:** A compressor that uses a piston and cylinder mechanism to provide pumping action.

**Compressor, rotary:** Compressor that uses vanes, eccentric mechanisms, or other rotating devices to provide pumping action.

**Compressor seal:** Leakproof seal between crankshaft and compressor body in open compressors.

**Compressor, single-stage:** Compressor having only one compressive step between low-side pressure and high-side pressure.

**Computer:** Series of electrical components which accepts inputs from an operator and controls outputs.

**Computer languages:** Specific working or codes, such a BASIC, FORTRAN, COBOL, and C, which direct a computer to accept and store information and control outputs.

**Condensate:** A fluid formed when a gas is cooled to a liquid state.

**Condensate pump:** Device to remove water condensate that collects beneath an evaporator.

**Condensation:** Liquid or droplets that form when a gas or vapor is cooled below its dew point.

**Condense:** Action of changing a gas or vapor to a liquid.

**Condenser:** The part of the refrigeration mechanism which receives hot, high-pressure refrigerant gas from compressor and cools gaseous refrigerant until it returns to its liquid state.

**Condenser, air-cooled:** Heat exchanger that transfers heat to surrounding air.

**Condenser comb:** Comb-like device, metal or plastic, used to straighten the metal fins on condensers and evaporators.

**Condenser fan:** Forced-air device used to move air through air-cooled condenser.

**Condenser, water-cooled:** Heat exchanger designed to transfer heat form hot gaseous refrigerant to water.

**Condensing furnace:** High-efficiency, gas forced-air furnace that extracts the latent heat lost in conventional gas forced-air furnaces.

**Condensing pressure:** Pressure inside a condenser at which refrigerant vapor gives up its latent heat of vaporization and becomes a liquid. This varies with the temperature.

**Condensing temperature:** Temperature inside a condenser at which refrigerant vapor gives up its latent heat of vaporization and becomes a liquid. This varies with the pressure.

**Condensing unit:** The part of the refrigerating mechanism that pumps vaporized refrigerant from the evaporator, compresses it, liquefies it in the condenser, and returns it to the refrigerant control.

**Condensing unit service valves:** Shutoff valves mounted on the condensing unit to enable service technicians to install and service the unit.

**Conduction:** The flow of heat between substances by molecular vibration.

**Conductivity:** Ability of a substance to transmit heat or electricity.

**Conductor:** Substance or body capable of transmitting electricity or heat.

**Console:** A total unit or system of controls located in one area and enclosed. A window air conditioner is a console air conditioner.

**Constant:** Remains the same; unchanging.

**Constrictor:** Tube or orifice used to restrict the flow of gas or a liquid.

**Contaminant:** Substance such as dirt, moisture, or other matter foreign to refrigerant or refrigerant oil system.

**Continuous absorption system:** System that has a continuous flow of energy input.

**Continuous operation:** In constant use.

**Contractual agreement:** A written arrangement, enforceable by law, that is entered into between two parties.

**Control:** Automatic or manual device used to stop, start, or regulate the flow of gas, liquid, or electricity.

**Control, compressor:** See Motor control.

**Control, defrosting:** Device used to automatically defrost the evaporator. It may operate by means of a clock, door cycling mechanism, or during the off cycle.

**Control, low-pressure:** Cycling device connected to the low-pressure side of system.

**Control module:** An electrical component used in automotive air conditioning systems to receive sensor input and regulate climate control functions. Also referred to as a microcomputer.

**Control, motor:** Temperature or pressure-operated device used to control running of motor.

**Control point:** The condition being maintained by a proportional control.

**Control, pressure motor:** High- or low-pressure control connected into the electrical circuit and used to start and stop motor. It is activated by demand for refrigeration or for safety.

**Control, refrigerant:** Device used to regulate flow of liquid refrigerant into evaporator. Can be a capillary tube, expansion valve, or high-side and low-side float valves.

**Control, temperature:** Temperature-operated thermostatic device that automatically opens or closes a circuit.

**Control system:** All of the components required for the automatic control of a process variable.

**Control valve:** Valve that regulates the flow or pressure of a medium that affects a controlled process. Control valves are operated by remote signals from independent devices using any of a number of control media such as pneumatic, electric, or electrohydraulic.

**Controller:** A group of controls and circuits used to accurately and automatically operate a device.

**Convection:** Transfer of heat by means of movement or flow of a fluid or gas.

**Convection, forced:** Transfer of heat resulting from forced movement of liquid or gas by means of a fan or pump.

**Convection, natural:** Circulation of a gas or liquid due to difference in density resulting from temperature differences.

**Cooler:** Heat exchanger that removes heat from a substance.

**Cooling coil:** Coils cooled by a fluid that does not evaporate (such as brine). The evaporator is sometimes incorrectly referred to as a cooling coil.

**Cooling tower:** Device that cools by water evaporation in air. Water is cooled to wet bulb temperature of air.

**Copper plating:** Abnormal condition developing in some units in which copper is electrolytically deposited on compressor surfaces.

**Core, air:** Coil of wire not having a metal core.

**Core, magnetic:** Magnetic center of a magnetic field.

**Core valves:** Schrader valve used to gain access to a hermetic unit.

**Corrosion:** Deterioration of materials from chemical action.

**Coulomb:** The quantity of electricity transferred by an electric current of one ampere in one second.

**Counter emf:** Tendency for reverse electrical flow as magnetic field changes in an induction coil.

**Counterflow:** Flow in opposite direction.

**Couplings:** Mechanical device joining refrigerant lines.  
"Cracking" a valve: Opening a valve a small amount.

**Crankthrow:** Distance between centerline of main bearing journal and centerline of the crankpin or eccentric.

**Crankshaft seal:** Leakproof joint between crankshaft and compressor body.

**Crisper:** Drawer or compartment in refrigerator designed to provide high humidity along with low temperature to keep vegetables--especially leafy vegetables--cold and crisp.

**Critical pressure:** Pressure at which vapor and liquid have same properties.

**Critical temperature:** Temperature at which vapor and liquid have same properties.

**Cross-charged:** Sealed container of two fluids that, together, create a desired pressure-temperature curve.

**Cryogenic Food Freezing:** See Fast food freezing.

**Cryogenic fluid:** A substance that exists as a liquid or gas at temperatures of -250F (-157C) or lower.

**Cryogenics:** Refrigeration that deals with producing temperatures of -250F (-157C) and lower.

**Current:** Transfer of electrical energy in a conductor by means of electrons changing position.

**Current-limiting fuse:** A fuse that protects an electrical circuit by limiting the amount of current that flows through it, but does not "blow".

**Current relay:** Device that opens or closes a circuit. It is made to act by a change of current flow in that circuit.

**Customer relations:** The evaluation of the technician by the customer as a result of the technician's job performance and attitudes.

**Cut-in:** The temperature of pressure at which the control circuit closes.

**Cut-out:** The temperature or pressure at which the control circuit opens.

**Cycle:** A series of events or operations that repeat.

**Cylinder:** 1 - Device that converts fluid power into linear mechanical force and motion. This usually consists of movable elements such as a piston and piston rod, plunger or ram, operating within a cylindrical bore. 2 - Closed container for fluids.

**Cylinder, refrigerant:** Cylinder in which refrigerant is stored and dispensed. Color code painted on cylinder indicated kind of refrigerant.

**Cylinder head:** Plate or cap that encloses compression end of compressor cylinder.

**Cylindrical commutator:** Commutator with contact surfaces parallel to the rotor shaft.

**Dalton's Law:** Vapor pressure created in a container by a mixture of gases is equal to sum of individual vapor pressures of the gases contained in mixture.

**Damper:** Device for controlling airflow.

**Dasher:** Stirring mechanism in a dispensing freezer.

**Deaeration:** Act of separating air from a substance.

**Decibel (dB):** Unit used for measuring relative loudness of sounds.

**Deck (coil deck):** Insulated horizontal partition between refrigerated space and evaporator space.

**Defrost cycle:** Refrigerating cycle in which evaporator frost and ice accumulation is melted.

**Defrost timer:** Device, connected into electrical circuit, that shuts unit off long enough to permit ice and frost accumulation on evaporator to melt.

**Defrosting:** Process of removing frost accumulation from evaporators.

**Defrosting evaporator:** Evaporator operating at such temperatures that ice and frost on surface melts during the Off cycle.

**Degreasing:** Removal of oil or grease from refrigerator parts with a solution or solvent.

**Degree-day:** Unit that represents on degree of difference from inside temperature and the average outdoor temperature; often used in estimating fuel requirements for a building.

**Dehumidifier:** Device used to remove moisture from air.

**Dehydrated oil:** Lubricant that has had most of its water content removed (dry oil).

**Dehydrator:** See Drier.

**Dehydrator-receiver:** Small tank that serves as liquid refrigerant reservoir and also contains a desiccant to remove moisture. Used on most automobile air conditioning installations.

**De-ice control:** Device for operating a refrigerating system in such a way as to provide melting of the accumulated ice and frost.

**Delta transformer:** Three-phase electrical transformer that has ends of each of three windings electrically connected to form a triangle.

**Demand meter:** Instrument that measures the kilowatt-hour usage of a circuit or group of circuits.

**Density:** Closeness of particles within a given substance. The weight per unit volume.

**Deodorizer:** Device that absorbs or adsorbs various odors, usually by principle of absorption. Activated charcoal is commonly used.

**Department of Transportation (DOT):** A governmental unit that regulates the transportation of refrigerants from one location to another.

**Desert bag:** A bag used to keep water cool in the desert. The fabric is not waterproof, so water leaks through and evaporates, cooling the water inside the bag.

**Desiccant:** Substance used to collect and hold moisture. A drying agent. Common desiccants are activated alumina and silica gel.

**Design pressure:** Highest pressure expected during operation. Sometimes calculated as operating pressure plus a safety allowance.

**Detector, leak:** Device used to detect and locate refrigerant leaks.

**Dew:** Condensed atmospheric moisture deposited in small drops on cool surfaces.

**Dew point:** Temperature at which vapor (at 100% humidity) begins to condense and deposit as a liquid.

**Diac:** A two-lead alternating current semiconductor that allows current to flow in both directions at a preset voltage.

**Diagnostics:** The process of identifying or determining the nature and circumstances of an existing condition.

**Diaphragm:** Flexible material usually made of thin metal, rubber, or plastic.

**Dichlorodifluoromethane:** Refrigerant commonly known as R-12.

**Die casting (dc):** Process of molding low-melting-temperature metals in accurately shaped metal molds.

**Dielectric fluid:** Fluid with high electrical resistance.

**Differential:** The difference between cut-in and cut-out temperature or pressure of a control.

**Diffuser:** Attachments for duct openings that distribute the air in wide flow patterns.

**Diode:** two-element electron tube that will allow more electron flow in one direction in a circuit than in the other direction; tube that serves as a rectifier.

**Direct current (dc):** Electron flow that moves continuously in one direction in a circuit.

**Direct Digital Control (DDC):** Use of digital computer to perform required automatic control operations in a total energy management system.

**Direct expansion evaporator:** Evaporator using either an automatic expansion valve (AEV) or a thermostatic expansion valve (TEV) refrigerant control.

**Direct-spark ignition:** A furnace control in which a spark is used to ignite the gas-air mixture. There is no constantly-burning pilot light.

**Dispensing freezers:** A freezer with built-in dispensing equipment, used for serving ice cream and frozen drinks.

**Displacement:** Volume obtained by multiplying the area of the cylinder bore by the length of the piston stroke.

**Distilling apparatus:** Fluid-reclaiming device used to reclaim used refrigerants. Reclaiming is usually done by vaporizing and then condensing refrigerant.

**Distribution controls:** Systems that help evenly and efficiently transfer the heating or cooling medium to the area where it is needed.

**District heating and cooling:** Use of a central utility system designed to provide heating and cooling to large residential and industrial areas.

**Dome-hat:** Sealed metal container for the motor compressor of a refrigerating unit.

**Door heater:** A heater located around the door opening of a freezer, used to prevent ice buildup from freezing the door closed.

**Double-duty case:** Commercial refrigerator in which a part of space is for refrigerated storage and part is equipped with glass windows for display purposes.

