Definition of Terms and Acronyms Used in the Refrigeration, Heating, Ventilating and Air Conditioning Industries

Contents

List of Tables

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Table 1 Revision History

Introduction

This guide lists the definitions of terms and acronyms, with abbreviations, commonly used within the refrigeration, heating, ventilating and air conditioning industries. Also listed are those terms specifically used within J & E Hall International and in company documentation including Instruction Manuals and Engineering Standards.

This guide incorporates the following standards:

- BS 5643:1985 Refrigeration, heating, ventilating and air conditions terms.

Aa

Absolute Humidity

See Humidity, Absolute.

Absolute Pressure

Pressure referenced to a perfect vacuum. Numerically it is equal to gauge pressure plus atmospheric pressure.

Absolute Roughness

See Roughness, Absolute.

Absolute Temperature

Temperature referenced to absolute zero.

Absolute Zero Temperature

Temperature at which molecular motion ceases.

Absorbent

Substance with ability to take-up, or absorb another substance.

Absorber

In an absorption refrigeration system the part in which the refrigeration vapour is absorbed (source: BS 5643:1984).

Absorption or Adsorption Refrigeration System

See Refrigeration System, Absorption.

Absorption Coefficient, Solar

The value of solar absorptivity for a surface (source: BS 5643:1984).

Absorption Coefficient, Sound

See Sound Absorption Coefficient.

Absorption, Sound

See Sound Absorption.

Absorptivity

The fraction of the incident radiation that is absorbed by a surface to that falling on the surface (source: BS 5643:1984).

Absorptivity, Solar

The ratio of the amount of solar radiation absorbed by a surface to that falling on the surface (source: BS 5643:1984).

Accelerated Control

See Control, Accelerated.

Access Door

A door providing access to an installation for maintenance or inspection purposes (source: BS 5643:1984).

Acclimatisation

Becoming accustomed to a particular climate or environment (source: BS 5643:1984).

Accumulator, Hot Water

Vessel in which heat is stored as hot water for use as required (source: BS 5643:1984).

Accumulator, Refrigerant

Vessel in the low pressure side of a system capable of holding liquid refrigerant and permanently connected between the exit of the evaporator and suction of the compressor (source: BS 5643:1984).

Accumulator, Steam

Vessel in which heat is stored as steam for use as required (source: BS 5643:1984).

Acid Condition

Condition in which refrigerant and/or refrigeration oil have become contaminated by the formation of acids. Typically caused by moisture being introduced into the system.

Acid Dewpoint

The temperature at which vapour in flue gases condenses when acid products of combustion are present (source: BS 5643:1984).

Acoustics

The science of sound waves including the properties of production and propagation (source: BS 5643:1984).

ACRIB

Air Conditioning and Refrigeration Industry Board.

ACRTI

Air Conditioning and Refrigeration Technology Institute.

Activated Carbon Air Filter

See Air Filter, Activated Carbon.

Actual Refrigerant Charge

The total quantity (kg) of refrigerant actually charged into a system. This quantity is stated on the refrigerating system nameplate.

See also Estimated Refrigerant Charge.

Actuator

A device, either electrically, pneumatically, or hydraulically operated, which, on receipt of an electrical or pressure signal, produces a mechanical movement capable of regulating energy or fluid flow, for example, to change the position of movable devices such as valves or dampers (source: BS 5643:1984).

Adiabatic Cooling

Adiabatic cooling is the process of reducing heat through a change in air pressure caused by volume expansion.

Adiabatic Mixing

The mixing of substances without the addition or removal of heat (source: BS 5643:1984).

Adiabatic Process

A thermodynamic process in which there is no addition or removal of heat (source: BS 5643:1984).

Adiabatic Saturation

The extent to which a gas can take up liquid without a change in heat content, for example, compressing a refrigerant gas without removing or adding heat. (source: BS 5643:1984).

Adiabatic Saturation Temperature

See Temperature of Adiabatic Saturation.

Adjustable Flow Rate (Air) Diffuser

See Air Diffuser, Adjustable Flow Rate.

Adjustable Grille

See Grille, Adjustable.

Adjustable Pattern (Air) Diffuser

See Air Diffuser, Adjustable Pattern.

Adjustable Pitch Axial Flow Fan

See Fan, Axial Flow, Adjustable Pitch.

Admittance

The measure of the ability of a surface to smooth out temperature variations (source: BS 5643:1984).

