

Absolute Humidity - Amount of moisture in the air, indicated in grains per cubic foot.

Absolute Pressure - Gauge pressure plus atmospheric pressure (14.7 lbs. per sq. in.).

Absolute Temperature - Temperature measured from absolute zero.

Absolute Zero Temperature - Temperature at which molecular motion ceases.

Absorbent - Substance with ability to take-up, or absorb another substance.

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

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

Absorption Refrigerator - Refrigerator which creates low temperatures by using the cooling effect formed when a refrigerant is absorbed by chemical substance.

Accelerate - To add to speed; hasten progress of development.

Accumulator - Storage tank which receives liquid refrigerant from evaporator and prevents it from flowing into suction line.

Acid Condition - Condition in which refrigerant and/or refrigeration oil have become contaminated by the formation of acids. Typically caused by moisture introduced into system due to improper evacuation/dehydration of system after being open to, and exposed to the atmosphere.

ACR Tubing - Tubing used in refrigeration which has ends to keep tubing clean and dry.

Activated Alumina - Chemical 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 which has 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.

AFUE - Annual Fuel Utilization Efficiency, a rating that reflects the efficiency of a gas furnace in converting fuel to energy. A rating of 90 means that approximately 90% of the fuel is utilized to provide warmth to your home, while the remaining 10% escapes as exhaust.

Air - Invisible, odorless, and tasteless mixture of gases (consisting mostly of Nitrogen, Oxygen and Carbon Dioxide) which form earth's atmosphere.

Ampere - Unit of measure referring to the flow of electrons within a circuit. Both voltage (pressure) as well as amperage (flow) are required, or must be available to produce work (watts). In a circuit with a fixed resistance (Ohms), the value of volts vs. amps will change inversely in relation to each other.

ASME - American Society of Mechanical Engineers -Agency regulating design and construction of boiler and pressure vessels.

Back Pressure - Pressure in low side of refrigerating system; 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 - Unicellular microorganisms.

Baffle - Plate or vane used to direct or control movement of fluid or air within confined area.

Balance Point - The point at which the heating capacity of a heat pump is equal to the heat losses of the structure it is heating.

Barometer - Instrument to measuring atmospheric pressure. It may be calibrated in pounds per square inch or in inches of mercury in column.

Bath - A liquid solution used for cleaning, plating or maintaining a specified temperature.

BTU - British Thermal Unit. In scientific terms, it represents the amount of energy required to raise one pound of water one degree Fahrenheit. One BTU is the approximate equivalent to the heat given off by a single wooden kitchen match. For your home, it represents the measure of heat given off when fuel is burned for heating or the measure of heat extracted from your home for cooling. There is generally 1060 BTU of heat realized from burning one cubic foot of natural gas at sea level.

Cabinet - Housing of a refrigerator.

Cabinet Volume - The volume of the interior cabinet dimensions.

Cadmium Plated - Parts coated with thin corrosion-resistant covering of cadmium metal.

Calcium Sulfate - Chemical compound (CaSO_4) which is used as a drying agent or desiccant in liquid line (high side) filter-dryers.

Calibrate - to determine; position indicators as required to obtain accurate measurements.

Calorie - Heat required to raise temperature of one gram of water one degree centigrade.

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 nonconductor (condenser or capacitor) that permits storage of electrical energy in an electrostatic field.

Capacitor, Motor Running - Single or dual rated (two posts vs. three posts) device which limits current and is permanently (hence phrase PSC - Permanent Split Capacitor) installed, in series, between the motors run and start windings. The current limiting characteristics prevent the start winding from burning. Also improves motor's efficiency (improves power factor) by realigning the motor's voltage and current sin waves. A PSC motor will generally consume 40-50% less electricity when compared to an equivalent Shaded Pole design motor.

Capacitor, Motor Starting - Device utilized in single phase compressors and/or electric motors to boost starting torque. Reduces inrush current (lights dimming)

and associated internal heat generated with the motor windings. Typically black in color, and cylindrical.