**Double-thickness flare:** Copper, aluminum, or steel tubing end that has been formed into two-wall thickness, 37 to 45 bell mouth or flare.

**Dowel pin:** Accurately dimensioned pin pressed into one assembly part and slipped into another assembly part to ensure accurate alignment.

**Downflow furnace:** A furnace in which return air enters through the top and is pulled down through the heat exchanger. Also called counterflow furnace.

**Draft gauge:** Instrument used to measure air movement by measuring air pressure differences.

**Draft indicator:** Instrument used to indicate or measure chimney draft or combustion gas movement. Draft is measured in units of 1" of water column.

**Draft regulator:** Device that maintains a desired draft in a combustion-heated appliance by automatically controlling the chimney draft to the desired value.

**Drier:** Substance or device used to remove moisture from a refrigeration system.

**Drip pan:** Pan-shaped panel or trough used to collect condensate from evaporator.

**Dry bulb:** An instrument with a sensitive element to measure ambient air temperature.

**Dry bulb temperature:** Air temperature as indicated by an ordinary thermometer.

**Dry capacitor:** See Electrolytic capacitor.

**Dry cell battery:** Electrical device used to provide dc electricity, having no liquid in the cells.

**Dry ice:** Refrigerating substance made of solid carbon dioxide, which changes directly from a solid to a gas (sublimates). its subliming temperature is -109F (-78C).

**Dry system:** Refrigeration system that has the evaporator liquid refrigerant mainly in the atomized or droplet condition.

**Dual-pressure regulator:** A combination of a high-pressure and low-pressure regulator.

**Duct:** Tube or channel through which air is conveyed or moved.

**Duct sweeper:** A tool used to remove dirt and debris from ducts.

**Dynamometer:** Device for measuring power output or power input of a mechanism.

**EPA:** See Environmental Protection Agency.

**Eccentric:** Circle or disk mounted off center on a shaft.

**Economizer:** A mechanism that removes flash gas from the evaporator.

**Eddy currents:** Induced currents flowing in a core.

**EER:** See Energy Efficiency Ratio.

**Effective area:** Actual flow area of an air inlet or outlet. Gross area minus area of vanes or grille bars.

**Effective latent heat:** The amount of heat absorbed from the cabinet and evaporator.

**Effectiveness (absorption systems):** Method of evaluating absorption cooling systems, in which the cooling effect is divided by the work equivalent to the heat supplied to the absorber.

**Effective temperature:** Overall effect of air temperature, humidity, and air movement on human comfort.

**Efficiency:** Output of a device, system, or activity, divided by the input necessary to create the output. In a compressor the efficiency would be the work output, as measured by pressure change, divided by the energy input (usually electrical).

**Ejector:** A device that uses high fluid velocity, such as a venturi, to create low pressure or vacuum at its throat to draw in fluid from another source.

**Electric defrosting:** Use of electric resistance heating coils to melt ice and frost off evaporators during defrosting.

**Electrical circuits:** The electrical wiring that permits flow from the energy source, through the circuit, and back to the energy source.

**Electrical resistance:** A resistance to (working against) the movement of electrons (flow of electricity).

**Electric heating:** System in which heat from electrical resistance units is used to heat a building.

**Electricity:** Electric current or power.

**Electric water valve:** Solenoid (electrically operated) valve used to turn water flow on and off.

**Electrodeposition:** Process in which metallic particles are applied to another metal surface through the use of an electric current.

**Electrolysis:** A chemical change in a substance caused by movement of electricity.

**Electrolytic condenser-capacitor:** Plate or surface capable of storing small electrical charges.

**Electromagnet:** Coil of wire wound around a soft iron core. When electric current flows through the wire, the assembly becomes magnetized.

**Electromagnetic Energy:** Energy that has both electrical and magnetic characteristics.

**Electromotive Force (emf) voltage:** Electrical force that causes current (free electrons) to flow or move in an electrical circuit. Unit of measure is volts.

**Electron:** Elementary portion or particle of an atom that carries a negative charge.

**Electronic Control Diagnostics:** Trouble codes that may be referenced on an automatic climate control system to diagnose problems.

**Electronic leak Detector:** Electronic instrument that measures electronic flow across a gas gap. Electronic flow changes indicate presence of refrigerant gas molecules.

**Electronic Relay:** Electronic switch, such as a triac, that controls a power consuming device.

**Electronics:** Field of science dealing with electron devices and their uses.

**Electronic Sight Glass:** Device that sends an audible signal when the system is low on refrigerant.

**Electrostatic Air Filter:** A device that gives dust particles an electric charge. This causes particles to be attracted to a plate so they can be

removed from air.

**Embrittlement:** To become easily broken.

**End Bell:** End structure of a plate of an electric motor, which usually holds the motor bearings.

**Endothermal:** Chemical reaction in which heat is absorbed.

**End Play:** Slight movement of shaft along its center line.

**Energized:** Having current flow.

**Energy:** Actual or the potential ability to perform work.

**Energy Audit:** The process of accurately determining the current energy consumption for a given area.

**Energy Efficiency Ratio (EER):** The ratio of the rated cooling capacity divided by the amount of electrical power used.

**Energy Management Cooling System:** Controllers used in a system which optimize total energy usage in a building or residence.

**Energy Utilization Index (EUI):** A number used to compare energy usage for different areas. It is calculated by dividing the energy consumption by the square footage of the conditioned space.

**Enthalpy:** total amount of heat in one pound of substance calculated from an accepted temperature base. Temperature of 32F (0C) is accepted base for water vapor calculation. For refrigerant calculations, accepted base is -40F (-40C).

**Entropy:** Engineering calculations used to determine heat available. Measured in Btu per pound degree change for a substance.

**Environment:** The surrounding conditions.

**Environmental Protection Agency (EPA):** A governmental agency, empowered by the government to protect the environment.

**Enzyme:** Complex organic substance, originating from living cells, which speed up chemical changes in foods. Cooling slows enzyme action.

**Epoxy:** Synthetic plastic adhesive.

**Equalizer:** A device that is used to balance pressure in a system or balance the level of liquids between two containers.

**Equivalent Length:** The length of piping plus pressure losses due to bends, elbows, fixtures etc.

**Ethane (R-170):** A Refrigerant sometimes added to other refrigerants to improve oil circulation.

**EUI:** See energy utilization Index.

**Eutectic:** The unique mixture of two substances providing the lowest possible melting temperature.

**Eutectic Points:** The freezing temperature of eutectic solutions.

**Evacuation:** Removal of air (gas) and moisture from a refrigeration or an air-conditioning system.

**Evaporation:** term applied to changing of a liquid to a gas. Heat is absorbed during the process.

**Evaporative Condenser:** A device that uses an open spray or spill water to cool a condenser. Evaporation of some of the water cools the condenser water and reduces water consumption.

**Evaporative Cooling:** A cooling method practical in hot and dry climates in which hot air is blown over hot water. As some water evaporates, the remaining water is cooled, and then used to cool air.

**Evaporator:** Part of a refrigerating mechanism in which the refrigerant vaporizes and absorbs heat.

**Evaporator, Dry:** Evaporator in which the refrigerant is in the droplet form.

**Evaporator, Flooded:** Evaporator containing liquid refrigerant at all times.

**Evaporator Fan:** Fan that increases the airflow over heat exchange surface of the evaporators.

**Excelsior:** Fine curled wood shavings.

**Exfiltration:** Flow of air from the building to the outdoors.

**Exhaust Valve:** A movable port that provides an outlet for the cylinder gasses in a compressor or engine.

**Exothermic:** Chemical reaction in which heat is released.

**Expansion Joint:** Device in piping designed to allow movement of the pipe caused by thermal expansion and contraction.

**Expansion Tank:** A tank used to allow water to expand and contract with temperature changes.

**Expansion Valve:** Device in refrigerating system that reduces the pressure from the high side to the low side.

**Expandable Refrigerant System:** A system that discards the refrigerant after it has evaporated.

**External Drive:** Term used to indicate a compressor driven directly from the shaft or by using an external motor. Compressor and the motor are serviceable separately.

**External Equalizer:** Tube connected to the low-pressure side of a thermostatic expansion valve diaphragm and to the exit end of the evaporator.

**Extrinsic Semiconductor:** An intrinsic semiconductor with impurities added; very sensitive to electrical forces.

**Fahrenheit Scale:** Temperature scale with, under standard atmospheric pressure, a water boiling point of 212F and freezing point of 32F.

**Fail-Safe Control:** A device that opens a circuit when a sensing element loses its pressure.

**Fan:** Radial or axial flow device used for moving or producing flow of gases.

**Farad:** Unit of electrical capacity. Capacity of a condenser which, when charged with one coulomb of electricity, gives a difference of potential of one volt.

**Faraday Experiment:** Silver chloride absorbs ammonia when cool and releases it when heated. This is basis on which some absorption refrigerators operate.

**Fast-acting fuse:** A fuse that blows immediately when the rated load is reached.

**Fast Food Freezing:** Method that uses liquid nitrogen or carbon dioxide to turn fresh food into long lasting frozen food. It is often referred to as Cryogenic Food Freezing.

**Featheredging:** Sanding a finish in a way that a level surface recesses evenly to a depressed point.

**Feedback:** Information on current operation of a system or device used by the control system to modify future operation.

**Feedback control system:** Control system that is constantly correcting the condition. Also called a "closed loop system."

**Female thread:** The internal thread on fittings, valves, machine bodies, etc.

**Fiberglass:** A composition of material consisting of glass fibers in resin.

**Field pole:** Part of the motor stator that concentrates the magnetic field of field winding.

**Fill (cooling tower):** Material in a cooling tower over which water flows.

**Filter:** Device for removing small foreign particles from a fluid.

**Firepot:** Refractory-lined combustion chamber.

**Flammability:** Tendency to ignite.

**Flammable liquids:** Liquids having a flash point below 140°F (60°C) and a vapor pressure not exceeding 40 psia (276 kPa) at 100°F (38°C).

**Flapper valve:** Thin metal valve used in refrigeration compressors that allows gaseous refrigerants to flow in only one direction.

**Flare:** An enlargement at the end of a piece of flexible tubing by which the tubing is connected to a fitting or another piece of tubing. This enlargement is made at about a 45° angle.

Fittings grip it firmly to make the joint leakproof and strong.

**Flare Nut:** Fitting used to clamp tubing flare against another fitting.

**Flash gas:** Instantaneous evaporation of some liquid refrigerant in evaporator, which cools the remaining liquid refrigerant to the desired evaporation temperature

**Flash point:** Temperature at which flammable liquid will give off sufficient vapor to support a flash flame but will not support continuous combustion.

**Flash weld:** Resistance weld in which mating parts are brought together under considerable pressure while a heavy electrical current is passed through the joint to be welded.

**Flexible Duct:** A duct that can be routed around obstacles by bending it gradually.

**Flexible Lines:** Lines that provide for easy bending.

**Float Valve:** Type of valve that is operated by a sphere or pan that floats on a liquid surface.

**Flooded system:** Type of refrigerating system in which the liquid refrigerant fills most of the evaporator at all times.

**Flooded system, High-Side float:** Refrigeration system that has a float operated by the level of the high-side liquid refrigerant.

**Flooded system, Low-Side float:** Refrigerating system that has a low-side float refrigerant control.

**Flow Check Piston:** Piston assembly, with an orifice in the center, that can operate as an expansion valve.

**Flow meter:** Instrument used to measure velocity or volume of fluid movement.

**Flue:** Gas or air passage that usually depends on natural convection to cause the combustion gases to flow through it. Forced convection may sometimes be used.

**Fluid:** Substance in either a liquid or gaseous state.

**Fluorescent:** Capable of exhibiting fluorescence, the emission of electromagnetic radiation of visible light.

**Flush:** Operation to remove any material or fluids from refrigeration system parts by purging them to the atmosphere using refrigerant or other fluids.

**Flux:** Substance applied to surfaces to be joined by brazing or soldering to keep oxides from forming.

**Foam leak detector:** System of Soap bubbles or special foaming liquids brushed over joints and connections to locate leaks.