Adsorbent

Substance with ability to hold molecules of a gas or fluid without causing a chemical or physical change.

Absorber

In an adsorption refrigeration system, the part in which refrigerant or water vapour is adsorbed (source: BS 5643:1984).

Adsorption

A process whereby a solid takes up a fluid by surface adhesion (source: BS 5643:1984).

Adsorption Refrigeration System

See Refrigeration System, Adsorption.

After Cooler

a) A heat exchanger designed to treat air as the final cooling process in the system (source: BS 5643:1984).
b) A heat exchanger for the removal of heat from a fluid as the final cooling process in a system (source: BS 5643:1984).

After Air Filter

See Air Filter, After.

After Heater

A heat exchanger designed to treat air as the final heating process in a system (source: BS 5643:1984).

Agitator

A device for causing turbulent motion in a fluid (source: BS 5643:1984).

AHRI

Air Conditioning, Heating and Refrigeration Institute.

Air

The mixture of invisible, odourless, tasteless gases (nitrogen, oxygen and others) that surrounds the earth.

Air Changes Per Hour

The hourly ventilation rate divided by the volume of a space. For perfectly mixed air or laminar flow spaces, this is equal to the number of times per hour that the volume the space is exchanged by mechanical and natural ventilation. Also called air change rate or air exchange rate. Abbreviated ACH or ac/hr.

Air Conditioner

An appliance, system, or mechanism designed to control temperature, humidity and air quality in a defined space.

Air-cooled System

Type of air conditioning system that uses air as the transfer medium to reject heat from the refrigerant in the condenser. Typically, the air-cooled condenser is located and rejects waste heat to the outdoors.

Air Cooled Condenser (ACC)

A condenser in which the heat of compression is rejected to air.

Air Cooler

Evaporator component of a refrigeration plant that absorbs the heat from the air within the cooled space. Comprises a fan and a coil in a self-contained unit.

Air Curtain

A steady stream of air (generated by a fan) that acts as a barrier to separate environments at different temperatures, without blocking the movement of people or objects.

Air Diffuser

Air distribution outlet or grill designed to direct and develop balanced airstreams.

Air, Dry

See Dry Air.

Air, Excess

See Excess Air.

Air, Exhaust

Air flow leaving the treated space (source: BS 5643:1984).

Air, Extract

Exhaust air that is discharged to atmosphere (source: BS 5643:1984).

Air, Fresh

Air from free atmosphere that is sufficiently uncontaminated to be used for ventilation (source: BS 5643:1984).

Air Handler

An air handling unit, defined as either "recirculating" or "once-through" design, made specifically for outdoor installation. They most often include, internally, their own heating and cooling devices. Very common in some regions, particularly in single-story commercial buildings. Also called a rooftop unit (RTU).

Air Handling Unit (AHU)

A central unit consisting of fan(s), heating and cooling elements, filter racks or chamber, dampers, humidifier and other central equipment required to provide suitable ventilation and extract.

Air Lock

Isolating chamber provided with separate entrance and exit doors allowing passage from one place to another whilst isolating one from the other.

Air, Make-up

See Make-up Air.

Air, Primary

a) Air for combustion purposes admitted directly to or with the fuel (source: BS 5643:1984).
b) Air introduced into a ventilation or air conditioning system from outside (source: BS 5643:1984).
c) In an induction system, air supplied to the terminal units from a central plant (source: BS 5643:1984).

Air Purging

The process of removing unwanted air (and other non-condensable gases) from the condenser.

Air Recirculation

Exhaust air returned to the air treatment system (source: BS 5643:1984).

Air Relief

Exhaust air which is allowed to escape from the treated space if the pressure in the space rises above a specified level (source: BS 5643:1984).

Air Return

Air exhausted from a conditioned space and returned to central plant for recirculation or discharge to waste (source: BS 5643:1984).

Air Secondary

a) Air for combustion admitted in proximity to the fuel for the purpose of completing the combustion (source: BS 5643:1984).
b) Room air entrained and set in motion by air discharge from a grille (source: BS 5643:1984).

Air Supply

Air flow entering the treated space (source: BS 5643:1984).

Air Transfer

Exhaust air which passes from the treated space to another treated space (source: BS 5643:1984).

Air Assisted Pressure Jet Burner

See Oil Burner, Steam (or Air) Assisted Pressure Jet.