CFM - A standard of airflow measurement. Cubic feet per minute. A typical system produces 400 CFM per ton of air conditioning.

Coil, Condenser or Outdoor - Located in the outdoor unit, the coil dissipates heat from the refrigerant. Hot vapor refrigerant is compressed by the compressor, and the refrigerant condenses from a vapor to a liquid state. Subcooling of condensed liquid occurs when all vapor is condensed. Role of outdoor coil is reversed in HEAT PUMPS, to that of EVAPORATOR COIL when placed in heating mode.

Coil, Evaporator or Indoor - The coil where heat is absorbed by warm air passing across. Liquid refrigerant boils as it is metered into coil, and changes from liquid to vapor. Role of indoor coil is reversed in HEAT PUMPS, to that of CONDENSER COIL when placed in heating mode.

Cold - A sensation felt as a result of the absence of heat. (Similarity: There is no true definition of darkness, other than the absence of light.)

Compressor - The heart or "pump" within an air conditioning or heat pump system. The compressor maintains adequate pressure to cause refrigerant to condense and flow in sufficient quantities to meet the cooling requirements of the system.

Damper - Valve for controlling airflow. Found in duct work, movable plate opens and closes to control airflow. Can be manually or automatically controlled to regulate airflow to desired system zones.

Deaeration - Act of separating air from a substance.

Decibel (dB) - Unit used for measuring relative loudness of sounds. One decibel is equal to approximate difference of loudness ordinarily detectable by human ear, the range of which is about 130 decibels on scale beginning with one for faintest audible sound.

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 which 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 - An evaporator operating at such temperatures that ice and frost on surface melts during off part of operating cycle.

Downflow Furnace - A furnace that pulls cold return air from its top and expels warm air at its base. Also referred to as counterflow (Flue gas travels up, circulated air travels down.).

Ductwork - Round or rectangular pipes or controlled paths acting as conduit for return, mixed, makeup, supply or exhaust air. Supply air is downstream of high pressure side of fan. Return air is upstream of low pressure inlet of fan.

Ebulator - A pointed or sharp edged solid substance inserted in flooded type evaporators to improve evaporation (boiling) of refrigerant in coil.

Eccentric - A circle or disk mounted off center. Eccentrics are used to adjust controls and connect compressor driveshafts to pistons.

Economizer - A mechanism that removes flash gas from the evaporator.

Eddy Currents - Induced currents flowing in a core.

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

Fahrenheit Scale - On a Fahrenheit thermometer, under standard atmospheric pressure, boiling point of water is 212 deg. and freezing point is 32 deg. above zero on its scale.

Fail Safe Control - Device which opens circuit when sensing element fails to operate.

Fan - A radial or axial flow device used for moving or producing artificial currents of air.

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

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

Field Pole - Part of stator of motor which concentrates magnetic field of field winding.

File Card - Tool used to clean metal files.

Filter - Device for removing small particles from a fluid.

Flame Test For Leaks - Tool which is principally a torch and when an air-refrigerant mixture is fed to flame, this flame will change color in presence of heated copper.

Flapper Valve - The type of valve used in refrigeration compressors which allows gaseous refrigerants to flow in only one direction.

Galvanic Action - Corrosion action between two metals of different electronic activity. The action is increased in the presence of moisture.

Gas - Vapor phase or state of a substance.

Gasket - A resilient or flexible material used between mating surfaces of refrigerating unit parts or of refrigerator doors to provide a leakproof seal.

Gasket, Foam - A joint sealing device made of rubber or plastic foam strips.

Gauge Manifold - A device constructed to hold compound and high pressure gauges containing hand valves to control flow.

Gauge, Vacuum - Instrument used to measure pressures below atmospheric pressure.

Halide Refrigerants - Family of refrigerants containing halogen chemicals.

Halide Torch - Type of torch used to detect halogen refrigerant leaks.

Head Pressure - Pressure which exists in condensing side of refrigerating system.

Head Pressure Control - Pressure operated control which opens electrical circuit if high side pressure becomes excessive.