**Frosting evaporator:** Refrigerating system that maintains the evaporator at frosting temperatures during all phases of cycle.

**Frozen:** 1-Water in its solid state 2-Preserved by freezing. 3-Seized (as in machine parts) due to lack of lubrication.

**Fuel Oil:** Kerosene or any hydrocarbon of) as specified by U.S. Department of Commerce Commercial Standard CS12 or ASTM D296, or the Canadian Government Specification Board, 3-GP-28, and having a flash point not less than IOOF (38°C).

**Fuel Oil Distillate:** Fuel oil produced through distillation

**Furnace:** Self-contained appliance designed to supply heated air through ducts to spaces remote from the appliance location.

**Fuse:** Electrical safety device consisting of strip of fusible metal in circuit, which melts when the circuit is overloaded.

**Fusible Plug:** Plug or fitting made with a metal of a known low-melting temperature. Used as safety device to release pressures in case of fire.

**Foaming:** Formation of a foam in an oil-refrigerant mixture due to the rapid evaporation of refrigerant dissolved in the oil. This is most likely to occur when the compressor starts and the pressure is suddenly reduced.

**Foot-Pound:** Unit of work. A foot-pound is the amount of work done in lifting one pound one foot.

**Force:** Accumulated pressure multiplied by an area.

**Forced air:** An air conditioning or heating system in which airflow is caused by a fan

**Forced-Air eating:** A heating system that uses a fan to circulate the heated air.

**Forced-Circulation Evaporators:** An evaporator that uses a fan to circulate air.

**Forced Convection;** Movement of fluid by mechanical force such as fans or pumps.

**Force-Feed Oiling:** Lubrication system which uses a pump to force oil to surface of moving parts.

**Frame:** See Stator.

**Free Wheeling:** Continued rotation of a magnetic clutch on an automotive compressor when the clutch is disengaged.

**Freeze Drying:** Process of food preservation wherein food is frozen and ice content changed rapidly into a vapor, which is then absorbed on an evaporator.

**Freezer Burn.** Condition applied to food that has not been properly wrapped in a freezer and has become hard, dry, and discolored.

**Freeze-up:** 1-Formation of ice in the refrigerant control device, which may stop the flow of refrigerant into the evaporator, 2-Frost formation on an evaporator, which may stop the airflow through the evaporator.

**Freezing:** Change of state from liquid to solid

**Freezing Point:** Temperature at which a liquid will solidify upon removal of heat. The freezing temperature for water is 32°F (0°C) at atmospheric pressure.

**Freezing Point Depression:** Temperature at which ice will form in solution of water and salt.

**Friction:** Force of resistance produced when two surfaces rub together.

**Frost Back:** Condition in which liquid refrigerant flows from the evaporator into the suction line; usually indicated by sweating or frosting of the suction line.

**Frost control, Automatic:** Control that automatically cycles refrigerating system to remove frost on evaporator.

**Frost Control, Manual:** Manual control used to change operation of refrigerating system to produce defrosting conditions.

**Frost Control, semi-automatic:** Control that starts defrost part of a cycle manually and then resume system to normal operation automatically.

**Frost-Free Refrigerator:** Refrigerated cabinet that operates with an automatic defrost during each cycle.

**Galvanic Action:** Corrosion of two unlike metals due to electrical current passing between them. The action is increased in the presence of moisture.

**Gas:** Vapor phase of a substance.

**Gas, noncondensable:** Gas that will not form into a liquid under the operating pressure-temperature conditions.

**Gas valve:** Device in a pipeline for starting, stopping, or regulating the flow of gas.

**Gasket:** Resilient (spongy) or flexible material used between mating surfaces to give a leakproof seal.

**Gauge, compound:** See Compound gauge.

**Gauge, high-pressure:** Instrument for measuring pressures in the range of 0 psig to 500 psig (101.3 kPa to 3 600 kPa).

**Gauge, low-pressure:** Instrument for measuring pressures in range of 0 psia to 50 psia (0 kPa to 350 kPa).

**Gauge, manifold:** Chamber device constructed to hold both compound and high-pressure gauges. Valves control the flow of fluids through it.

**Gauge port:** Opening or connection provided for installing a gauge.

**Gauge vacuum:** Instrument used to measure pressures, below atmospheric Pressure.

**Generator:** In an absorption system, the component in which the ammonia-water mixture is heated.

**Geothermal:** An underground or underwater temperature source used for the operation of a heating cooling system (heat pump).

**Geothermal Heat Pump:** A heat pump that uses the constant underground or underwater temperature supply.

**Glycol Water Solution forced-air furnace:** Furnace with 50% glycol and 50% distilled water solution, which passes through a tube-and-fin heat exchanger to distribute heat through the furnace duct system.

**Grain:** Unit of weight equal to 1/7000 lb., used to indicate the amount of moisture in the air.

**Gravity Air:** Air that naturally rises when heated and flows through warm air ducts. When it cools, it becomes denser (heavier) and flows down.

**Gravity flow:** The tendency of liquids to flow downward and rest at the lowest possible point.

**Gravity Heating:** Heating system in which heated air is distributed by natural rising (no fans are used for circulation).

**Grille:** Ornamental or louvered opening placed in a room at the end of an air passageway.

**Grommet:** Plastic, metal, or rubber doughnut-shaped protectors, which line holes where wires or tubing pass through panels.

**Ground, short circuit:** Fault in an electrical circuit allowing electricity to flow into the metal parts of a mechanism.

**Ground Coil:** Heat exchanger buried in the ground. May be used either as an evaporator or as a condenser.

**Ground Wire:** Electrical wire that will safely conduct electricity from a structure into the ground.

**Gun burner:** Furnace burner that atomizes oil by pushing it through an orifice, into the combustion chamber.

**Halide refrigerants:** Family of refrigerants containing halogen chemicals.

**Halide torch:** Type of torch used to safely detect halogen refrigerant leaks in system.

**Halogens:** Substance containing; fluorine, chlorine, bromine, or iodine.

**Head:** Pressure, usually expressed in feet of water, inches of mercury, or millimeters of mercury.

**Head, Static:** Pressure of fluid expressed in terms of height of column of the fluid, such as water or mercury.

**Head, Total Static:** Static head from the surface of the supply source to the free discharge surface

**Head Friction:** Head required to overcome friction of the interior surface of a conductor and between fluid particles in motion.

**Head Pressure:** Pressure that exists in condensing side of refrigerating system.

**Head Pressure Control:** Pressure-operated control that operates electrical circuit if high-side pressure becomes too high.

**Head Pressure Safety Controls:** Motor protection device wired in series with motor; will shut off the motor when excessive head pressures occur.

**Head Velocity:** Height of fluid equivalent to its velocity pressure in flowing fluid.

**Header:** Length of pipe or vessel, to which two or more pipe lines are joined, that carries fluid from a common source to various points of use.

**Heat:** Form of energy that acts on substances to raise their temperature; energy associated with random motion of molecules.

**Heat Absorber:** The low-pressure side of a refrigeration system. The evaporator absorbs heat.

**Heat Anticipators:** A thermostatic anticipator.

**Heat Dissipater:** The high-pressure side of a refrigeration system. The condenser dissipates heat.

**Heat Energy:** Kinetic energy of molecules in motion.

**Heat exchanger:** Device used to transfer heat from a warm or hot surface to a cold or cooler surface. (Evaporators and condensers are heat exchangers.)

**Heat Gains:** Heat added to a space being cooled.

**Heat Input Method:** Method of sizing motor in which the required energy from the motor is the amount of heat added to the vapor in the compressor.

**Heat Insulators:** Poor conductors of heat.

**Heat Lag:** The time it takes for heat to travel through a substance heated on one side.

**Heat Leakage:** Flow of heat through a substance.

**Heat Leakage Load:** Total amount of heat that leaks from a structure.

**Heat Load.** Amount of heat removed during a period of 24 hours.

**Heat Loss:** Loss of warm air, resulting in a lower temperature.

**Heat of Compression:** Additional temperature produced by increased pressure.

**Heat of Fusion:** Heat released from a substance to change it from a liquid state to a solid state. The heat of fusion of ice is 144 Btu per pound (335 kJ/kg).

**Heat-Pipe:** High efficiency gas furnace that uses vertical liquid filled pipes. The pipes are heated by a burner at their base, and the liquid boils and vaporizes within the pipe. The furnace blower circulates air over the pipes for heating.

**Heat Pump:** Compression cycle system used to supply heat to a temperature-controlled space. The same system can also remove heat from the same space.

**Heat Recovery system:** Produces and Stores hot water by transferring heat from condenser to cooler water.

**Heat Sink:** Relatively cold surface capable of absorbing heat.

**Heat Transfer:** Movement of heat from one body or substance to another. Radiation, conduction, convection, or a combination of these three methods may transfer heat.

**Heat transfer coefficient:** (U-value) A measure of the amount of heat that a material or combination of materials will allow through.

**Heat Transfer module:** Primary system of heat transfer in a glycol water solution forced-air furnace. The heat transfer module contains the ignitor, burner, and primary solution circulating coil.

**Heat transfer rate (Q):** The amount of heat transfer through a given material per unit time.

**Heating Coil:** Heat transfer device consisting of a coil of piping, that releases heat.

**Heating Control:** Device that controls temperature of a heat transfer unit.

**Heating Value:** Amount of heat that may be obtained by burning a fuel. The heating, value is usually expressed in Btu per lb., Btu per gal., or kJ/kg.

**Hermetic Compressor:** Compressor that has the driving motor sealed inside the compressor housing. The motor operates in an atmosphere of the refrigerant.

**Hermetic Motor:** Compressor motor sealed within same casing which contains compressor.

**Hermetic Unit:** Refrigeration system which has a compressor driven by a motor contained in compressor dome or housing.

**Hertz (Hz):** Correct terminology for cycles per second.

**Hg. (mercury):** Heavy silver-white metallic element, only metal that is liquid at ordinary room temperature.

**High-Efficiency, Gas Furnace:** Furnace that uses recycling of combustion gases or pulse combustion to obtain operating efficiencies from 85% to 95%

**High-limit control:** Control that stops the flow of gas when the bonnet on a furnace is too hot. Also called a safety stat.

**High-pressure Cut-Out:** Electrical control switch, operated by the high-side pressure, that automatically opens electrical circuit if pressure is too high.

**High, Side:** The parts of a refrigerating system subject to the condenser pressure.

**High-Side Float:** Refrigerant control mechanism that controls the level of the liquid refrigerant in the high pressure side of mechanism.

**Horizontal furnace:** A furnace in which air blows horizontally through the heat exchanger.

**Horsepower:** Unit of power equal to 33,000 ft.-lb. of work per minute. One electrical horsepower equals 746 W.

**Hot Gas:** High temperature gas taken from the compressor used to defrost the evaporator.

**Hot Gas Bypass:** Piping system in refrigerating unit that moves hot refrigerant gas from condenser into low pressure side.

**Hot Gas Defrost:** Defrosting system in which hot refrigerant gas from the high side is directed through the evaporator for short period of time at predetermined intervals in order to remove frost.

**Hot Junction:** The part of thermoelectric circuit that releases heat.

**Hot-Surface Ignition System:** Furnace ignition system in which a silicon carbide element is heated in order to light the main burner. No pilot light is needed.

**Hot Water Heating System:** System in which water is circulated through heating coils.

**Hot wire:** 1-Resistance wire in an electrical relay which expands when heated and contracts when cooled; 2-Electrical lead which has a voltage difference between it and the ground.

**Humidifier:** Device used to add to the humidity.

**Humidistat:** Electrical control that is operated by change in the humidity.

**Humidity:** Moisture; Dampness of air.

**Hunting:** The cycling above and below the set point.

**Hydraulics:** Having to do with the mechanical properties of water and other liquids in motion.

**Hydrocarbons:** Organic compounds containing only hydrogen and carbon atoms in various combinations

**Hydrochlorofluorocarbons (HCFCs):** Type of refrigerant that is damaging to the ozone layer, but to a lesser degree than CFCs.

