Honeywell

Refrigerant/Refrigeration Terminology

A

Absolute pressure - The sum of gage pressure and atmospheric pressure.

Accumulator- A storage chamber for low-side liquid refrigerant, also known as a surge drum or surge header.

Azeotropic mixture- A mixture of liquids whose vapor and liquid phases in equilibrium have identical compositions (the boiling point is constant).

Azeotropic point- The temperature at which a liquid mixture boils and produces a vapor having the same composition as the liquid.

B

Bubble Point (refrigerant)-The pressure at which the liquid mixture starts to vaporize.

C

Capillary tube- A tube of small internal diameter used as a refrigerant pressure and flow control between the high and low sides of a system.

Carbonization- The formation of carbonaceous deposits which may be produced by decomposition of lubricating oil or other organic materials.

Carnot Cycle- An ideal reversible thermodynamic cycle comprising two isothermal processed and two adiabatic processes. It represents the maximum theoretical conversion of heat energy into mechanical energy.

Cascade refrigeration system- A system with two or more refrigerant circuits, each with a pressure imposing element.

Centrifugal compressor- nonpositive displacement compressor which utilizes centrifugal forces to obtain pressure rises, used with low pressure refrigerants.

Change of state- change from one form of the three phases, solid, liquid, or gas, to another.

Coefficient of performance, (COP) -The ratio of the refrigerating capacity to the work absorbed by the compressor per unit time.

Compound compression- Compression accomplished by stages as in two or more cylinders or machines.

Compression- a process that increases the pressure of a gaseous refrigerant.

Compressor – a device for mechanically increasing the pressure of a refrigerant.

Booster compressor - a compressor for raising the pressure of a gas delivered to a following compressor

Compound compressor - a compressor in which compression is accomplished by stages, as in two or more cylinders

Open type compressor - a refrigerant compressor with a shaft or other moving part extending through its casing to be driven by an outside source of power, thus requiring a shaft seal

Positive displacement compressor - a compressor that obtains compression by reduction of the internal volume of a compression chamber by a piston

Reciprocating compressor - a positive displacement compressor that changes internal volume of the compression chamber(s) by the reciprocating motion of one or more pistons

Refrigerant compressor - that component of a refrigerating system which increased the pressure of a compressible refrigerant fluid and simultaneously reduces its volume while moving the fluid through the device

Semi-hermetic compressor- a hermetic refrigerant compressor whose housing is sealed against entry of air by one or more gasketed joints and is provided with means of access for servicing internal parts in the field

Welded hermetic compressor – a hermetic compressor whose housing is permanently sealed by welding or brazing and is not provided with a means of access for servicing internal parts in the field

Rotary compressor - a positive displacement compressor that changes internal volume of the compression chambers by the rotary motion of a positive displacement member

Scroll Compressor - a scroll compressor uses two interleaved scrolls to pump, compress, or pressurize fluids such as liquids and gases

Swash-Plate Compressor - a compressor in which the pistons move parallel to the crankshaft. The pistons are actuated by a cam or by a plate mounted axially on the shaft and inclined to it

Compressor Capacity (refrigerating) – The heat removal by the refrigerant assigned to the compressor in a refrigerating system. This rate equals the product of the mass rate of refrigerant flow produced by the compressor and the difference in specific enthalpies of the refrigerant vapor at its thermodynamic state entering the compressor and the refrigerant liquid at the saturation temperature corresponding to the pressure of the vapor leaving the compressor

Compressor displacement- Actual volume of gas or vapor, at compressor inlet conditions, moved by a compressor per revolution or per unit of time

Compressor unloader- a device on or in a compressor for equalizing the high and low side pressures for a brief period during starting in order to decrease the starting load on the motor: also a device for controlling compressor capacity by rendering one or more cylinders ineffective

Condenser- A vessel or arrangement of pipe or tubing that liquefies vapor by removal of heat

> **Aircooled condenser**- a refrigerant condenser that removes heat ientirely by heat absorption of ambient air flowing over the condensing surfaces
>
> **Evaporative condenser**- a condenser that removes heat by the evaporation of water induced by the forced circulation of air over it
>
> **Water cooled condenser**- A condenser that removes the heat of the refrigerant by water flowing over condensing surfaces

Condensing Pressure- The pressure of a gas at which it condenses

Condensing Unit-An assembly of refrigerating compressor, receiver, condenser and necessary accessories attached to one base

Cooling tower- A structure over which water is circulated to cool the water evaporatively by contact with air

