

Saturated Air: A mixture of dry air and saturated water vapor, all at the same dry-bulb temperature. It may also be considered as air containing the maximum possible amount of water vapor at a given temperature without becoming supersaturated.

Saturation: The condition for coexistence in stable equilibrium of two or more distinct phases, such as steam over the water from which it is being generated.

Saturation Pressure: The saturation pressure for a pure substance for any given temperature is that pressure at which vapor and liquid or vapor and solid can coexist in stable equilibrium.

Sensible Heat: Heat which manifests itself by temperature change.

Smoke: Carbon or soot particles less than 0.1 micron in size which result from the incomplete combustion of carbonaceous materials such as coal, oil, tar, and tobacco.

Smokeless Arch: An inverted baffle placed in an up-draft furnace toward the rear to aid in mixing the gases of combustion and thereby to reduce the smoke produced.

Specific Enthalpy: The ratio of total enthalpy to total weight. The specific enthalpy of air is its enthalpy, Btu per pound, measured above 0 F and 29.921 in. Hg as a reference point. The specific enthalpy of water is its enthalpy, Btu per pound, measured from the reference point of saturated liquid at 32 F. (See *Enthalpy*.)

Specific Gravity: The ratio of the weight of a body to the weight of an equal volume of water at some standard temperature, usually 39.2 F.

Specific Heat: The ratio of heat absorbed per unit weight of substance to temperature rise. For gases, both specific heat at constant pressure, c_p , and specific heat at constant volume, c_v , are frequently given. In air conditioning, c_p is usually used.

Specific Volume: The volume, expressed in cubic feet, of one pound of a substance.
 $v = 1 \div d = V \div W$.

Split System: A system in which the heating and ventilating are accomplished by means of radiators or convectors supplemented by mechanical circulation of air (heated or unheated) from a central point.

Square Foot of Heating Surface (Equivalent): Equivalent Direct Radiation (EDR). That amount of heating surface which will give off 240 Btu per hour. The equivalent square feet of heating surface may have no direct relation to the actual surface area.

Stack Height: The height of a gravity convector between the bottom of the heating unit and the top of the outlet opening.

Standard Air: Air weighing 0.075 lb per cubic foot. (The density of air at 29.921 in. Hg barometric pressure, 68 F dry-bulb and 50 per cent relative humidity is 0.07497; and dry air at 70 F dry-bulb is 0.07496.)

Static Pressure: The normal force per unit area that would be exerted by a moving fluid on a small body immersed in it if the body were carried along with the fluid. Practically, it is the normal force per unit area at a small hole in a wall of the duct through which the fluid flows (piezometer) or on the surface of a stationary tube at a point where the disturbances created by inserting the tube cancel. It is supposed that the thermodynamic properties of a moving fluid depend on static pressure in exactly the same manner as those of the same fluid at rest depend upon its uniform hydrostatic pressure.

Steam: Water in the vapor phase. *Dry Saturated Steam* is steam at the saturation temperature corresponding to the pressure, and containing no water in suspension. *Wet Saturated Steam* is steam at the saturation temperature corresponding to the pressure, and containing water particles in suspension. *Superheated Steam* is steam at a temperature higher than the saturation temperature corresponding to the pressure.

Steam Heating System: A heating system in which heat is transferred from the boiler or other source of steam to the heating units by means of steam at, above, or below atmospheric pressure.

Steam Trap: A device for allowing the passage of condensate and preventing the passage of steam, or for allowing the passage of air as well as condensate.

Superheated Steam: See *Steam*.

Supply Mains (Steam): The pipes through which the steam flows from the boiler or source of supply to the run-outs and risers leading to the heating units.

Surface Conductance: The amount of heat (Btu) transmitted by radiation, conduction, and convection from a surface to the air or liquid surrounding it, or vice versa, in one hour per square foot of surface for a difference in temperature of 1 deg between the surface and the surrounding air or liquid.

Therm: 100,000 Btu. (Used in the gas industry.)

Thermal Resistance: The reciprocal of *conductance*.

Thermal Resistivity: The reciprocal of *conductivity*.

Thermostat: An instrument which responds to changes in temperature and which directly or indirectly controls the source of heat supply.

Ton of Refrigeration: The removal of 12,000 Btu of heat per hour at a low temperature.

Ton Day of Refrigeration: The removal of 288,000 Btu of heat at a low temperature.

Total Heat: This can usually be interpreted as increase of enthalpy at constant pressure. It is often regarded as synonymous with enthalpy.

Total Pressure: In the theory of the flow of fluids; the sum of the static pressure and the velocity pressure at the point of measurement.

Tube (or Tubular) Radiator: A cast-iron heating unit used as a radiator and having small vertical tubes.

Two-Pipe System (Steam or Water): A heating system in which one pipe is used for the supply of the heating medium to the heating unit and another for the return of the heating medium to the source of heat supply. The essential feature of a two-pipe system is that each heating unit receives a direct supply of the heating medium which medium cannot have served a preceding heating unit.

Underfeed Distribution System (Hot Water): A hot water heating system in which the main flow pipe is below the heating unit.

Underfeed Stoker: A stoker which feeds the coal underneath the fuel bed.

Unit: As applied to heating, ventilating and air conditioning equipment this word means factory-built and assembled equipment with apparatus for accomplishing some specified function or combination of functions. (See Chapters 21 and 22.)

It is loosely applied to a great variety of equipment. Usually the function is included in the name, and hence come terms like Unit Heater, Unit Ventilator, Humidifying Unit, and Air Conditioning Unit.

Units are said to be *direct* or *room*, when intended for location, or located in, the treated space; *indirect* or *remote*, when outside or adjacent to the treated space. They are *ceiling* units when suspended from above, and *floor* when supported from below. Other descriptive words include *free delivery* when the unit is not intended to be attached to ducts or similar resistance-producing devices, and *pressure* when for use with such ducts. Complete description requires the use of several of these qualifying words or phrases. (See Chapter 22.)

Up-Feed System (Steam): A steam heating system in which the supply mains are below the level of the heating units which they serve.

Vacuum Heating System: A two-pipe steam heating system equipped with the necessary accessory apparatus which will permit operating the system below atmospheric pressure when desired.

Vapor: Any substance in the gaseous state.

Vapor Heating System: A steam heating system which operates under pressures at or near atmospheric and which returns the condensation to the boiler or receiver by gravity. Vapor systems have thermostatic traps or other means of resistance on the return ends of the heating units for preventing steam from entering the return mains; they also have a pressure-equalizing and air-eliminating device at the end of the dry return. *Direct Vent Vapor System:* A vapor heating system with air valves which do not permit re-entry of air.

Vapor Pressure: Synonymous with saturation pressure in the case of a pure substance.