

sooner than it would be without such means, to produce a smaller differential of the controlled property.

control, dual effect: one responsive to temperatures of two zones, or to two variable conditions.

control, high pressure: pressure-responsive device (usually an electric switch), actuated directly by the refrigerant vapor pressure on the high side of a refrigerating system (usually compressor head pressure).

control, low-pressure: a pressure-responsive device (usually an electric switch), actuated directly by refrigerant vapor pressure in the low side of a refrigerating system.

convection: transfer of heat by movement of fluid.

convection, forced: convection resulting from forced circulation of a fluid, as by a fan, jet or pump.

convection, natural: circulation of gas or liquid (usually air or water) due to differences in density resulting from temperature changes.

convactor: an agency of convection. In heat transfer, a surface designed to transfer its heat to a surrounding fluid largely, or wholly, by convection. The heated fluid may be removed mechanically or by gravity (Gravity Convactor). Such a surface may or may not be enclosed or concealed. (See also definition of radiator.) (See also Chapter 55.)

cooler, cold storage: an insulated room maintained at 30°F or above.

cooling, direct method of refrigeration: a system in which the evaporator is in direct contact with the material or space refrigerated or is located in air circulating passages communicating with such spaces.

cooling, indirect method of refrigeration: a system in which a liquid, such as brine or water, cooled by the refrigerant, is circulated to the material or space refrigerated or is used to cool air so circulated.

copper plating: a film of copper deposited by electrical immersion, or other means on the surface of another material such as iron or steel. In refrigeration, usually occurs on compressor walls, pistons, discharge valves, and shaft or seal.

core area: the total plane area of the portion of a grille bounded by a line tangent to the outer edges of the outer openings through which air can pass.

corresponding values: simultaneous values of various properties of a fluid, such as pressure, volume, temperature, etc., for a given condition of fluid.

corrosive: having chemically destructive effect on metals (occasionally on other materials).

counterflow: in heat exchange between two fluids, opposite direction of flow, coldest portion of one meeting coldest portion of the other.

critical point: of a substance, state point at which liquid and vapor have identical properties; critical temperature, critical pressure and critical volume are the terms given to the temperature, pressure and volume at the critical point. Above the critical temperature or pressure there is no line of demarcation between liquid and gaseous phases.

cryohydrate: a frozen mixture of water and a salt; a brine mixed in eutectic proportions to give the lowest freezing point.

cutting room: cold room in which animal carcasses are cut up into commercial sizes such as rib roast, legs, etc.

cycle: a complete course of operation of working fluid back to a starting point, measured in thermodynamic terms (functions). Also used in general for any repeated process on any system.

cycle, binary vapor: a refrigerating cycle in which two separate refrigerants are used, one superimposed upon and augmenting the cycle of the other.

cycle, Carnot: a sequence of reversible processes forming the reversible working cycle of an ideal heat engine of maximum thermal efficiency. It consists of isothermal expansion, adiabatic expansion, isothermal compression and adiabatic compression to the initial state.

cycle, closed: any cycle in which the primary medium is always enclosed and repeats the same sequence of events.

cycle, defrosting: the portion of a refrigeration operation which permits the cooling unit to defrost.

cycle, refrigeration: complete course of operation of refrigerant back to a starting point, evidenced by: a repeated series of thermodynamic processes, or flow through a series of apparatus, or a repeated series of mechanical operations.

cycle, reversible: theoretical thermodynamic cycle, composed

of a series of reversible processes, which can be completely reversed; e.g., Carnot cycle.

Dalton's Law of partial pressure: each constituent of a mixture of gases behaves thermodynamically as if it alone occupied the space. The sum of the individual pressures of the constituents equals the total pressure of the mixture.

dampener: a device used to vary the volume of air passing through an air outlet, inlet, or duct.

decibel: a unit used to express the relation between two amounts of power. By definition the difference in decibels between two powers P_1 and P_2 , P_1 being the larger, is: db difference = $10 \log_{10} P_1/P_2$. Used in acoustics.

declination of sun: the angle above or below the equatorial plane. It is plus if north of the plane, and minus if below. Celestial objects are located by declination.

decomposition: process of chemical change, breaking up, of structures, spoilage.

defrosting: removal of accumulated ice from cooling element. Thawing frozen foods.

degree day: a unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F, there exist as many degree days as there are Fahrenheit degrees difference in temperature between the mean temperature for the day and 65°F.