**Hydrofluorocarbons (HFCs):** A type of refrigerant that will not damage the ozone layer.

**Hydrogen:** A light gas that makes up a small part of atmosphere. It is present in most fuels.

**Hydrometer:** Floating instrument used to measure specific gravity, of a liquid.

**Hydronic:** Heating system that circulates a heated fluid, usually water, through baseboard coils by means of a circulating pump controlled by a thermostat.

**Hygrometer:** Instrument used to measure amount moisture in the air.

**Hygroscopic:** Ability of a substance to absorb and release moisture and change physical dimensions as its moisture content changes.

**Ice Bank:** Refrigerating systems that form a bank of ice around the evaporator to provide reserve cooling capacity.

**Ice melting Effect:** Amount of heat absorbed by melting ice at 32F (0°C) is 144 Btu per pound of ice or 288,000 Btu per ton.

**Identification Plate:** Provides information such as manufacturer, part number, and specification. Frequently mounted on the outside housing of motors and compressors.

**Idler:** Pulley used on some belt drives to provide belt tension and to eliminate belt vibration.

**Ignition System:** Method of lighting a furnace

**Ignition Transformer:** Transformer designed to provide a high-voltage current. Used in many heating systems.

**Immersion Freezing:** Freezing of articles by dipping them in to liquid refrigerant.

**Impedance:** Opposition in an electrical circuit to the flow of an alternating current that is similar to the electrical resistance to a direct current.

**Impeller:** Rotating part of a pump.

**Incandescent:** Glowing due to heat.

**Incomplete Combustion:** Combustion with insufficient oxygen.

**Indoor Air Quality (IAQ):** The status of indoor air as measured by numerous factors: temperature, humidity, air flow, pollutants, occupants etc.

**Induced Magnetism:** Ability of a magnetic field to produce magnetism in a metal.

**Inductance:** Inducing voltage in a coil due to the change in the rate of flow of current in the coil.

**Induction Motor:** An ac motor that operates on the principle of a rotating magnetic field. The rotor has no electrical connection, but received electrical energy by transformer action from field windings.

**Inductive Reactance:** Electromagnetic induction in a circuit creates a counter or reverse emf as the original current changes. It opposes the flow of alternating current.

**Infiltration:** Passage of outside air into building through doors, cracks, windows and other opening.

**Infrared:** Invisible rays just beyond red in the visible spectrum.

**Inhibitor:** Substance that prevents a chemical reaction.

**Inspection:** To examine and compare with established guidelines

**Instrument:** Used broadly to denote a device that has measuring, recording, indicating, or controlling abilities.

**Insulation, Electric:** Substance that has almost no free electrons.

**Insulation, Thermal:** Material that is a poor conductor of heat: used to retard flow of heat through wall.

**Integrated Circuit:** A circuit that incorporates multiple transistors and other semiconductors to a single circuit, sometimes called a "chip."

**Integrated Circuit Board:** Electronic circuit made from transistors, resistors, etc., all placed into a package referred to as a "chip," since all circuits are on one base of semiconductor material.

**Interlocked:** Controlled by a switch that does not allow a component to operate when a hazardous condition exists.

**Intermittent Absorption System:** Refrigeration system using a kerosene burner and ammonia, normally used in situations where gas and electricity is not available.

**Intermittent Cycle:** Cycle which repeats itself a varying time intervals.

**Interstate Commerce Commission (ICC):** Government body that controls the design and construction of pressure containers.

**Intrinsic Semiconductor:** Material that is neither conductor nor insulator, such as silicon and germanium, often used in temperature sensing devices.

**Ion:** Group of atoms or a atom which is electrically charge.

**IR Drop:** Electrical term indicating the loss in a circuit expressed in amperes times resistance ( $I \times R$ ) or voltage drop.

***Isothermal:*** Changes of volume or pressure under conditions of constant temperature.

***Jet Cooling System:*** Jet pump is used to produce a vacuum so water or refrigerant may evaporate at relatively low temperatures. These systems usually require a large condenser and have a low efficiency.

***Jet Pump:*** A centrifugal pump combined with a ejector, which can replace the compressor in some refrigeration systems.

***Joint:*** Connecting point as between two pipes.

***Joule:*** Metric unit of heat.

***Joule-Thomson Effect:*** The change in the temperature of a gas on its expansion through a porous plug from a higher pressure to a lower pressure.

***Journal, Crankshaft:*** Part of shaft that contacts the bearing on the large end of the piston rod.

***Junction Box:*** Box or container housing group of electrical terminals.

***Kata Thermometer:*** Large-bulb alcohol thermometer used to measure air speed or atmospheric conditions by means of cooling effect.

***Kelvin Scale (K):*** Thermometer scale on which unit of measurement equals the Celsius degree and according to which absolute zero is 0, the equivalent of -273.16 C. Water freezes at 273.16K and boils at 373.16K.

***Kilocalorie:*** Great calorie (1000 calories) used in engineering science.

***Kilometer (km):*** Metric unit of linear measurement equal to 1000 meters.

***Kilopascal (kPa):*** Metric unit of pressure equal to 1000 Pascals..

***Kilovolt Ampere (kVA):*** Unit of electrical flow equal to volts multiplied by amperes and divided by one thousand.

***Kilowatt:*** Unit of electrical power, equal to 1000 watts.

***Kinetic Energy:*** Energy of motion.

***King Valve:*** Liquid receiver service valve.

***Lacquer:*** Protective coating or finish that dries to form a film by evaporation of a volatile constituent.

***Ladder Diagram:*** Electrical diagram that indicates order of electrical devices in a specific electrical circuit.

***Lag:*** Delay in response.

***Lamp, Steri:*** Lamp that has a high-intensity ultraviolet ray used to kill bacteria. Also used in food storage cabinets and in air ducts.

***Lapping:*** Smoothing a metal surface to high degree of refinement or accuracy using a fine abrasive.

***Latent Heat:*** Heat energy absorbed in process of changing from of substance (melting, vaporization, fusion) without change in temperature or pressure.

***Latent Heat of Condensation:*** Amount of heat released (lost) to change from a vapor (gas) to a liquid.

***Latent Heat of Vaporization:*** Amount of heat required to change from a liquid to a vapor (gas).

***Leak Detector:*** Device or instrument, such as a halide torch, an electronic sniffer, or soap solution, used to detect leaks.

***Legionnaire's Decease Bacterium (LDB):*** Is thought to be transmitted by airborne routes, possible by open air cooling towers or evaporative condensers in commercial systems. Disease is named after an outbreak of illness at an American Legion convention in July, 1976.

**Limit Control:** Control used to open or close electrical circuits as temperature or pressure limits are reached.

**Liquefied Gases:** A gas below a certain temperature and above a certain pressure, that becomes liquid.

**Liquid:** Substance whose molecules move freely among themselves, but do not tend to separate like those of gases.

**Liquid Absorbent:** Chemical in liquid form that has the property to “take on” or absorb other fluids.

**Liquid Desuperheater:** Valve that permits small flow of refrigerant to enter low side of systems to cool suction gas.

**Liquid Floodback:** A surge of liquid returning to the compressor.

**Liquid Indicator:** Device located liquid line that provides a glass window through which liquid flow may be watched.

**Liquid Line:** Tube that carries liquid refrigerant from the condenser or liquid receiver to the refrigerant control mechanism.

**Liquid Nitrogen:** Nitrogen in liquid form used as a low-temperature refrigerant in expendable or chemical refrigerant systems.

**Liquid Receiver:** Cylinder (container) connected to condenser outlet for storage of liquid refrigerant in a system.

**Liquid Receiver Service Valve.** Two-or three-way manual valve located at the outlet of the receiver and used for installation and service purposes. It is sometimes called the king valve.

**Liquid Transfer Method:** Method of liquid refrigerant recovery in which the air conditioning unit is pressurized and refrigerant is removed by the created pressure difference.

**Liquid-Vapor Valve Refrigerant Cylinder:** Dual hand valve on refrigerant cylinders that is used to release either gas or liquid refrigerant from the cylinder.

**Listing:** To tilt to one side due to an unbalanced load.

**Liter:** Metric unit of volume, equal to 61.03in<sup>3</sup>

**Lithium Bromide:** Chemical commonly used as the absorbent in absorption cooling system. Water would then be the refrigerant.

**Localized Controllers:** Independent energy control device located near the system it is controlling.

**Locked Rotor Amperage:** Initial current when initially closing a circuit, two to four times as high as the running current.

**Locker Plant:** Manufacturing plant designed to prepare freeze, and store food products.

**Lockout Relay:** A device that shuts down a circuit whenever a safety control device is open.

**Low Pressure Safety Cutout:** Motor protection device that senses low-side pressure. Control is wired in series with the motor and will shut off during periods of excessively low suction pressure. Also called low-side pressure indicator.

**Low Side:** The parts of a refrigeration system subject to the evaporator pressure.

**Low-side Float Valve:** Refrigerant control valve operated by level of liquid refrigerant in low-pressure side of system.

**Low-side Pressure:** Pressure in cooling side of refrigerating cycle.

**Low-side Pressure Control:** Device used to keep low-side evaporating pressure from dropping below certain pressure.

**Low-side Pressure Limiter:** See low-pressure safety cutout.

**LP Fuel:** Liquefied petroleum used as a fuel gas.

**Machine Room:** Area where commercial and industrial refrigeration machinery-except evaporators-is located.

**Machine Screws:** Fine threaded fasteners manufactured to narrow tolerances.

**Magnetic Clutch:** Device operated by magnetism to connect or disconnect a power drive.

**Magnetic Field:** Space in which magnetic lines of force exist.

**Magnetic Flux:** Lines of force of a magnet.

**Magnetic Gasket:** Door-sealing material that keeps door tightly closed with small magnets inserted in gasket.

**Magnetic Permeability:** Property of a material that determines its flux density under a magnetic field.

**Magnetism:** A field of force which causes a magnet to attract materials made of iron, nickel-cobalt, or other ferrous material.

**Make-up Air Units:** An air unit used to create a slight positive pressure in homes, reducing infiltration.  
screw together.

**Manifold, Service:** Chamber equipped with gauges and manual valves, used by service technicians to service refrigerating systems.

**Manometer:** Instrument for measuring pressure of gases and vapors. Gas pressure is balanced against a column of liquid, such as mercury, in a U-shaped tube.

**Mass:** Quantity of matter held together so as to form one body.

**Matched:** In refrigeration systems, the correct balancing of the following items: heat load, condensing unit capacity, evaporator capacity, and total system capacity.

**MBH:** Thousands of British thermal units (1 MBH = 1000 Btu.).

**McLeod Gauge:** Instrument used to measure high vacuums.

**Mean Effective Pressure (MEP):** Average pressure on a surface when a changing in pressure condition exists.

**Mechanical Cycle:** Cycle that is a repetitive series of mechanical events.

**Mechanism:** Machinery.

**Melting Point:** Temperature at which a substance will melt at atmospheric pressure.

**Micro:** Prefix denoting one-millionth: for example, a microliter is one-millionth of a liter.

**Microcomputer:** A computer containing a microprocessor.

**Micrometer:** Precision measuring instrument used for making measurements accurate to .001 to .001”.

**Micron:** Unit of length in metric system equal to one-millionth of a meter.

**Micron gauge:** Instrument for measuring vacuums very close to a perfect vacuum.

**Microorganism:** A plant or animal of microscopic size.

**Microprocessor:** Electrical component consisting of integrated circuits that may accept information, store it, and control an output device.

**Milli:** Prefix denoting one thousandth (1/1000), for example, millivolt means one thousandth of a volt.

**Minerals:** A substance with a definite chemical composition and characteristics. In this text, the term refers to substances found in water (carbonate, sulfate, lime, iron, etc) that produce scale formation inside tubing.

**Minimum Stable Signal (MSS):** Correct setting for an expansion valve where is utilizing the evaporator efficiently but remains free from hunting.