Air Blast Freezer

See Freezer, Air Blast.

Air Bottle

A container for collecting air, for example, from a high point of a hot water heating system (source: BS 5643:1984).

Air Change Rate

The replacement of the volume of air in an enclosure per unit time (source: BS 5643:1984).

Air Cock

See Cock, Air

Air Compressor

See Compressor (Air).

Air Conditioner, Room

See Room Air Conditioner.

Air Conditioning

A method of air treatment whereby temperature, humidity, ventilation and air cleanliness are controlled within limits determined by the requirements of the air conditioned enclosure (source: BS 5643:1984).

Air Conditioning, Air/Water System

See System, Air/Water.

Air Conditioning, All Air System

See System, All Air.

Air Conditioning, Comfort

Air conditioning to satisfy the comfort requirements of the occupants of the air conditioned enclosure (source: BS 5643:1984).

Air Conditioning, Complete

Air conditioning in which temperature and humidity are independently controlled (source: BS 5643:1984).

Air Conditioning, Full

The application of air conditioning to all the habitable areas in a building other than transit areas, stores, toilets and the like (source: BS 5643:1984).

Air Conditioning, Partial

The application of air conditioning to some, but not all, of the habitable areas in a building (source: BS 5643:1984).

Air Conditioning, Year-round System

A complete air conditioning system which ventilates, heats and humidifies in winter, cools and dehumidifies in summer, the air in the spaces under consideration and provides the desired degree of air cleanliness and motion (source: BS 5643:1984).

Air Conditioning Convector

See Convector, Air Conditioning.

Air Cooled Condenser

See Condenser, Air Cooled.

Air Cooler

See Cooler, Air.

Air Cooler Battery

See Battery, Air Cooler.

Air Curtain

A stream of air that creates a barrier between two spaces which are at different conditions, for example, at different temperatures (source: BS 5643:1984).

Air Cushion

A quantity of air deliberately collected at a point in a heating circuit to minimise variations in pressure with temperature (source: BS 5643:1984).

Air Cycle Refrigeration System

See Refrigeration System, Air Cycle.

Air Diffuser

An air supply device usually placed in the ceiling and generally of circular, square or rectangular form, composed of divergent defecting members (source: BS 5643:1984).

Air Diffuser, Adjustable Flow Rate

An air diffuser incorporating an integral device for varying air flow rate without affecting the direction of the air jets (source: BS 5643:1984).

Air Diffuser, Adjustable Pattern

An air diffuser incorporating an integral device by means of which the direction of the air jets can be varied (source: BS 5643:1984).

Air Diffuser, Ceiling

An air diffuser suitable only for ceiling mounting (source: BS 5643:1984).

Air Diffuser, Fully Adjustable

An air diffuser incorporating an integral devices to achieve the following:

a) Vary the direction of the air jets without altering the flow rate (source: BS 5643:1984); and
b) Vary the air flow rate without altering the direction of the air jets (source: BS 5643:1984).

Air Diffusion

The distribution of the air in a space by means of air diffusers (source: BS 5643:1984).

Air Distribution

The transportation of a specific air flow to or from the treated space or spaces, generally by means of ducts (source: BS 5643:1984).

Air Filter

A device for removing particulate contaminates from an air stream (source: BS 5643:1984).

Air Filter, Activated Carbon

Specially processed carbon used as a filter/drier. Commonly used to clean air (source: BS 5643:1984).

Air Filter, After

An air filter used to collect particulate matter downstream from another filter (source: BS 5643:1984).

Air Filter, Automatic Roll

A time-controlled rotary screen or panel viscous filter (source: BS 5643:1984).

Air Filter, Cleanable

An air filter containing a medium that can be cleaned, typically washed or wiped (source: BS 5643:1984).

Air Filter, Coarse

An air filter used to collect the largest particles of particulate matter (source: BS 5643:1984).

Air Filter, Dry

An air filter with a processed foam plastic or brush type fabric (source: BS 5643:1984).

Air Filter, Electrostatic

An air filter that applies an electric charge to the dust particles in the airstream, and collects, precipitates or builds up the particles on plates of opposite charge (source: BS 5643:1984).

Air Filter, Fabric

A filter using a fabric medium panel construction with a filter medium of fabric (source: BS 5643:1984).

