

TERMINOLOGY

DEFINITIONS OF TERMS

ABSOLUTE HUMIDITY: The weight of water vapor in a given amount of air. Grains per cubic foot.

ABSOLUTE PRESSURE: Pressure measured with a base of zero.

ABSOLUTE TEMPERATURE: A temperature scale expressed in degrees, F or C, using absolute zero as a base. Referred to as the Rankin or Kelvin scale.

ABSOLUTE ZERO: The temperature at which molecular activity theoretically ceases (-459.69°F or -273.16°C)

AFUE %: AFUE stands for "annual fuel utilization efficiency". This rating is based on average usage, including on and off cycling, as set out in the standardized Department of Energy test procedures.

AIR CONDITIONING: The process of controlling the temperature, humidity, cleanliness and distribution of the air.

AIR STANDARD CONDITIONS: Conditioning at which BTU ratings for summer air conditioning equipment is rated. 95°F dry bulb, 75°F wet bulb at the condenser inlet and 80°F dry bulb, 67°F wet bulb at the evaporator inlet.

AIR: Atmospheric air is composed of approximately 78% Nitrogen, 21% Oxygen and 1% rare gases including Carbon Dioxide, Krypton, Neon, Argon, Ozone, Helium and Ammonia. Over the sea, traces of salt are present, and over the land, traces of sulfates. Dust and micro-organisms are also present.

ATMOSPHERIC PRESSURE: The weight of 1 square inch column of the earth's atmosphere. At sea level this pressure is 14.696 pounds per square inch.

BIMETAL: Two metals with different rates of expansion fastened together. When heated or cooled they will warp and can be made to open or close a switch or valve.

BOILING POINT: The temperature at which the addition of any heat will begin a change of state from a liquid to a vapor.

BRITISH THERMAL UNIT (BTU): The amount of heat necessary to raise the temperature of 1 pound of pure water (about 1 pint) by 1° Fahrenheit.

CAPILLARY TUBE: A refrigerant control consisting of a small diameter tube which controls flow by restriction. They are carefully sized by inside diameter and length for each particular application.

CENTIGRADE: A temperature scale with the freezing point of water 0° and the boiling point 100° at atmospheric pressure.

COEFFICIENT OF PERFORMANCE (COP): A ratio calculated by dividing the total heating capacity provided by the refrigeration system, including circulating fan heat but excluding supplementary resistance (BTUs per hour), by the total electric input (watts) x 3.412.

COMPRESSION: The reduction of volume of a vapor or gas by mechanical means.

COMPRESSOR: A mechanical device used to compress gases. Four main types are: Reciprocating; Centrifugal, Rotary and Scroll.

CONDENSATION POINT: The temperature at which removal of any heat will begin a change of state from a vapor to a liquid.

CONDENSER: A device in which the superheat and latent heat of condensation are removed to effect a change of state from a vapor to a liquid. Some sub-cooling is also usually accomplished.

CONDENSING MEDIUM: The substance, usually air or water, to which the heat in a condenser is transferred.

CONDENSING UNIT: The portion of a refrigeration system where the compression and condensation of refrigerant is accomplished. Sometimes referred to as the "high side".

CONDUCTION: The transfer of heat from molecule to molecule within a substance.

CONTACTOR: An electro-magnetic actuated relay. Usually used to refer to the relay which closes the circuit to a compressor.

CONVECTION: The transfer of heat by a moving fluid.

COOLING ANTICIPATOR: A resistance heater (usually not adjustable) in parallel with the cooling circuit. It is "on" when the circuit is "off" adding heating to shorten the off cycle.

CYCLE: The complete course of operation of a refrigerant back to a selected starting point in a system. Also used to describe alternating current through 360 space degrees.

DENSITY: Mass or weight per unit of volume, i.e.: Standard air .075 pounds per cubic foot.

DISCHARGE LINE: A tube used to convey the compressed refrigerant vapor from the compressor to the condenser inlet.

DISCHARGE PRESSURE: The pressure read at the compressor outlet. Also called head pressure or high pressure.

DOE: Department of Energy.

DRY BULB TEMPERATURE: Temperature read with an ordinary thermometer.

ENERGY EFFICIENT RATIO (EER): A ratio calculated by dividing the cooling capacity in BTUs per hour (BTUH) by the power input in watts or any given set of rating conditions, expressed in BTUH per watt (BTUH/watt).

EVAPORATIVE COOLING: The cooling effect of vaporization of a liquid in a moving air system.

EVAPORATOR SUPERHEAT: The actual temperature of the refrigerant vapor at the evaporator exit as compared to the saturated vapor temperature indicated by the suction pressure.

EVAPORATOR: A device in which a liquid refrigerant is vaporized. Some superheating usually takes place.

FAHRENHEIT: A temperature scale with freezing point of water 32° and the boiling point 212° at atmospheric pressure.

FREEZING POINT: The temperature at which the removal of any heat will begin a change of state from liquid to a solid.

GAUGE PRESSURE: Pressure measured with atmospheric pressure as a base.

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HEAT EXCHANGER: A device for the transfer of heat energy from the source to the conveying medium.

HEAT FLOW: Heat flows from a warmer to a cooler substance. The rate depends upon the temperature difference, the area exposed and the type of material.

HEAT OF COMPRESSION: The heat added to a vapor by the work done on it during compression.

HEAT OF THE LIQUID: The increase in total heat (Enthalpy) per pound of saturated liquid as its temperature is increased above a chosen base temperature. (Usually -40°F for refrigerants). It is expressed in BTUs.

HEAT TRANSFER: The three methods of heat transfer are conduction, convection and radiation.