**Miscibility:** Capable of being mixed.

**Modulate:** Control or adjust.

**Modulating Controls:** A Control capable of gradual adjustments, rather than simple on-off control.

**Modulating Refrigeration Cycle:** Refrigerating system of variable capacity.

**Modules:** Thermoelectric cooling units.

**Moisture Indicator:** Instrument used to measure moisture content of a refrigerant.

**Molecule:** Smallest portion of an element or compound that retains chemical identity with the substance.

**Mollier's Diagram:** Graph of refrigerant pressure, heat, and temperature properties.

**Monochlorodifluoromethane:** Refrigerant better known as r-22. Chemical formula is  $\text{CHClF}_2$ . Cylinder color code is green.

**Motor:** Rotating machine that transforms fluid or electric energy into a mechanical motion.

**Motor, Capacitor:** Single-phase induction motor with an auxiliary starting winding connected in series with a condenser (capacitor) for better starting characteristics.

**Motor Burnout:** Condition in which the insulation of an electric motor has deteriorated due to overheating.

**Motor Control:** Device to start and stop a motor at a certain temperature or pressure.

**Male Thread:** External thread on pipe, fittings, and valves for making connections that Motor Starter: High-capacity electric switches, usually operated by electromagnets.

**Muffler:** Sound absorber chamber in refrigeration system. Used to reduce sound of gas pulsations.

**Mullion Heater:** Electrical heating element mounted in the mullion. Used to keep mullion from sweating or frosting.

**Multiple-pass Recycling Machine:** A refrigerant recycling machine that cycles the refrigerant through a filter-drier several times in order to separate and remove oil.

**Multiple System:** Refrigerating mechanism in which several evaporators are connected to one condensing unit.

**Multipurpose Fuse:** A fuse that does not blow under small overload conditions of a short duration, but blows immediately when a large overload occurs.

**Multistage System:** A system used to produce very low temperatures.

**Natural Convection:** See Convection, natural.

**Natural Gas:** A mixture of methane and other hydrocarbons found in the earth's crust, used as fuel.

**of an atom core which has no electrical neutral. Needle point valve:** Valve having a needle point plug and a small seat orifice for low-flow metering.

**Negative Temperature Coefficient Thermistor (NTC):** Electronic thermistor that decreases in resistance as temperature increases.

**Neoprene:** Synthetic rubber that is resistant to hydrocarbon oil and gas.

**Net capacity:** The interior volume of a refrigeration cabinet.

**Neutralizer:** Substance used to counteract acids in a refrigeration system.

**Neutron:** That part

**Newton:** Force required to accelerate an object that has a mass of 1 kilogram to 1m/sec<sup>2</sup>.

**Nitrogen:** A gaseous element comprising three-fourths of the earth's atmosphere by weight.

**Nitrogen dioxide (NO<sub>2</sub>):** Mildly poisonous gas often found in smog or automobile exhaust fumes.

**No-frost Freezer:** Low-temperature refrigerator cabinet in which no frost or ice collects on freezer surfaces or materials stored in cabinet.

**Noise Dosimeter:** Instrument used to measure sound.

**Nominal Size Tubing:** Tubing measurement that has an inside diameter the same as iron pipe.

**Noncode Installation:** Functional refrigerating system installed where there are no local, state, or national refrigeration codes in effect.

**Noncondensable Gas:** Gas which does not change into a liquid at operating temperatures and pressures.

**Nonferrous:** Group of metals and metal alloys that contain no iron.

**Nonfrosting Evaporator:** Evaporator that never collects frost or ice on its surface.

**Nominductive Load:** An electrical load consisting of resistance, which does not affect the power factor.

**Normal Charge:** Thermal element charge that is part liquid and part gas under all operating conditions.

**North Pole, Magnetic:** End of magnet out of which magnetic lines of force flow.

**NTC:** See Negative temperature coefficient thermistor.

**Octave:** Frequency difference between harmonic vibrations: the doubling of the frequency of sound.

**Octyl Alcohol-ethyl Hexanol:** Additive in absorption machines that reduces surface tension in absorber.

**Odor:** The property of air contaminants that affect the sense of smell.

**Off Cycle:** Segment of refrigeration cycle when system is not operating.

**Offset:** In a proportional control system, the deviation between the set point and the control point. Also called error.

**Ohm:** Unit of easement of electrical resistance. One ohm exists when one volt causes a flow of one ampere.

**Ohmmeter:** Instrument for measuring electrical resistance in ohms.

**Ohm's Law:** Mathematical relationship between voltage, current, and resistance in an electric circuit: discovered by George Simon Ohm. It is stated as follows voltage (E) equals amperes (I) times ohms (R): or  $E=I \times R$ .

**Oil Refrigeration:** Specially prepared oil used in refrigerator mechanism which circulates, to some extent, with refrigerant.

**Oil, Refrigeration:** Specially prepared oil used in refrigerator mechanism which circulates, to some extent, with refrigerant.

**Oil Binding:** Condition in which oil layer on top of refrigerant liquid may prevent it from evaporating at normal pressure and temperature.

**Oil Burner:** A device for burning vaporized oil (gas) to produce heat.

**Oil Bushing:** Assembly in which a shaft passes through a sintering, bushing (which is impregnated with oil). Bushing is permanently

lubricated.

**Oil Level Regulator:** A device that controls the oil level in the compressor.

**Oil Pressure Safety Cutout:** Motor protection device that senses oil pressure in the compressor. It is wired in series with the compressor and will shut it off during periods of low oil pressure.

**Oil Reservoir:** Container that stores the compressor's oil supply.

**Oil Ring:** Lower piston ring.

**Oil Separator:** Device used to remove oil from gaseous refrigerant.

**Oil Slugging -:** Oil being pumped out of the compressor

**One way Valve:** A Valve with only one opening that can be either opened or closed.

**Open Circuit:** Interrupted electrical circuit, which stops flow of electricity.

**Open Compressor:** Term used to indicate an external drive compressor (not hermetic).

**Open-cycle Refrigeration:** Refrigeration system in which the refrigerant is released to the atmosphere after evaporation.

**Open Display Case:** Commercial refrigerator designed to maintain its contents at refrigerating temperatures even though the contents are in an open case.

**Open System:** Refrigerating system which used a belt driven or a coupling-driven compressor.

**Operating Controls:** Devices used to cause a refrigeration system to maintain desired conditions.

**Operating Differential:** The actual temperature or pressure difference in the conditioned area.

**Operating Pressure:** Actual pressure at which the system works under normal conditions. This pressure may be positive or negative (vacuum).

**Organic:** Pertaining to or derived from living organisms

**Orifice:** Accurate size opening for controlling fluid flow

**Orifice Tube:** Metering device consisting of a restricting tube with inlet and outlet screens.

**O-rings:** Sealing devices used between parts where there may be some motion.

**Oscilloscope:** Fluorescent-coated tube that visually shows an electrical wave.

**Overload:** Load greater than that for which the system was intended.

**Overload protector:** Device, either temperature, pressure, or current operated, that will stop operation of unit if dangerous conditions arise.

**Oxidation:** The chemical combining of oxygen with a specific material, resulting in deterioration of that material.

**Oxygen:** An elemental gas that comprises approximately 21% of the atmosphere. It is required for combustion.

**Ozone:** A form of oxygen, O<sub>3</sub>, having three atoms to the molecule, usually produced by discharge of electricity through the air. The ozone layer is the outermost layer of the earth's atmosphere, that absorbs ultraviolet light from the sun and shields the lower layers and the earth from harmful rays.

**Packaged terminal air conditioning:** A combination heating and cooling unit designed for a single room or zone.

**Package units:** Complete refrigerating system including compressor, condenser, and evaporator located in refrigerated space.

**Packing:** Sealing device consisting of soft material or one or more mating soft elements. Reshaped by manually adjustable compression to obtain or maintain a leak-proof seal.

**Partial pressures:** Condition where two or more gases occupy a space and each one creates part of the total pressure.

**Parts per million (ppm):** Unit of concentration of one element in another.

**Pascal (Pa):** Unit of pressure in the metric system.

**Pascal's Law:** Pressure imposed upon a fluid is transmitted equally in all directions.

**Passive solar heating system:** A solar energy system that is dependent upon the radiation striking directly on the surface to be heated.

**PCB:** See Polychlorinated Biphenyl.

**Peltier Effect:** When direct current is passed through two adjacent metals, one junction will become cooler and the other will become warmer. This principle is the basis of thermoelectric refrigeration.

**Perimeter drier:** An electrical resistance heat wire located in a freezer door to prevent condensation on the exterior of the cabinet and around the freezer door.

**Perimeter hot gas tube system:** System that has a tube located on the surface of the outer portion of the cabinet to prevent condensation from forming.

**Permanent magnet:** Material that has its molecules aligned and has its own magnetic field; bar of metal that has been permanently magnetized.

**Permanent split capacitor motor:** A motor with no relay, in which current flows through both the starting and running winding, making the motor sensitive to line voltage and resulting in low starting torque.

**Permeable:** Having openings that allow the passage of liquid or gas.

**pH:** Measurement of the free hydrogen ion concentration in an aqueous solution. A pH of 7 is neutral.

**Phase:** Distinct functional operation during a cycle.

**Phase loss monitor:** Motor protection device for polyphase motors that measures current flow to detect phase loss.

**Phial:** Term sometimes used to denote the sensing element on a thermostatic expansion valve.

**Photoelectricity:** Physical action wherein an electrical flow is generated by light waves.

**Photon:** Particle of electromagnetic energy found in solar radiation.

**Photostatically:** Method by which the molecular formation of an element changes due to light.

**Photovoltaic cell:** See Solar cell.

**Piercing valve:** A type of service valve used on hermetic units.

**Piezoelectric:** Property of quartz crystal that causes it to vibrate when a high frequency (500 kHz or higher) voltage is applied. Concept is used to atomize water in a humidifier.

**Piston:** Close-fitting part or plug that moves up and down in a cylinder.

**Pitot tube:** Tube used to measure air velocities.

**Planck's constant:** Constant value ( $6.626 \times 10^{-34}$  J s) which, when multiplied by the frequency of radiation, determines the amount of energy in a photon.

**Plenum chamber:** Chamber or container for moving air or other gas under a slight positive pressure.

**Pneumatic system:** An air conditioning system in which pneumatic motors are operated by pressurized air lines.

**Pollen count:** A measure of the amount of pollen in the air.

**Polychlorinated Biphenyl (PCB):** Dielectric fluid used in capacitors and transformers that is very toxic. Use of PCB in transformers and capacitors is strictly regulated by the Environmental Protection Agency.

**Polyphase motor:** Electrical motor designed to be used with a three- or four-phase electrical circuit.

**Polystyrene:** Plastic used as an insulation in some refrigerated structures.

**Polyurethane:** Any synthetic rubber polymers produced from the polymerization of an HO and NCO group from two different compounds. Often used in insulation and molded products.

**Ponded roof:** Flat roof designed to hold a quantity of water, which acts as a cooling device.

**Porcelain:** Ceramic coating applied to steel surfaces.

**Portable service cylinder:** Container used to store refrigerant. Two most common types are disposable and refillable.

**Positive pressure:** A pressure greater than atmospheric.

**Positive temperature coefficient thermistor (PTC):** Electronic thermistor that increases in resistance as temperature increases.

**Potassium permanganate:** Chemical used in carbon filters to help reduce odors.

**Potential, electrical:** Electrical force that moves, or attempts to move, electrons along a conductor or resistance.

**Potential energy:** Energy related to an object's position.

**Potential relay:** Electrical switch that opens on high voltage and closes on low voltage.

**Potentiometer:** Instrument for measuring or controlling by sensing small changes in electrical resistance.

**Pound-force:** Force applied to a 1-lb. Mass to give it an acceleration of  $32.173 \text{ ft./82}$  (gravitational acceleration).

**Pour point:** Lowest temperature at which a liquid will pour or flow.

**Power:** 1-Time rate at which work is done or energy emitted. 2- Source or means of supplying energy.

**Power burner:** A burner that has air blown into it by a blower.

**Power element:** Sensitive element of a temperature-operated control.

**Power factor:** Correction coefficient for the changing current and voltage values of ac power.

**Power saver switch:** A switch that disconnects heaters in a refrigerant cabinet.

**Ppm:** See Parts per million.

**Precooler condenser:** Used to cool the refrigerant prior to entering the main condenser.

**Pressure:** Energy impact on a unit area; force or thrust on a surface.

**Pressure, absolute:** See Absolute pressure.

**Pressure, atmospheric:** See Atmospheric pressure.

**Pressure, back:** See Back pressure.

**Pressure cycling switch:** Pressure-controlled switch located on the inlet line of the evaporator to prevent rapid cycling of the compressor.