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

Head, Velocity - In flowing fluid, height of fluid equivalent to its velocity pressure.

Heat - Invisible energy (except high intensity infra-red) caused by the motion of molecules within any substance or matter. Will always travel from warm/hot to cold, via either or a combination of conduction, convection or radiation. Materials which resist flow or transfer of heat are called insulators, or insulation.

Heat Exchanger - A device for the transfer of heat energy from the source to the conveying medium, with the latter often being air or water. Most common combinations are: Refrigerant to air or Refrigerant to water (DX), Water to air (hydronic), Steam to air, Steam to water.

Humidifier - A device introducing water vapor to conditioned space as a means to raise relative humidity and overall human comfort.

Humidity - The total amount of moisture in air. Relative humidity (RH), is the amount of moisture in air, relative to its total capability based upon its temperature (dewpoint). Moisture will condense on surfaces which are below this dewpoint.

HSPF - Heating Seasonal Performance Factor, a rating used in measuring the heating efficiency of a heat pump. The higher the number, the more efficient the unit.

HVAC - Heating, ventilation and air conditioning.

Ice Cream Cabinet - Commercial refrigerator which operates at approximately 0 F. and is used for storage of ice cream.

Idler - A pulley used on some belt drives to provide the proper belt tension and to eliminate belt vibration.

Ignition Transformer - A transformer designed to provide a high voltage current. Used in many heating systems to ignite fuel.

Impeller - Rotating part of a centrifugal pump.

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

Induction Motor - An AC motor which operates on principle of rotating magnetic field. Rotor has no electrical connection, but receives electrical energy by transformer action from field windings.

Insulation - Any material or substance which has the ability to retard the flow or transfer of heat.

Joule - Thomson Effect-Change in temperature of a gas on expansion through a porous plug from a high pressure to a lower pressure.

Journal, Crankshaft - Part of shaft which contacts the bearing.

Junction Box - Group of electrical terminals housed in protective box or container.

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

Kelvin Scale (K) - Thermometer scale on which unit of measurement equals the centigrade degree and according to which absolute zero is 0 deg., the equivalent of -273.15 deg. C. Water freezes at 273.15 deg. and boils at 373.15 deg

Kilowatt - Unit of electrical power, equal to 1000 watts.

Lacquer - A protective coating or finish which dries to form a film by evaporation of a volatile constituent.

Lamp, Steri - A lamp which gives forth a high intensity ultraviolet ray and is used to kill bacteria. It is often used in food storage cabinets.

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 form of substance (melting, vaporization, fusion) without change in temperature or pressure. Also referred to as "hidden" heat.

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

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

Liquid Absorbent - A chemical in liquid form which has the property to "take on" or absorb moisture.

Magnetic Clutch - A device operated by magnetism to connect or disconnect a power drive.

Magnetic Field - Space in which magnetic lines of force exists.

Magnetic Gasket - A sealing material which adheres due to small magnets inserted in gasket.

Magnetism - An electronic force causing a magnet to attract items made of iron or steel.

Manifold, Service - A device equipped with gauges and manual valves, used by serviceman to service refrigerating systems.

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

Mass - A quantity of matter cohering together to make one body, which is usually of indefinite shape.

Metering Device - TXV, capillary tube assembly, constant pressure expansion valve or bullet type piston orifice designed to regulate flow of liquid refrigerant entering the evaporator. Creates pressure drop to allow liquid refrigerant to boil and absorb latent heat. Separates high side of system from low side (as does the compressor).

Natural Convection - Movement of a fluid caused by temperature differences (density changes).

Neoprene - Synthetic rubber resistant to hydrocarbon based oils and gas. Also known by trade name Buna-N

Neutralizer - Substance used to counteract acids, in refrigeration system.

Neutron - Part of an atom core containing no electrical potential. It is electrically neutral.

No-Frost Freezer - Low temperature refrigerator-cabinet in which no frost or ice collects on produce

Nominal Size Tubing - Tubing measurement which has an inside diameter the same as iron pipe of the same stated size.