HEAT: A form of energy causing the agitation of molecules within a substance.

HEATING SEASONAL PERFORMANCE FACTOR (HSPF): The total heating output of a heat pump during its normal annual usage period for heating divided by the total electric power input in watt-hours during the same period.

INCHES OF MERCURY: Atmospheric pressure is equal to 29.92 inches of mercury.

LATENT HEAT OF CONDENSATION: The amount of heat energy, in BTUs, that must be removed to change the state of 1 pound of a vapor to 1 pound of liquid at the same temperature.

LATENT HEAT OF FUSION: The amount of heat energy, in BTUs, required to change the state of 1 pound of a liquid to 1 pound of solid at the same temperature.

LATENT HEAT OF MELTING: The amount of heat energy, in BTUs, that must be removed to change the state of 1 pound of a solid to 1 pound of liquid at the same temperature.

LATENT HEAT OF VAPORIZATION: The amount of heat energy, in BTUs, required to change the state of 1 pound of liquid to 1 pound of vapor at the same temperature.

LATENT HEAT: Heat that produces a change of state without a change in temperature. i.e.: Ice to water at 32°F; Water to steam at 212°.

LIQUID LINE: A tube used to convey the liquid refrigerant from the condenser outlet to the refrigerant control device of the evaporator.

MANOMETER: A tube filled with liquid used to measure pressure.

MELTING POINT: The temperature at which the addition of any heat will begin a change of state from a solid to a liquid.

MERCURY MANOMETER: Used to measure vacuum in inches of mercury.

MICRON: A unit used to measure high vacuums. One micron equals 1/25,400 of 1 inch mercury.

PARTIAL PRESSURE: The pressure exerted by an individual gas in a mixture.

PRESSURE - TEMPERATURE RELATIONSHIP: The change effected in temperature when pressure is changed or visa versa. Only used at saturated conditions. An increase in pressure results in a temperature increase. A decrease in temperature results in a pressure decrease.

PRESSURE DROP: The decrease in pressure due to friction of a fluid or vapor as it passes through a tube or duct.

PSYCHROMETER: A device having both a dry and a wet bulb thermometer. It is used to determine the relative humidity in a conditioned space. Most have an indexed scale to allow direct conversion from the temperature readings to the percentage of relative humidity.

PSYCHROMETRIC CHART: A chart on which can be found the properties of air under varying conditions of temperature, water vapor content, volume, etc.

RADIATION: The transfer of heat without an intervening medium. It is absorbed on contact with a solid surface.

REFRIGERANT CONTROL: A device used to meter the amount of refrigerant to an evaporator. It also serves as a dividing point between the high and low pressure sides of the system.

REFRIGERANT: A substance which produces a refrigerating effect while expanding or vaporizing.

REFRIGERATION: The transfer of heat from a place where it is not wanted to a place where its presence is not undesirable.

RELATIVE HUMIDITY: The percentage of water vapor present in a given quantity of air compared to the amount it can hold at its temperature.

RELAY: A device used to open and close an electrical circuit. The relay may be actuated by a bimetal electrically heated strip, a rod wrapped with a fine resistance wire causing expansion when energized, a bellows actuated by expansion of a fluid or gas or an electromagnetic coil.

SATURATED VAPOR: Vapor in contact with a liquid.

SATURATION: A condition of stable equilibrium of a vapor and a liquid.

SEASONAL ENERGY EFFICIENCY RATIO (SEER): The total cooling of a central unitary air conditioner or unitary heat pump in BTUs during its normal annual period for cooling divided by the total electric energy input in watt-hours during the same period.

SENSIBLE HEAT: Heat that can be measured or felt. Sensible heat always causes a temperature rise.

SOUND RATING (SR): A tone corrected A-weighted sound power level expressed in bels. The Sound Rating is based on tests performed at Standard Rating Conditions (cooling).

SPECIFIC HEAT: The amount of heat necessary to change the temperature of 1 pound of substance 1°F.

SPECIFIC VOLUME: The volume of a substance per unit of mass. i.e.: standard air 13.33 cubic feet per pound. The reciprocal of density.

STANDARD AIR DENSITY: .075 pounds per cubic foot. Equivalent to dry air at 70°F and at sea level pressure.

STATE CONDITION: Substances can exist in three states – Solid, Liquid or Vapor.

SUB-COOLING: Cooling of a liquid, at a constant pressure, below the point at which it was condensed.

SUCTION LINE: A tube used to convey the refrigerant vapor from the evaporator outlet to the suction inlet of a compressor.

SUCTION PRESSURE: The pressure read at the inlet side of a compressor. Also called back pressure or low side pressure.

SUPERHEAT: Heat added to a vapor after all liquid has been vaporized.

TEMPERATURE: A measure of heat intensity.

THERMOSTAT: A switch to close and open a circuit to indicate or terminate operation of a heating or air conditioning system.

THERMOSTATIC EXPANSION VALVE: Refrigerant control which monitors the flow rate according to the superheat at the evaporator outlet.

TON OF REFRIGERATION: The amount of heat necessary to completely melt 1 ton of 32°F ice in 24 hours. 200 BTUs per minute; 12,000 BTUs per hour; 288,000 BTUs in 24 hours. This is based on the latent heat fusion for ice which is 144 BTUs per pound.

TOTAL HEAT: (Enthalpy) The total heat energy in a substance. The sum of sensible and latent heat.

TOTAL PRESSURE: The sum of all partial pressures in a mixture of gases.

VACUUM: Any pressure below atmosphere pressure.

WATER MANOMETER: Used to measure pressure in inches of water.

WET BULB TEMPERATURE: Temperature read with a thermometer whose bulb is encased in a wetted wick.