**Pressure drop:** Pressure difference at two ends of a circuit, or part of a circuit.

**Pressure gauge:** Instrument for measuring the pressure exerted by the contents on its container.

**Pressure, gauge:** Pressure above atmospheric pressure.

**Pressure, head:** Force caused by the weight of a column or body of fluids.

**Pressure-heat diagram:** Graph of refrigerant pressure, heat, and temperature properties. (Mollier's diagram).

**Pressure limiter:** Device that remains closed until a certain pressure is reached, then opens and releases fluid to another part of system or breaks an electric circuit.

**Pressure motor control:** Device that opens and closes an electrical circuit as pressures change.

**Pressure-Operated Altitude (POA) valve:** Device that maintains a constant low-side pressure, independent of altitude of operation.

**Pressure, operating:** Pressure at which a system is operating.

**Pressure regulator, evaporator:** Automatic pressure regulating valve mounted in the suction line between the evaporator outlet and the compressor inlet. Its purpose is to maintain a predetermined pressure and temperature in the evaporator.

**Pressure, suction:** Pressure in low-pressure side of a refrigerating system.

**Pressure switch:** Switch operated by a change in pressure.

**Pressure water valve:** Device used to control water flow. It is responsive to head pressure of refrigerating system.

**Primary air:** In a combustion system, the air mixed with fuel prior to ignition.

**Primary coil:** A tube-and-fin circular coil that contains a water-glycol solution, which surrounds the ignitor and burner. This coil is used in a water-glycol gas forced-air furnace.

**Primary control:** Device that directly controls operation of heating system.

**Process tube:** Length of tubing fastened to hermetic unit dome, used for servicing unit.

**Product heat load:** Sum of specific, latent, and respiration heat loads.

**Products of combustion:** The material produced when a substance is burned.

**Propane:** Volatile hydrocarbon used as a fuel or as a refrigerant.

**Proportional:** Being in the proper relative quantity or balance.

**Protector, circuit:** Electrical device that will open an electrical circuit if excessive electrical conditions occur.

**Proton:** Particle of an atom with a positive charge.

**Psi:** Pounds per square inch.

**Psia:** Pounds per square inch absolute. Absolute pressure equals gauge pressure plus atmospheric pressure.

**Psig:** Pounds per square inch gauge.

**Psychrometer:** Instrument for measuring the relative humidity of atmospheric air. Also called Wet Bulb Hygrometer.

**Psychrometric chart:** Chart that shows relationship between the temperature, pressure, and moisture content of the air.

**PTC:** See Positive temperature coefficient thermistor.

**Puffback:** The ignition of vaporized oil in the firepot.

**Pulley:** Flat wheel with a “V” groove. When attached to a drive and drive members, the pulley provides a means for driving the compressor.

**Pulse:** Term referring to one cycle of ignition and combustion of a gas-air mixture in a pulse combustion furnace.

**Pulse combustion process:** Repeated ignition of a gas and air mixture in a high efficiency gas furnace.

**Pulse furnace:** Furnace that has a “tuned” (resonant) combustion chamber. Part of the energy normally lost through the flue is returned to start next “pulse” of combustion.

**Pump:** Any one of various machines that force gas or liquid into-or draw it out of-something as by suction or pressure.

**Pump, centrifugal:** Pump that produces fluid velocity and converts it to pressure head.

**Pump, fixed displacement:** A pump in which the displacement per cycle cannot be varied.

**Pump, reciprocating single-piston:** A pump having a single reciprocating (moving up and down or back and forth) piston.

**Pump, screw:** Pump having two interlocking screws rotating in a housing.

**Pump down:** The act of using a compressor or a pump to reduce the pressure in a container or a system.

**Purging:** Releasing compressed gas to the atmosphere for the purpose of removing contaminants.

**Pyrometer:** Instrument for measuring high temperatures.

**Quenching:** Submerging a hot object in cooling fluid.

**Quick-connect coupling:** A device that permits easy and fast connecting of two fluid lines.

**R-value:** The thermal resistance of a given material.

**R-11, Trichloromonofluoromethane:** Low-pressure, synthetic chemical refrigerant that is also used as a cleaning fluid.

**R-12, Dichlorodifluoromethane:** Popular refrigerant known as Freon 12.

**R-22, Monochlorodifluoromethane:** Low temperature refrigerant with boiling point of -41°F (-40.5°C) at atmospheric pressure.

**R-113, Trichlorotrifluoroethane:** Synthetic chemical refrigerant which is nontoxic and nonflammable.

**R-160, Ethyl chloride:** Toxic refrigerant now seldom used.

**R-170, Ethane:** Low-temperature refrigerant.

**R-290, Propane:** Low-temperature refrigerant.

**R-500:** Refrigerant that is an azeotropic mixture of R-12 and R-152a.

**R-502:** Refrigerant that is an azeotropic mixture of R-22 and R-115.

**R-503:** Refrigerant that is an azeotropic mixture of R-23 and R-13.

**R-504:** Refrigerant that is an azeotropic mixture of R-32 and R-115.

**R-600, Butane:** Low-temperature refrigerant; also used as a fuel.

**R-611, Methyl formate:** Low-pressure refrigerant.

**R-717, Ammonia:** Popular refrigerant for industrial refrigerating systems; also a popular absorption system refrigerant.

**Radial commutator:** Electrical contact surface on a rotor, perpendicular to the shaft centerline.

**Radiant heating:** Heating system in which warm or hot surfaces are used to radiate heat into the space to be conditioned.

**Radiation:** Transfer of heat by heat rays.

**Range:** Pressure or temperature settings of a control; change within limits.

**Rankine scale:** Name given the absolute (Fahrenheit) scale. Zero (0°R) on this scale is -460°F.

**Reactance:** That part of the impedance of an alternating current circuit due to capacitance or inductance or both.

**Receiver-drier:** Cylinder (container) in a refrigerating system for storing liquid refrigerant and desiccant.

**Receiver heating element:** Electrical resistance heater mounted in or around liquid receiver. It is used to maintain head pressures when ambient temperature is low.

**Reciprocal:** Inverse.

**Reciprocating:** Back and forth motion in a straight line.

**Reciprocating compressor:** A compression driven by piston (positive displacement).

**Reclaiming:** Taking refrigerant that has been removed from a system and processing it in accordance with EPA rules.

**Recording ammeter:** Electrical instrument that uses a pen to record the amount of current flow on a moving paper chart.

**Recording thermometer:** Temperature measuring instrument that has a pen marking a moving chart.

**Recovery:** Removal of refrigerant from a system.

**Rectifier, electric:** Electrical device for converting ac to dc.

**Recuperative coil:** Secondary coil in glycol water forced-air furnace that extracts latent heat from combustion gases.

**Recycling:** Passing of flue gases from combustion in a furnace to a secondary heat exchanger to remove latent heat.

**Reed valve:** Compressor valve consisting of a thin, flat, high-carbon alloy steel.

**Refractory:** A material with a high melting point.

**Refractory cement:** A variety of mixtures used to line furnaces.

**Refrigerant:** Substance used in refrigerating mechanism. It absorbs heat in evaporator by change of state from a liquid to a gas, and releases its heat in a condenser as the substance returns from the gaseous state back to a liquid state.

**Refrigerant charge:** Quantity of refrigerant in a system.

**Refrigerant control:** Device that meters flow of refrigerant between two areas of a refrigerating system. It also maintains pressure difference between high-pressure and low-pressure side of the mechanical refrigerating system while unit is running.

**Refrigerant dye:** Coloring agent that can be added to refrigerant to help locate leaks in a system.

**Refrigerant jets:** A jet pump that sprays refrigerant into the condenser.

**Refrigerant management System:** A refrigerant recovery/recycling unit.

**Refrigerant quality:** Ratio of liquid refrigerant to refrigerant vapor.

**Refrigerant transfer unit:** Machine designed to safely remove refrigerant from a system.

**Register:** Combination grille and damper assembly covering a duct opening.

**Relative density:** Ratio of the mass of a volume of gas compared to the mass of the same volume of hydrogen.

**Relative humidity:** Ratio of (difference between) amount of water vapor present in air to greatest amount possible at same temperature.

**Relay:** An electromagnetic mechanism moved by a small electrical current in a control circuit. It operates a valve or switch in an operating circuit.

**Relief valve:** Safety device on a sealed system. It opens to release fluids before dangerous pressure is reached.

**Reluctance:** A force working against the passage of magnetic lines of force (flux) through a magnetic substance.

**Remedy:** A procedure whereby refrigerants are prepared for reuse by returning them to new product specifications.

**Remote controller:** Energy control device capable of controlling multiple devices. It can be located away from the devices it is controlling.

**Remote power element control:** Device with sensing element located apart from operating mechanism it controls.

**Remote system:** Refrigerating system in which condensing unit is away from space to be cooled.

**Remote temperature-sensing element:** Control device used to maintain desired temperature.

**Repair:** To restore, to remedy.

**Reprocessing:** Procedure whereby refrigerants are prepared for reuse by returning them to new product specifications.

**Repulsion-start induction motor:** An electric motor that has an electrical winding on the rotor for starting purposes.

**Resistance:** An opposition to flow or movement. A coefficient of friction.

**Resistance (R), electrical:** The difficulty electrons have moving through a conductor or substance.

**Resistor:** Electrical device that is a poor conductor of electricity and produces a given amount of resistance to current flow.

**Restrictor:** A device for producing a deliberate pressure drop or resistance in a line by reducing the flow area.

**Retrofit:** Term used in describing reworking an older installation to bring it up to date with modern equipment or to meet new code requirements.

**Reverse cycle defrost:** Method of heating evaporator for defrosting. Valves move hot gas from compressor into evaporator.

**Reversing valve:** Device used to reverse direction of the refrigerant flow, depending upon whether heating or cooling is desired.

**Ringlemann scale:** Device for measuring smoke density.

**Riser valve:** Device used to manually control flow of refrigerant in vertical piping.

**Rotary blade (vanes) compressor:** Mechanism for pumping fluid by revolving blades inside cylindrical housing.

**Rotary compressor:** Mechanism that pumps fluid by using rotating motion.

**Rotor:** Rotating or turning part of a mechanism.

**Run capacitor:** A device that dissipates heat generated by a motor.

**Running time:** amount of time a condensing unit is run per hour or per 24 hours.

**Running winding:** Electrical winding of motor that has current flowing through it during normal operation of motor.

**Saddle valve (tap-a-line):** Valve body shaped so it may be silver-brazed or clamped onto a refrigerant tubing surface.

**Safety can:** Approved container of not more than five-gallon capacity with a spring-closing lid and spout cover. It is designed to relieve internal pressure safety when exposed to fire.

**Safety control:** Device to stop refrigerating unit if unit safe pressure, temperatures, or dangerous conditions are reached.

**Safety interlock switch:** A switch that, when activated prevents a piece of interlocked equipment from operating.

**Safety motor control:** Electrical device used to open the circuit to the motor if temperature, pressure, or current flow exceed safe conditions.

**Safety plug:** Device that will release the contents of a container before rupture pressures are reached.

**Safety valve:** Self-operated, quick opening valve used for fast relief of excessive pressures.

**Saturation:** Condition existing when substance contains all of another substance it can hold.

**Scale:** A coating of deposited material.

**Scale-free system:** A system that eliminates deposits in condensers by picking up electrical energy from water, allowing deposits to be carried through the system and disposed.

**Scavenger pump:** Mechanism used to remove fluid from sump or container.

**Schrader valve:** Spring-loaded device that permits fluid flow in one direction when a center pin is depressed and in other direction when a pressure difference exists.

**Scotch yoke:** Mechanism used to change reciprocating motion into rotary motion or vice versa. Used to connect crankshaft to piston in refrigeration compressor.