Off Cycle - That time period of a refrigeration cycle when the system is not operating.

OHM (R) - A standard unit of measure for electrical resistance. One ohm of resistance will allow one ampere of current to flow when one volt of electricity is applied to a circuit.

Ohmmeter - An instrument for measuring resistance in ohms.

Ohms Law - Mathematical relationships between voltage, current and resistance in an electric circuit, discovered by George Simon Ohm. It is stated as follows: voltage ($E = \text{Amperes (I)} \times \text{Ohms (R)}$); or $E = I \times R$.

Package System - A self-contained air conditioning and/or heating unit, whereas all components are located in one cabinet. Used primarily for commercial, and occasionally in residential applications, and installed either adjacent to structure or on roof.

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

Pascal's Law - A pressure imposed upon a fluid is transmitted equally in all directions.

Peletier Effect - When direct current is passes through two adjacent metals one junction will become warmer. This principle is the basis of thermoelectric refrigeration.

Permanent Magnet - A material which has its molecules aligned and has its own magnetic field; bar of metal which has been permanently magnetized.

Photoelectricity - A physical action wherein an electrical flow is generated by light waves.

Pinch-Off Tool - Device used to press walls of a tubing together until fluid flow ceases.

Piston - Close fitting part which moves up and down in a cylinder.

Piston Displacement - Volume displaced by piston as it travels length of stroke.

PSC Motor - High-efficiency design motor used on virtually all of today's HVAC & R equipment requiring motors over 1/10hp. An upgrade from Shaded Pole design motors. See Capacitor, Motor Running.

Psychrometer - Either a sling type, or electronic. Instrument used to determine wet bulb temperatures and relative humidity. Combining RH with dry bulb temperature will yield total heat.

Quenching - Submerging hot solid object in cooling fluid.

Quick Connect Coupling - A device which permits easy, fast, connecting of two fluid lines.

Radial Commutator - Electrical contact surface on a rotor which is perpendicular or at right angles to the shaft center line.

Radiant Heating - Heating system in which warm or hot surfaces are used to radiate heat objects and thereby condition space. Universaly, heat radiated from our sun traveling through Earth's atmosphere and is absorbed by its surface (except that small amount absorbed by CO₂ or other atmospheric "greenhouse" gases). Absorbed radiant heat then spreads via conduction through surface objects, and then heats the surrounding air via convection. This means

(Radiant/Conduction/Convection) is the same principal which also applies to modern radiant heating methods in homes today.

Radiation - Transfer of heat by heat waves. Same type of heat as what is felt by the sun's rays, even though the outside temperature may be cool.

Range - Pressure or temperature settings of a control; change within limits.

Receiver Heating Element - Electrical resistance mounted in or around liquid receiver, used to maintain head pressures when ambient temperature is at freezing or below freezing.

Reciprocating - Action in which the motion is back and forth in a straight line.

Recording Ammeter - Electrical instrument which used a pen to record amount of current flow on a moving paper chart.

Refrigerant - A substance produces a refrigerating or cooling (heat absorbing) effect while expanding or vaporizing.

Refrigeration - The moving of heat from an undesirable location, to that of a location where its presence is less undesirable.

Reversing Valve - A device in a heat pump that reverses the flow of refrigerant as the system is switched from cooling to heating. Also called a switchover or four-way valve.

Saddle Valve (Tap-A-Line) - Self piercing valve body designed to be permanently silver brazed or clamped to refrigerant tubing surface. Provides system access to monitor pressure, charge or evacuate refrigerant.

Safety Control - Device used to electrically shut down a refrigerating unit when unsafe pressures and/or temperatures exist.

Safety Motor Control - Electrical device used to open circuit if the temperature, pressure, and/or the current flow exceed safe conditions.

Safety Plug - Device which releases the contents of a container above normal pressures, and before rupture pressures are reached.

Saturation - Condition existing when substance contains maximum of another substance for that temperature and pressure.