dehumidification: the condensation of water vapor from air by cooling below the dew point or removal of water vapor from air by chemical or physical methods.

dehumidifier: an air cooler or washer used for lowering the moisture content of the air passing through it. An absorption or adsorption device for removing moisture from the air.

dehumidify: to reduce by any process the quantity of water vapor within a given space.

dehumidifying effect: the heat removed in reducing the moisture content of air, passing through a dehumidifier, from its entering to its leaving condition.

dehydrate: to remove water in all forms from matter. Liquid water, hygroscopic water, and water of crystallization or water of hydration are included.

dehydration: the removal of water vapor from air by the use of absorbing or adsorbing materials. The removal of water from stored goods.

density: the ratio of the mass of a specimen of a substance to the volume of the specimen. The mass of a unit volume of a substance. When weight can be used without confusion, as synonymous with mass, density is the weight per unit volume.

desiccant: any absorbent or adsorbent, liquid or solid, that will remove water or water vapor from a material. In a refrigeration circuit the desiccant should be insoluble in the refrigerant.

desiccation: any process for evaporating water or removing water vapor from a material.

dew point: see temperature, dew point.

dew point, apparatus: that temperature which would result if the psychrometric process occurring in a dehumidifier, humidifier or surface cooler were carried to the saturation condition of the leaving air while maintaining the same ratio of sensible to total heat load in the process.

dew point, room: the dew-point temperature of the conditioned room or space.

differential (of a control): the difference between cut-in and cut-out temperatures or pressures.

diffusivity, thermal: thermal conductivity divided by product of density and specific heat. See definition of α in Chapters 5 and 64.

direct connected: driver and driven, as motor and compressor, positively connected in line to operate at same speed.

displacement, actual: the actual volume, at compressor inlet conditions, of gas moved per unit of time.

displacement, piston: the volume swept by a piston per revolution.

displacement, theoretical: the total volume displaced by all the pistons of a compressor per revolution or per unit of time.

distributor: device for dividing flow of liquid fluid between parallel paths in an evaporator, or in other types of heat transfer apparatus.

down-feed one-pipe riser (steam): a pipe which carries steam downward to the heating units and into which the condensate from the heating units drains.

Terminology

draft: a current of air, when referring to the pressure difference which causes a current of air or gases to flow through a flue, chimney, heater, or space; or to a localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of air flow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

draft head (gravity heating convector): 1. (side outlet enclosure): the height of a gravity convector between the bottom of the heating unit and the bottom of the air outlet opening. 2. (top outlet enclosure): the height of a gravity convector between the bottom of the heating unit and the top of the enclosure.

drier: a manufactured device containing a desiccant, placed in the refrigerant circuit, its primary purpose being to collect and hold within the desiccant all water in the system in excess of the amount which can be tolerated in the circulating refrigerant.

drift: in a water spray device, the entrained unevaporated water carried from the device by air movement through it.

drinking water cooler: a factory-made assembly which employs a complete refrigerating system and which has the primary function of cooling potable water and provides for dispensing such water, by either integral or remote means, or both.

drop: a pipe, or a steam trap and a pipe considered as a unit, which conducts condensation from the steam side of a piping system to the water or return side of the system.

drop: the vertical distance that the lower edge of a horizontally projected air stream falls or rises as the combined result of density effect of cool or warm air and the vertical expansion of the air path resulting from entrainment.

dry: to separate or remove a liquid or vapor from another substance. The liquid may be water, but the term is also used for the removal of liquid or vapor forms of other substances.

dry ice: solid carbon dioxide, CO_2 (proprietary term).

duct: a passageway made of sheet metal or other suitable material, not necessarily leak-tight, used for conveying air or other gas at low pressures.

dunnage: strips of wood used in stowing cargo to provide air space between pieces or packages.

dust: an air suspension (aerosol) of solid particles of earthy material as differentiated from smoke.

ebullator: a device inserted in flooded evaporator tubes to prevent the evaporator from becoming oil bound or refrigerant liquid becoming quiescent at a pressure lower than its boiling point.

effective area: the net area of an outlet or inlet device through which air can pass; it is equal to the free area of the device times the coefficient of discharge.

efficiency, compression: ratio of hp required to compress adiabatically and reversibly all the vapor delivered by compressor (in single stage) to the indicated horsepower.

efficiency, mechanical: ratio of the compression energy or work of a compressor to the energy or work input.