Critical Point- The state of a substance at which the corresponding physical properties of liquid and gas are identical

Critical Pressure- for a specific fluid. The vapor pressure at which the liquid and vapor have identical properties

Critical Temperature- Saturation temperature corresponding to the critical state of the substance at which the properties of the liquid and vapor are identical

D

Dew point (refrigerant) – The pressure at which the vapors of a refrigerant mixture start to condense

Discharge Pressure- An operating pressure in a refrigerating system measured at the outlet of the compressor

Distributor- A device for dividing flow of fluids between parallel paths. In a refrigeration system this device is commonly found on the evaporator after the thermal expansion device

Drier- A manufactured device containing a desiccant placed in a refrigeration system

Dry bulb temperature- The temperature of air indicated by an ordinary thermometer

E

EER- the ratio of net cooling capacity in BTU/h t the total rate of electric input in watts, under designated operating conditions

Enthalpy- a thermodynamic property of a substance defined as the sum of its internal energy plus the quantity Pv/J, formerly called total heat and heat content

Enthalpy Chart - a graphical representation of thermal properties of a substance with enthalpy as one of the coordinates

Entropy - the rate of the heat absorbed by a substance to the absolute temperature at which it was added

Entropy chart - a graphical representation of thermal properties of a substance with entropy as one of the coordinates

Equation of state - a thermodynamic expression relating the volume, pressure and temperature of a given substance

Evaporating Temperature- the temperature at which a refrigerant vaporizes within an evaporator

Evaporator – that part of a refrigeration system in which the refrigerant absorbs heat from the contacting fluid by evaporation

Expansion valve (thermostatic) - a controlling device for regulating flow of refrigerant into a cooling unit: it is actuated by changes in evaporator pressure and superheat of the refrigerant leaving the cooling unit. The basic response is to superheat

F

Flash gas - that portion of the liquid refrigerant that is vaporized by sudden reduction of pressure

Flooded Evaporator - an evaporator in which the total volume of refrigerant does not evaporate. Refrigerants with zero to negligible glide are required for this application

G

Gage Pressure - pressure measured from atmospheric pressure as opposed to absolute pressure

Glide- the range in temperature measured at constant pressure during the evaporation or condensation of zeotropic refrigerant blends

H

Head Pressure - operating pressure measured in the discharge line of a compressor, fan or pump

Head Pressure Control - a technique which uses electrical or mechanical devices or schemes to control the condensing pressure of a refrigeration system to compensate for the variances in the condensing medium

Heat - a form of energy that is exchanged between a system and its environment or between parts of the system induced by temperature difference existing between them

Heat Capacity - the amount of heat necessary to raise the temperature of a given mass one degree; numerically, the mass multiplied by the specific heat

Heat exchanger- a device to transfer heat between two physically separated fluids

Horsepower- unit of power in the I-P system; work done at the rate of 550 ft lb per sec (745.7 W)

Hot Gas bypass regulator- in a refrigeration system, an automatic valve that maintains suction pressure above a given value by diverting a certain quantity of highside vapor to the low side of the system

Hygroscopic- absorbs and retains moisture

I

Ice storage system (ice bank) – a thermal storage system, usually applied for comfort cooling, that uses the phase change properties of water/ice. Ice is formed during periods of low refrigeration demand for use during periods of high refrigeration demand. This system is also applied to shift compressor run time to “off peak” electrical hours

Ideal gas (perfect gas) – a gas whose internal energy and enthalpy depend solely on temperature and that is defined by the perfect gas equation, pv = RT

Isentropic Process - a thermodynamic change at constant entropy

L

Liquid recirculation refrigerating system – a refrigeration system that flushes a refrigerant liquid to saturated suction pressure and temperature in an accumulator and them feeds it by a mechanical pump or by refrigerant vapor pressure to the evaporators. This liquid is normally fed at a rate greater that the evaporation rate for the refrigerant to insure wetting or the entire evaporator surface for improved heat transfer

Liquid, subcooled- a liquid whose temperature is lower that the condensation temperature at its given pressure

Load- the amount of heat per unit time imposed on a refrigeration system by the required rate of heat removal

Load (latent heat load) – the cooling load to remove latent heat

Load (sensible heat load) – the cooling load to remove the sensible heat

Low-pressure-stage – in a refrigeration system, the compression stage from a low to an intermediate pressure level

M

MBTUH – I-P unit of power. One thousand Btu per hour.

