

Heating Surface: The exterior surface of a heating unit. *Extended heating surface (or extended surface):* Heating surface consisting of fins, pins or ribs which receive heat by conduction from the prime surface. *Prime Surface:* Heating surface having the heating medium on one side and air (or extended surface) on the other. (See also *Boiler Heating Surface*.)

Heat of the Liquid: This can usually be interpreted as the specific enthalpy of saturated liquid.

Hot Water Heating System: A heating system in which water is used as the medium by which heat is carried through pipes from the boiler to the heating units.

Humid Heat: Ratio of increase of enthalpy per pound of dry air to rise of temperature under conditions of constant pressure and constant humidity ratio.

Humidity: To increase, by any process, the density of water vapor within a given space.

Humidistat: A regulatory device, actuated by changes in humidity, used for the automatic control of relative humidity.

Humidity: Water vapor when mixed with dry air or other diluent gases. *Absolute humidity* is the weight of water vapor per unit volume of moist air, pounds per cubic foot. It can be calculated by dividing the humidity ratio, weight of water vapor per pound of dry air, by the volume of the mixture per pound of dry air. *Relative humidity* is the ratio of the partial pressure of the water vapor in the air to the saturation pressure of pure water corresponding to the actual temperature. (See Chapter 1.)

Humidity Ratio: Weight of water vapor per pound of dry air. (Formerly called specific humidity.)

Hygrostat: Same as *Humidistat*.

Inch of Water: The pressure due to a column of liquid water one inch high at a temperature of 60 F.

Insulation (Heat): A material having a relatively high heat-resistance per unit of thickness.

Isobaric: An adjective used to indicate a change taking place at constant pressure.

Isothermal: An adjective used to indicate a change taking place at constant temperature.

Latent Heat: Latent heat is the heat required to produce a change of state at constant temperature. The most general interpretation is heat absorbed at constant temperature. More specifically the *latent heat of vaporization* is the difference between the specific enthalpies of saturated vapor and saturated liquid at the same temperature (and, for a pure substance, the same pressure). *Latent heat of sublimation* is the difference between the specific enthalpies of saturated vapor and saturated solid at the same temperature. *Latent heat of fusion* is the difference between the specific enthalpies of saturated liquid and saturated solid at the same temperature.

Laws of Thermodynamics: The Law of Conservation of Energy states that energy, in any of its forms, can neither be created nor destroyed. As a corollary to this, the *First Law of Thermodynamics* states that in any power cycle or refrigeration cycle the net heat absorbed by the working substance is exactly equal to the net work done. The *Second Law of Thermodynamics* states that a power cycle which absorbs heat at a single temperature and converts it wholly into work, as required by the First Law, is impossible; hence it is absolutely necessary to reject heat at some lower temperature if any work is to be done. The Second Law further prescribes the least possible quantity of heat that must be so rejected depending on the two temperatures involved.

Manometer: An instrument for measuring pressures; essentially a U-tube partially filled with a liquid, usually water, mercury, or a light oil, so the amount of displacement of the liquid indicates the pressure being exerted on the instrument.

Mass: The quantity of matter, in pounds, to which the unit of force (one pound) will give an acceleration of one foot per second per second. $m = W \div g$.

Mb, Mbh: Symbols which represent, respectively, 1000 Btu and 1000 Btu per hour.

Mechanical Equivalent of Heat: The conversion factor from Btu to foot pounds; $J = 778.3$ foot pounds per Btu. This is also referred to as Joule's Equivalent.

Micron: A unit of length, the thousandth part of one millimeter or the millionth of a meter.

Mol (Pound Mol): A weight in pounds numerically equal to the molecular weight of a substance. In the case of gases, and at not too high pressures, the volume of 1 mol is approximately the same for any gas at the same temperature and pressure. At 32 F and standard atmospheric pressure this volume is 358.65 cu ft.

One-Pipe Supply Riser (Steam): A pipe which carries steam upward to a heating unit and which also carries the condensation from the heating unit in a direction opposite to the steam flow.

One-Pipe System (Hot Water): A hot water system in which the cooled water from the heating units is returned to the supply main. Consequently, the heating units farthest from the boiler are supplied with cooler water than those near the boiler in the same circuit.

One-Pipe System (Steam): A steam heating system consisting of a main circuit in which the steam and condensate flow in the same pipe, usually in opposite directions. Ordinarily to each heating unit there is but one connection which must serve as both the supply and the return, although separate supply and return connections may be used.

Overhead System: Any steam or hot water system in which the supply main is above the heating units. With a steam system the return must be below the heating units; with a water system, the return may be above the heating units.

Panel Radiator: A heating unit placed on or flush with a flat wall surface and intended to function essentially as a radiator.

Plenum Chamber: An air compartment maintained under pressure and connected to one or more distributing ducts.

Potentiometer: An instrument for measuring or comparing small electromotive forces.

Power: The rate of performing work; usually expressed in units of horsepower, Btu per hour, or watts.

Prime Surface: See *Heating Surface*.

Psychrometer: An instrument for ascertaining the humidity or hygrometric state of the atmosphere. *Psychrometric:* Pertaining to psychrometry or the state of the atmosphere as to moisture. *Psychrometry:* The branch of physics that treats of the measurement of degree of moisture, especially the moisture mixed with the air.

Pyrometer: An instrument for measuring high temperatures.

Radiant Heating (Panel Heating): A method of heating involving the installation of the heating units (pipe coils) within the wall, floor or ceiling of the room, so that the heating process takes place mainly by radiation from the wall, floor or ceiling surfaces to the objects in the room. As used in Chapter 45, *panel heating* refers to a system transmitting heat by both radiation and convection to both air and surrounding surfaces, while *radiant heating* refers to a system dependent on radiation alone in which case only the heat radiated from the panel is effective for heating purpose.

Radiation: The transmission of heat through space by wave motion.

Radiator: A heating unit exposed to view within the room or space to be heated. A radiator transfers heat by radiation to objects within visible range and by conduction to the surrounding air which in turn is circulated by natural convection; a so-called *radiator* is also a *convector* but the single term *radiator* has been established by long usage.

Recessed Radiator: A heating unit set back into a wall recess but not enclosed.

Refrigerant: A substance which produces a refrigerating effect by its absorption of heat while expanding or vaporizing.

Relative Humidity: See *Humidity*; also discussion relative humidity, Chapter 1.

Return Mains: The pipes which return the heating medium from the heating units to the source of heat supply.

Reversed-Return System (Hot Water): A hot water heating system in which the water from several heating units is returned along paths arranged so that all circuits composing the system or composing a major sub-division of the system are practically of equal length.