**Screw compressor:** compressor constructed of two mated revolving screws.

**Scroll compressor:** A compressor that uses the interaction of two spiral coils( scrolls) to compress a vapor.

**Sealed unit:** See Hermetic system. Motor compressor assembly in which motor and compressor operate inside sealed housing.

**Seal, shaft:** Device used to prevent leakage between shaft and housing.

**Seasonal Energy Efficiency Ratio (SEER):** A measure of cooling capacity.

**Seat:** That portion of a valve mechanism against which the valve presses to effect shutoff.

**Secondary air:** Air added to a flame after ignition to maintain combustion.

**Secondary refrigerating system:** Refrigerating system in which the condenser is cooled by the evaporator of another (primary) refrigerating system.

**Seebeck effect:** When two different adjacent metals are heated, an electric current is generated between the metals.

**SEER:** See Seasonal Energy Efficiency Ratio.

**Selective absorber surface:** Surface used to increase the temperature of a solar collector.

**Self-inductance:** Magnetic field induced in a conductor carrying current.

**Semiconductor:** A class of solids whose ability to conduct electricity lies between that of a conductor and an insulator.

**Semihermetic compressor:** Hermetic compressor with service valves.

**Sensible heat:** Heat that causes a change in temperature of a substance.

**Sensor:** Material or device that goes through physical or electronic change as surrounding conditions change.

**Separator, oil:** Device to separate refrigerant oil from refrigerant gas and return the oil to the compressor crankcase.

**Sequence controls:** Group of devices that acts in series (one after another) or in time order.

**Sequential operating control:** A series of controls used in a preset order.

**Serpentine belt:** Drive belt that assumes many winding forms. Both sides of the belt transmit power. Only one serpentine belt is needed, eliminating the number of belts needed to drive accessories.

**Service valve:** Manually-operated valve mounted on refrigerating systems used for service operation.

**Serviceable hermetic:** Hermetic unit housing containing motor and compressor assembly by use of bolts or cap screws.

**Servicing:** Performing the manual work needed to correct a problem.

**Servo:** A servomotor supplies power to a servomechanism. A servomechanism is a low-power device (electrical, hydraulic, or pneumatic) used to put in operation and control a more complex or powerful mechanism.

**Shaded-pole motor:** Small ac motor designed to start under light loads.

**Shell and coil condenser:** Condenser consisting of a coil of tubing housed in a shell. Similar to a Shell and tube condenser.

**Shell and tube condenser:** Condenser consisting of a shell filled with copper tubes, through which hot water circulates. Vapors in the shell condense, and the shell serves also as a receiver.

**Shell-and-tube flooded evaporator:** An evaporator that uses water flow (through tubes built into cylindrical vessels).

**Short circuit:** Electrical condition where part of circuit touches another part of circuit and causes all or part of current to take wrong path.

**Short cycling:** Refrigerating system that starts and stops more frequently than it should.

**Shroud:** Housing over condenser, evaporator, or fan.

**Shunt:** Type of field coil with a specific resistance placed in parallel with an ammeter.

**SI Metric System (Le System International d'Unites):** Metric system of measurement adopted by most technical industries through the world.

**Sick Building Syndrome (SBS):** In a building, conditions existing that may result in human illness.

**Sight glass:** Glass tube or glass window in refrigerating mechanism. It shows amount of refrigerant or oil in system and indicates presence of gas bubbles in liquid line.

**Silica gel:** Absorbent chemical compound used as a drier. When heated, moisture is released and compound may be reused.

**Silicon-controlled rectifier (SCR):** Electronic semiconductor that contains silicon. Controls current by timing pulses.

**Silver brazing:** Brazing process in which brazing alloy contains some silver.

**Sine wave:** Wave form of single frequency alternating current.

**Single-pass recycling machine:** A recycling machine in which the refrigerant is passed through a filter-drier once.

**Single-phase motor:** Electric motor that operates on single-phase alternating current.

**Single-pipe system:** System of steam heating in which a single pipe carries steam to radiator and is also used as a condensate return.

**Single-pole, double-throw switch (SPDT):** Electric switch with one blade and two contact points.

**Single-pole, single-throw switch, (SPST):** Electric switch with one blade and one contact point.

**Single-stage compressor:** Compressor having only one compressive step between inlet and outlet.

**Skin condenser:** Condenser using the outer surface of the cabinet as the heat radiating medium.

**Sleeve covers:** The top opening cover on an ice cream cabinet.

**Sling psychrometer:** Measuring device with wet and dry bulb thermometers. Moved rapidly in air, it measures relative humidity.

**Slip ring lubricating method:** A lubricating method in which a brass ring lubricates the bearing.

**Slug:** 1 - Unit of mass equal to the weight of object (in pounds) divided by 32.2 (acceleration due to the force of gravity). 2 - Detached mass of liquid or oil which causes an impact or hammer in a circulating system.

**Slugging:** Condition in which a mass of liquid enters the compressor, causing hammering.

**Smoke test:** Test made to determine completeness of combustion.

**Snow making:** The process of producing artificial snow by means of a water spray into which compressed air is added, creating a fine mist that freezes rapidly.

**Solar cell:** Device that converts solar radiation directly to electricity. Also known as a Photovoltaic cell.

**Solar collector:** Device used to trap solar radiation, usually using an insulated black surface.

**Solar energy:** Energy contained in sunlight.

**Solar energy systems:** Systems used to collect, convert, and distribute solar energy in forms useful within a business or residence. A passive system uses no additional energy from other sources for the distribution of the solar generated heat. An active system may use blowers, supplementary coils, etc.

**Solar heat:** Heat created by energy waves from the sun.

**Soldering:** Joining two metals by adhesion of a metal with a melting temperature of less than 800°F (427°C).

**Solenoid valve:** Electromagnet with a moving core. It serves as a valve or operates a valve.

**Solid fuel heating:** The use of solid natural resources such as wood or coal to provide heat.

**Solid-state electronic relays:** See Electronic relays.

**Solubility:** The tendency of a substance to dissolve in another substance.

**Solution:** A liquid that has another liquid or solid completely dissolved in it. A lithium bromide water solution, commonly used in absorption systems, is water with lithium bromide dissolved in it. "Strong" and "weak" solutions are those with respectively high and low concentrations of another liquid or solid.

**Sone:** Sound loudness rating.

**Sound tracer:** Instrument that helps locate sources of sound.

**South Pole, magnetic:** That part of magnet into which magnetic flux lines flow.

**Specific gravity:** Weight of a liquid relative to water.

**Specific heat:** Ratio of quantity of heat required to raise temperature of a body 1° to that required to raise temperature of equal mass of water 1°.

**Specific heat capacity:** The amount of heat required to change a given mass of a substance from one temperature to another.

**Specific volume:** Volume per unit mass of a substance.

**Splash system, oiling:** Method of lubricating moving parts by agitating or splashing oil in the crankcase.

**Split-phase motor:** Motor with two stator windings. Both windings are in use while starting. One is disconnected by centrifugal switch after motor attains speed. Motor then operates on other winding only.

**Split system:** Refrigeration or air conditioning installation that places condensing unit outside or away from evaporator. Also applicable to heat pump installations.

**Spray cooling:** Method of refrigerating by spraying expendable refrigerant or by spraying refrigerated water.

**Squirrel cage:** Fan that has blades parallel to fan axis and moves air at right angles or perpendicular to fan axis.

**Standard air:** Air having a mass density of 0.075 lb./ft<sup>3</sup> (1.204 kg/m<sup>3</sup>), a temperature of 70°F (21°C), and a pressure of 30" Hg (760 mm Hg).

**Standard atmosphere:** Condition when air is at 14.7 psia pressure, at 68°F (20°C) temperature and a relative humidity of 36%.

**Standard conditions:** Used as a basis for air conditioning calculations: temperature of 68°F (20°C), pressure of 29.92" of mercury (Hg), and relative humidity of 30%.

**Standing Pilot:** Old system of furnace burner ignition, in which a pilot light is constantly burning.

**Start Capacitor:** A capacitor used in the starting winding only.

**Starve:** Condition in which there is not enough refrigerant reaching the evaporator.

**Starting Relay:** Electrical device that connects and disconnects starting winding of electric motor.

**Starting Unwinding:** Winding in electric motor used only briefly, while motor is starting.

**Static Electricity:** Electricity at rest.

**Static head:** Vertical piping run.

**Static System:** A system in which air is circulated through the condenser by natural convection.

**Stationary Blade Compressor:** Rotary pump that uses a non-rotating blade inside pump to separate intake chamber from exhaust chamber.

**Stator, Motor:** Stationary part of electric motor.

**Steam:** Water in vapor state.

**Steam Heating:** Heating system in which steam from a boiler is piped to radiators.

**Steam Jet Refrigeration:** Refrigerating system that uses a steam venturi to create high vacuum (low pressure) on a water container causing water to evaporate at low temperature.

**Steam Trap:** Automatic valve that allows condensate to pass while preventing passage of steam.

**Sterling Cycle:** A refrigeration cycle that can produce temperatures down to  $-450^{\circ}\text{F}$  ( $-268^{\circ}\text{C}$ ).

**Stethoscope:** Instrument used to detect sounds and locate their origin.

**Strainer:** Device such as a screen or filter used to retain solid particles while liquid passes through.

**Stratification:** Condition in which there little or no air movement in room; air lies in temperature layers.

**Stroke:** The distance traveled by a piston.

**Sub-cooling:** Cooling of liquid refrigerant below its condensing temperature.

**Sublimation:** Condition where a substance changes from a solid to a gas without becoming a liquid.

**Substance:** Any form of matter or material.

**Suction Line:** Tube or pipe used to carry refrigerant gas from evaporator to compressor.

**Suction Pressure Control Valve:** Device located in the suction line that maintains constant pressure in evaporator during running portion of cycle.

**Suction Service Valve:** Two-way, manually operated valve located at the inlet to compressor. It controls suction gas flow and is used to service unit.

**Suction Side:** Low-pressure side of the system extending from the refrigerant control through the evaporator to the inlet valve of the compressor.

**Superheat:** 1-Temperature of vapor above its boiling temperature as a liquid at that pressure. 2-The difference between the temperature at the evaporator outlet and the lower temperature of the refrigerant evaporating in the evaporator.

**Super-Heater:** Heat exchanger arranged to take heat from liquid going to evaporator and use it to superheat vapor leaving the evaporator.

**Surge:** Regulating action of temperature or pressure before it reaches its final value or setting.

**Surge Tank:** Container connected to the low-pressure side of a refrigerating system which increases gas volume and reduces rate of pressure change.

**Swaging:** Enlarging one tube end so the end of another tube of the same size will fit within it.

**Swamp Cooler:** Evaporative type cooler in which air is drawn through porous mats soaked with water.

**Swash Plate:** Device used to change rotary motion to reciprocating motion. Used in some refrigeration compressors.

**Sweating:** 1-Condensation of moisture from air on cold surface. 2-Method of soldering in which the parts to be joined are first coated with a thin layer of solder.

**Sweat Water:** Term sometimes used to describe tap water.

**Synchronous Speed:** A speed equal to that of a rotating magnetic field.

**Synthetic:** Produce through synthesis, not natural occurring.

**Synthetic Dust Weight Arrestancec:** Measurement of filter's ability to remove synthetic dust from test air.

**Tail Pipe:** Outlet pipe from the evaporator.

**Tandem:** A term used to identify a system that connects two motor compressors at the motor end.

**Tank, Supply:** Separate tank connected directly or by a pump to the oil-burning appliance.

**Tap (screw thread):** Tool used to cut internal threads.

**Temperature:** 1-Degree of hotness or coldness as measured by a thermometer. 2-Measurement of the speed of motion of molecules.

**Temperature Humidity Index:** Actual temperature and humidity of air Sample compared to air at standard conditions.

**Temperature Sensing Bulb:** Bulb containing a volatile fluid and bellows or diaphragm. Temperature increase on the bulb causes the bellows or diaphragm to expand.

**Test Light:** Light provided with test leads. Used to test or probe electrical circuits to determine if they are working properly.