Molecular sieve- an absorbent composed of porous alumina-silicates with pores of uniform molecular dimensions that will selectively absorb molecules of the substance to be gathered

Mollier diagram – a graphical representation of the properties of a refrigerant, generally in terms of enthalpy and entropy

N

Non condensable gas- gas in a refrigeration system that does not condense at the temperature and partial pressure at which it exists in the condenser, therefore imposing a higher head pressure on the system

O

Oil return - migration of oil from the evaporator to the crankcase of the compressor.

Oil separator - a device for separating oil and oi vapor form the refrigerant, usually installed in the compressor discharge line.

Oil trap – a device for separating and collecting oil at a given point in a refrigerating circuit.

P

Pressure – thermodynamically, the normal force exerted by a homogeneous liquid or gas, per unit of area on the wall of a container.

Psychrometric chart- a graphical representation of the properties of moist air, usually including wet and dry bulb temperatures, specific and relative humidities, enthalpy, and density.

Pump down – of refrigerant, the withdrawal of all refrigerant from the low side of a system by pumping it to either the condenser or the liquid receiver.

R

R-value – in thermal insulation, the thermal resistance of insulation materials or constructions

Rankine cycle - a theoretical thermodynamic cycle used in steam engines comprising four principal stages: vaporization of liquid under high pressure; expansion of steam; condensation of steam; pumping of the liquid back to initial pressure

Refrigerant - the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat a low temperature and low pressure and transfers heat a higher temperature and a higher pressure, usually with changes of state

Refrigerant charge - the actual amount of refrigerant in a closed system

Reverse cycle defrosting - A method of hot gas defrosting where discharge gas is directed to the suction line of a refrigerant circuit, through the evaporator and into the liquid line bypassing the expansion device

Rupture disk – a valve or rupture member designed to relieve excessive pressure by mechanical failure of the disk

S

Service Valve - a valve used by service technicians to check pressures and charge refrigerating units

Short cycling - the excessive frequency of starting and stopping in an operating system

Soft soldering – a hot joining operation in which the melting temperature of the filler metal is lower than 850ºF (450ºC)

Solenoid Valve – a valve that is closed by gravity, pressure, or spring action and opened by the magnetic action of an electrically energized coil, or vice versa

Steam – water in the vapor state

Subcooling – in refrigeration, the removal of heat from liquid to a point lower than the saturation temperature corresponding to its pressure

Suction line - the tube or pipe that carries the refrigerant vapor from the evaporator to the compressor inlet

Suction line - double riser- an arrangement of two vertical suction lines that assures oil is entrained, even at minimum load

Superheat - extra heat in a vapor when at a temperature higher than the saturation temperature corresponding to its pressure

Suction temperature - the temperature of the refrigerant vapor drawn into the compressor inlet

T

Thermal conductance (C factor) – the time rate of heat flow through unit area of a body induced by a unit temperature difference between the body surfaces. Units are Btu/h·ft²·ºF (W/(m²·K)

Thermodynamics - the science of the relation of heat to other forms of energy

Thermodynamic properties - basic qualities used to define the condition of a substance such as temperature, pressure, volume, enthalpy, entropy etc

Ton (of refrigeration) – a time rate of cooling equal to 12,000 Btu/h (approximately 3517 W)

Triple point – the physical state temperature at which solid, liquid and gaseous phases exist in equilibrium

Two phase flow – simultaneous flow of two phases of a fluid, usually gas-liquid flows

U

Unitary refrigeration system – a complete factory assembled and tested refrigeration system comprising one or more assemblies that may be shipped as one unit or separately, but are designed to be used together

V

Vacuum – state in which the gas pressure is lower than atmospheric pressure

Vacuum test – a test to check the gas tightness of an uncharged refrigeration system by drawing a vacuum upon it

Vapor- a gas, particularly one that is near equilibrium with its liquid phase and tht does not follow the gas laws. The term is usually used instead of gas to refer to a refrigerant , or , in general, to any gas below the critical temperature

Velocity (mass velocity) – the ratio of the mass flow rate of a fluid in a pipe to the cross sectional area of the pipe

Viscosity – the property of a fluid to resist flow pr change of shape

Viscosity index – an empirical number evaluated by comparing the viscosity of a substance with that of a standard substance

Volumetric Efficiency – the ratio of volume induced, at suction conditions, by a compressor in a given time to the swept volume as measured of the same time

W

Wax Content – the wax contained in lubricating oil at a specified temperature

Wet compression – a system of refrigeration in which some liquid refrigerant is mixed with vapor entering the compressor to cause the discharge vapors from the compressor to be saturated rather than superheated.