Saturation Temperature - The temperature where a refrigerant exists in both liquid and vapor form relative to its measured pressure.

SEER - Seasonal Energy Efficiency Ratio, a rating that measures the cooling efficiency of a heat pump or air conditioner (BTU output / Watt of energy consumption). The higher the number, the more efficient the unit.

Sensible Heat - That heat that which be measured using a thermometer or thermocouple probe (as opposed to latent heat).

Split System - A comfort system consisting of components in two locations. Common examples include an outside unit, such as an air conditioning condenser, and an indoor unit, such as a furnace and mounted evaporator coil or air handler.

Super Heat - The temperature rise within an evaporator/suction line assembly from the evaporator's saturation temperature.

Sub Cooling - Process whereas additional sensible heat (as opposed to latent heat) is removed from condensed refrigerant liquid prior to the metering device. The proper method for charging a system utilizing a TXV.

Tap-A-Line - Device used to puncture or tap a line where there are no service valves available; sometimes called a saddle valve.

Tap Drill - Drill used to form hole prior to placing threads in hole. The drill is the size of the root diameter of tap threads.

Tap (Screw Thread) - Tool used to cut internal threads.

Teflon - Synthetic rubber material often used for O rings.

Temperature - Degree of hotness or coldness as measured by a thermometer; measurement of speed of motion of molecules.

Temperature Humidity Index - Actual temperature and humidity of sample of air, compared to air at standard conditions.

Test Light - Light provided with test leads, used to test or probe electrical circuits to determine if they are alive.

Thermostat - A temperature control device. In HVAC, typically wall mounted in conditioned space. Programmable thermostats allow varying levels of comfort during different times of day.

Therm - Quantity of heat equivalent to 100,000 Btu.

TON - A unit of measurement used for determining cooling capacity. One ton is the equivalent of 12,000 BTUs per hour.

TXV - Thermostatic Expansion Valve. A metering valve which acts as a superheat controller. Most are mechanically operated, and utilize a remote sensing bulb attached to the outlet of the evaporator assembly (via a sealed capillary tube) to regulate flow of sub-cooled liquid refrigerant at the evaporator inlet.

Ultraviolet - Invisible radiation waves with frequencies shorter than wave lengths of visible light and longer than X-Ray.

Universal Motor - Electric motor operable on both AC and DC.

Urethane Foam - Type of insulation foamed in between inner and outer walls of display case.

Vacuum - Reduction in pressure below atmospheric pressure.

Vacuum Control Systems - In many automobile air conditioning systems, intake manifold vacuum is used to operate dampers and controls in system.

Vacuum Pump - Special high efficiency device (pump) used create deep vacuum within an HVAC/R systems, for the purpose of moisture removal (dehydration), removal of non-condensibles and can also be used, as well, for leak checking.

Valve, Service - Typically, a multi-ported valve used by service technicians to isolate remote system components, as well as check pressures and charge refrigerating units.

Valve, Solenoid - Valve actuated by magnetic action by means of an electrically energized coil. Walk-In Cooler-Large commercial refrigerated space kept below room temperature. Often found in large supermarkets or wholesale meat distribution centers.

Volt - Electrical "pressure" applied to a circuit. One volt will cause one ampere of current (volume) to flow in a circuit containing one ohm of resistance.

Water -Cooled Condenser - Condensing unit which is cooled through use of water.

Water Defrosting - Use of water to melt ice and frost from evaporator during off-cycle.

Watt - Unit of electrical power. In non-inductive DC circuits, Volts x Amps = Watts.

Wax - Undesirable component in many refrigeration lubricants, which may separate out of solution if cooled sufficiently.

Wet Bulb - Device used in measurement of relative humidity. Evaporation of moisture lowers temperature of wet bulb compared to dry bulb temperature in same area.

Wet Cell Battery - Cell or connected group of cells that converts chemical energy into electrical energy by reversible chemical reactions.

Zoning - A method of dividing a home or building into separate zones and enabling individual control (and \$ savings) by limiting HVAC resources to only occupied zones, or those calling for such.