**Therm:** Quantity of heat equal to 10.0,000 Btu.

**Thermal Conductivity:** The ability of a material to transfer heat.

**Thermal Precipitation:** The collection of dirt around warm air grilles.

**Thermal Relay (hot wire relay):** Heat-operated electrical control used to open or close a refrigeration system electrical circuit. This system uses a resistance wire to convert electrical energy into heat energy.

**Thermal Resistance:** See R-value.

**Thermistor:** A semiconductor with electrical resistance that varies with temperature.

**Thermocouple:** Device that generates electricity, using the principle that if two unlike metals are welded together and the junction is heated, a voltage will develop across the open ends.

**Thermo-disc Defrost Control:** Electrical switch with bimetal disc controlled by temperature changes.

**Thermodynamics:** Part of science that deals with the relationship between heat and mechanical action.

**Thermo-electric Refrigeration:** Refrigerator mechanism that depends on Peltier effect. Direct current flowing through an electrical junction between unlike metals provides heating or cooling effect, depending on direction of current flow.

**Thermometer:** Device for measuring temperatures.

**Thermo-modoule:** Number of thermocouples used in parallel to achieve low temperatures.

**Thermopile:** Number of thermocouples; used in series to create a higher voltage.

**Thermostat:** Device that senses ambient temperature conditions and, in turn acts to control a circuit.

**Thermostat Droop:** Added heat in line-voltage thermostat }, produced by the thermostat itself.

**Thermostatic Control:** Device which operates system or part of system based on temperature change.

**Thermostatic Expansion Valve (TEV):** Control valve operated by temperature and pressure within evaporator. It controls flow of refrigerant. Control bulb is attached to outlet of evaporator.

**Thermostatic Motor Control:** Device used to control cycling of unit through use of control bulb. Bulb reacts to temperature changes.

**Thermostatic Switch:** A switch controlled by temperature changes.

**Thermostatic Valve:** Valve controlled by temperature change response elements.

**Thermostatic Water Valve:** Valve used to control flow of water, actuated (made to work) by temperature difference. Used in units such as water-cooled compressors and condensers.

**Three-phase:** Operating by means of combination of three alternating current circuits that differ in phase by one-third of a cycle.

**Three-way Valves:** Flow control valve with three fluid flow openings.

**Throttling:** Expansion of gas through orifice or controlled opening without gas performing any work as it expands.

**Throw:** the distance air travels from a grille before slowing to 50 ft./minute.

**Time-delay Fuse:** A fuse that does not blow until the overload has persisted for a set duration of time (normally about 10 seconds).

**Timed On-Off Control:** Control needed when the existing differential is too great.

**Timers:** Clock-operated mechanism used to control opening and closing of an electrical circuit.

**Timer-thermostat:** Thermostat control which includes a clock mechanism. Unit automatically controls room temperature and changes temperature range depending on time of day.

**Ton of refrigeration:** Refrigerating effect equal to the melting of 1 ton of ice in 24 hours. This may be expressed as follows: 288,000 Btu/24 hr., 12,000 Btu/1hr., 200 Btu/min.

**Ton Refrigeration Unit:** Unit that removes same amount of heat in 24 hours as melting of one ton of ice.

**Torque:** Turning or twisting force.

**Torque Full Load:** Maximum torque delivered without overheating.

**Torque, Stall:** Torque developed when starting.

**Torque, Starting:** Amount of torque available to start and accelerate the load.

**Torque wrenches:** Wrench which may be used to measure torque or pressure applied to a nut or bolt.

**Torr:** A unit of pressure equal to 1/760 of an atmosphere (1 mm Hg), normally used for measuring vacuum, pressure.

**Total Air Balance (TAO):** In an air circulation system, adjusting the system, so that all rooms receive the proper amount of air.

**Total Energy Management (TEM):** Conservation concept where a building is looked at in terms of its total energy usage, rather than analyzing the requirements separate systems.

**Total heat:** Sum of both the sensible and latent heat.

**Toxicity:** A measure of the amount of poison in a substance or the amount of harm it can cause.

**Transducer:** Device turned on by a change of power from one source for the purpose of supplying power in a other form to a second system.

**Transformer:** Electromagnetic device that transfers electrical energy from the primary circuit into variations of voltage in a secondary

circuit.

**Transformer Rectifier:** Combination transformer and rectifier in which input ac current may be varied and rectified into dc current.

**Transistor:** Electronic device commonly used for amplification. Similar in use to electron tube. Depends on the conducting properties of semiconductors in which electrons moving in one direction are considered as leaving holes that serve as carriers of positive electricity in opposite direction.

**Transmission:** Heat loss or gain from a building through exterior components such as windows, walls, floors, etc.

**Triac:** Three-lead semiconductor that allows current flow in two directions when a preset voltage is applied at one of the leads.

**Trichlorotrifluoroethane:** Complete name of R-113. Group. A1 refrigerant in common use. Chemical compounds that make up this refrigerant are chlorine, fluorine, and ethane.

**Triple Point:** Pressure-temperature condition in which a substance is in equilibrium (balance) in solid, liquid, and vapor states.

**Troposphere:** Part of the atmosphere immediately above the earth's surface in which most weather changes occur.

**Troubleshooting:** The analysis of a problem.

**Truck, Refrigerated:** Commercial vehicle equipped to maintain cool temperatures.

**Tube-within-a-tube condenser:** Water-cooled condensing unit in which a small tube is placed inside a large unit. Refrigerant passes through the outer tube, water passes through the inner tube.

**Tubing:** Fluid-carrying thin-walled pipe

**Twin parallel:** Two or more units installed in line by piping.

**Two-pipe system:** A heating system in which one pipe delivers steam to radiators and a second pipe is used to return condensate.

**Two-position On-Off control:** A control system in which the control device can only start and stop the equipment.

**Two-stage vacuum pump:** A vacuum pump used to remove vapor and moisture from a system.

**Two-temperature valve:** Pressure-opened valve used in suction line on multiple refrigerator installations that maintains evaporators in system at different temperatures.

**Two-way valve:** Valve with one inlet port and one outlet port.

**U-value:** Represents the heat leakage from one side of a wall to the other.

**Ultrasonic:** Having a frequency above the range of human hearing.

**Ultraviolet:** Invisible radiation waves with frequencies shorter than wave lengths of visible light and longer than X rays.

**Unitary system:** A factory assembled heating/cooling system in one package and usually designed for conditioning one space or room.

**Universal motor:** Electric motor that will operate on either ac or dc.

**Unloader:** A device that allows for easier compressor start-up by temporarily reducing high-side pressure at the cylinder head.

**Upflow furnace:** A furnace in which air is forced up through the furnace from the bottom.

**Urethane Foam:** Type of foam insulation that is placed between the inner and outer walls of a container.

**Vacuum:** Pressure lower than atmospheric pressure.

**Vacuum Activators:** Dampers and control valves used in automotive air conditioning system; controlled by the vacuum created by engine intake manifold vacuum.

**Vacuum control system:** Intake manifold vacuum is used to operate dampers and controls in some automobile systems.

**Vacuum Pump:** Device used for creating vacuums for testing or drying purposes.

**Valve:** Device used for controlling fluid flow.

**Valve, Expansion:** Type of refrigerant control that maintains constant pressure in the low side of refrigerating mechanism. Valve is caused to operate by pressure in low or suction side. Often referred to as an automatic expansion valve, or AEV.

**Valve, service:** Device used to check pressures and charge refrigerating systems.

**Valve, solenoid:** Valve made to work by magnetic action through an electrically energized coil.

**Valve, suction:** Valve in refrigeration compressor that allows vaporized refrigerant to enter cylinder from suction line and prevents its return.

**Valve, water:** In most water cooling units, a valve that provides a flow of water to cool the system while it is running.

**Valve plate:** Part of the compressor located between the top of compressor body and the head. It contains compressor valves and ports.

**Vapor:** A gas that is often found in its liquid state while in use. The preferred name for vaporized refrigerant.

**Vapor, saturated:** Vapor condition that will result in condensation into droplets of liquid if temperature is reduced.

**Vapor Barrier:** Thin plastic or metal foil sheet used to prevent water vapor from penetrating insulating material.

**Vaporization:** Change of liquid into a gaseous state.

**Vapor lock:** Condition where liquid is trapped in a line because of a bend or improper installation. Such vapor prevents liquid flow.

**Vapor pressure:** Pressure imposed by a vapor.

**Vapor pressure curve:** Graphic presentation of various pressures produced by refrigerant under various temperatures.

**Vapor recovery method:** A refrigerant recovery system using relatively small equipment to remove refrigerant from residential, automobile, and light commercial units.

**Vapor velocity:** Speed or rate at which a gas moves.

**Variable Air Volume (VAV) controller:** Device having electronic components used to regulate the volume of air in a distribution system.

**Variable control:** A control that can make gradual adjustments to equipment, as opposed to a simple on/off control.

**Variable pitch pulley:** Pulley that can be adjusted to provide different pulley drive ratios.

**VAV:** See Variable air volume.

**V-belt:** Belt commonly used in refrigeration work with a contact surface and pulley in a V-shape.

**Velocimeter:** Instrument used to measure air speeds.

**Velocity:** Quickness of motion; swiftness speed. Change in position with respect to time.

**Ventilation:** Airflow from one area to another.

**Vibration absorbers:** Soft or flexible substance or device that will reduce the transmission of a vibration.

**Viscosity:** Resistance to flow,.

**V<sub>max</sub>:** Maximum (peak) voltage in alternating current cycle.

**Volatile:** Easily vaporized; A liquid that changes to the gaseous state readily.

**Voltage:** 1- Term used to indicate the electrical potential or electromotive force in an electrical circuit. 2-Voltage or electrical pressure which causes current to flow, 3-Electromotive force.

**Voltmeter:** Instrument for measuring, voltage in electrical circuit

**Volumetric efficiency:** Term used to express the relationship between the actual performance of a compressor or of a vacuum pump and theoretical performance of the pump based on its displacement.

**Vortex tube:** Mechanism for cooling or refrigerating that accomplishes cooling effect by releasing compressed air through a specially designed tube.

**V<sub>rms</sub>:** Root mean square voltage; average voltage equal to the maximum voltage multiplied by a constant.

**Walk-in cooler:** Larger, commercially refrigerated space. Often found in supermarkets or wholesale meat distribution centers.

**Water-cooled condenser:** See Condenser, water-cooled.

**Water coil:** A coil submerged in water to take advantage of the water's temperature.

**Water defrosting:** Use of water to melt ice and frost from the evaporator.

**Water hammer:** Noise generated by backpressure of water when a valve is closed.

**Water Spray:** A filtering device in which air is blown through a spray of water, removing solid contaminants, liquid contaminants, and water-soluble contaminants.

**Watt:** Unit of electrical power.

**Wax:** An ingredient in many lubricating oils that may separate from the oil.

**Wet bulb hygrometer:** See Psychrometer.

**Wet bulb temperature.** Measure of the degree of moisture. It is the temperature of evaporation for an air sample.

**Wet cell battery:** Cell or connected group of cells that converts chemical energy into electrical energy by reversible chemical reactions.

**Wet roof cooling:** Method of heat reduction in a building in which a pond of water is kept on the roof at all times. Heat from the sun is dissipated through the evaporation of water, so the roof surface remains cool.

**Wheatstone bridge:** Electronic circuit consisting of resistors and a thermistor. A temperature change causes the bridge to become unbalanced, which sends a signal to the output device.

**Wick system:** Lubricating method used in external-drive motors.

**Wind chill index:** A measure of how cold it feels, based on dry bulb temperature and wind velocity.

**Window unit:** Air conditioner that is placed in a window.

**Wobble plate:** See Swash plate.

**Work:** A force applied over a distance.

**Work hardening:** Increasing the strength of a material. (normally a metal) by bending and deforming it.

**Zeotropic:** A refrigerant blend, comprised of various refrigerants, that changes in volumetric composition and saturation temperature when used.

**Zero Ice:** Trade name for dry ice. See Dry ice.

**Zone Control:** Controls used to maintain each specific area or zone within a building at a desired condition. This is a type of distribution control often used in hydronic heating systems.