efficiency, volumetric, apparent: ratio of length of suction line, on indicator card, to stroke.

efficiency, volumetric, due to cylinder heating: ratio of the total to the apparent volumetric efficiency. Also called real or no-clearance volumetric efficiency.

efficiency, volumetric, total: ratio of the actual volume of gas moved by the compressor or pump to the actual displacement of the compressor or pump.

effector: a device which builds up a high fluid velocity in a restricted area to obtain a lower static pressure at that point so that fluid from another source may be drawn in.

electric precipitator: device for removing dust from the air by means of electric charges induced on the dust particles.

element, bimetallic: one formed of two metals having different coefficients of thermal expansion such as are used in temperature indicating and controlling devices.

element, electric heating: a unit assembly consisting of a resistor, insulated supports, and terminals for connecting the resistor to electric power.

emissivity: the ratio of the total radiant flux emitted by a surface to that emitted by an ideal black body at the same temperature.

emulsion: a relatively stable suspension of small but not colloidal particles of a substance in a liquid, the suspended particles being undissolved.

energy, available: the portion of the total energy which can be converted to work in a perfect engine.

energy, internal (intrinsic): the sum of all the kinetic and potential energies contained in a substance due to the states of motion and separation of its several molecules, atoms and electrons. It includes sensible heat (vibration energy) and that part of the latent heat that is represented by the increase in energy during evaporation.

engine: prime mover; device for transforming fuel or heat energy into mechanical energy.

enthalpy: thermodynamic property of a substance defined as the sum of its internal energy plus the quantity Pv/J , where P = pressure of the substance, v = its volume, and J = the mechanical equivalent of heat. Formerly called by the obsolescent names total heat and heat content.

enthalpy, free: a thermodynamic property which serves as a measure of the available energy of a system with respect to surroundings at the same temperature and same pressure as that of the system. No process involving an increase in available energy can occur spontaneously.

enthalpy, specific: a term sometimes applied to enthalpy per unit weight.

entrainment: the induced flow of room air by the primary air from an outlet, creating a mixed air path (commonly called secondary air motion).

entropy: the ratio of the heat added to a substance to the absolute temperature at which it is added.

entropy, specific: a term sometimes applied to entropy per unit weight.

enzyme: a complex organic substance such as diastase, pepsin, etc., capable of transforming by catalytic action some other compound; a soluble ferment.

Equivalent Direct Radiation (EDR): a unit of heat delivery of 240 Btu per hr.

equivalent evaporation: the amount of water a boiler would evaporate, in pounds per hour, if it received feed water at 212°F and vaporized it at the same temperature and corresponding atmospheric pressure.

eutectic mixture (solution): a mixture which melts or freezes at constant temperature and with constant composition. Its melting point is usually the lowest possible for mixtures of the given substances.

evaporation: change of state from liquid to vapor.

evaporative cooling: the adiabatic exchange of heat between air and a water spray or wetted surface. The water approaches the wet bulb temperature of the air, which remains constant during its traverse of the exchanger.

evaporative equilibrium (of a wet-bulb instrument): the condition attained when the wetted wick has reached a stable and constant temperature (when the instrument is exposed to air at velocities over 900 fpm, this temperature may be considered to approach the true wet-bulb temperature).

evaporator: that part of a refrigerating system in which refrigerant is vaporized to produce refrigeration.

evaporator, dry-type: an evaporator of the continuous tube type where refrigerant from a pressure-reducing device is fed into the inlet end and the suction line connects to the outlet end.

evaporator, flooded: a refrigerant evaporator in which: (1) the heat transfer surface is immersed in the refrigerant being evaporated, or (2) an excess of refrigerant over that which can be evaporated is circulated through the surface.

exfiltration: air flow outward through a wall, leak, membrane, etc.

exhaust opening: any opening through which air is removed from a space which is being heated or cooled, or humidified or dehumidified, or ventilated.

exhauster: a fan used to withdraw air under suction.

expansion, dry: a process of heat removal by a refrigerant in an evaporator fed by a flow control, responsive to temperature, pressure or both at some point in the evaporator, or to the difference between high and low side pressures, and not to the liquid level in the evaporator; all entering refrigerant is evaporated before being recirculated.

expansion, multi-stage: passing volatile refrigerant through two or more pressure reducing devices, connected in series, usually with an expander between them operating at one pressure and a second evaporator fed through both devices at a lower pressure.

expansion, coil: an evaporator constructed of pipe or tubing.