Air Filter, Graduated Density

An automatic dry type of filter in which advancement of various grades of filter media is normally controlled by a pressure differential switch (source: BS 5643:1984).

Air Filter, Grease

A washable air filter normally located within the hood over kitchen appliances (source: BS 5643:1984).

Air Filter, High Efficiency

An air filter that can remove a high proportion of all particle sizes (source: BS 5643:1984).

Air Filter, Impingement

An all-metal construction viscous air filter with a high dust-loading capacity (source: BS 5643:1984).

Air Filter, Mechanical

An air filter that depends on dynamic principles for filtration (source: BS 5643:1984).

Air Filter, Panel

An air filter in which the filtration medium is constructed on one or more frames to facilitate withdrawal (source: BS 5643:1984).

Air Filter, Pre

An air filter used to remove coarse particulate particles and some initial dust load from the air stream before other (finer) filters (source: BS 5643:1984).

Air Filter, Replaceable Media

A non-cleanable air filter in which the filter medium, when dirty, is discarded and replaced by a new item (source: BS 5643:1984).

Air Filter, Rotary Viscous

A time-switch controlled rotary screen or rotary panel viscous type air filter (source: BS 5643:1984).

Air Filter, Self-cleaning

A moving curtain, dry or viscous impingement type air filter (source: BS 5643:1984).

Air Filter, Terminal

An air filter located in ductwork close to the outlet grill from the same duct (source: BS 5643:1984).

Air Filter, Throw-away

An air filter comprising one or more panels which, when used, are replaced by new items (source: BS 5643:1984).

Air Filter, Viscous

An air filter comprising one or more wetted surfaces for collecting dust from the air stream (source: BS 5643:1984).

Air Filter, Wet

Air washers that act as air cleaning devices (source: BS 5643:1984).

Air Filter Blow-off

Collected dust inadvertently blown from a filter into the air stream (source: BS 5643:1984).

Air Filter Cell

An interchangeable frame containing a filtering material (source: BS 5643:1984).

Air Filter Dust Holding Capacity

The mass of dust which a filter can retain at rated air flow during an increase in resistance from that under 'clean' conditions to the resistance at some arbitrary value, usually twice the value of the pressure drop under 'clean' conditions (source: BS 5643:1984).

Air Filter Efficiency

The measure of the ability of a filter to remove dust from the air (source: BS 5643:1984).

Air Filter Life

The duration before the efficiency of filtration falls to an unacceptable level (source: BS 5643:1984).

Air Filter Medium

The material forming the operative part of a mechanical filter (source: BS 5643:1984).

Air Filter Resistance

The pressure drop across a filter at some specified condition of the filter itself (source: BS 5643:1984).

Air Filter Resistance, Final

The pressure drop across a filter at the end of a specified period and conditions of use (source: BS 5643:1984).

Air Filter Resistance, Initial

The pressure drop across a filter in the 'unused' condition (source: BS 5643:1984).

Air Filter Test, Blackness

An on-site optical test which uses normal airborne impurities instead methylene blue dust (source: BS 5643:1984).

Air Filter Test, Gravimetric

An efficiency test in which filter efficiency is defined as the ratio of the mass of dust retained on the filter to the mass of dust fed to it (source: BS 5643:1984).

Air Filter Test, Methylene Blue

An efficiency test using methylene blue dust in which the staining power of the dust before and after passage through the filter is determined from optical density measurements of samples taken (source: BS 5643:1984).

Air Filter Test, Optical

An efficiency test in which the relationship of change in optical density of the filter paper to volume of the sample is a measure of efficiency (source: BS 5643:1984).

Air Filter Test, Sodium Flame

A test based on the characteristic yellowing of a hydrogen flame by sodium chloride (source: BS 5643:1984).

Air Flow Pattern

The variation of air velocity and direction over a given cross-section or in an enclosure (source: BS 5643:1984).

Air Flow Rate

The mass or volume of air moved in unit time (source: BS 5643:1984).

Air Flow Rate Controller

A type of controller in which the measured variable is the rate of air flow (source: BS 5643:1984).

Air Flow Switch

See Switch, Air Flow.

Air Heater Battery

See Battery, Air Heater.

Air Intake

The air drawn into a system by mechanical means (source: BS 5643:1984).

Air Lighting Troffer

See Lighting Troffer, Air

Air Lock

The obstruction by air of the movement of liquid in a system (source: BS 5643:1984).

Air-lock

An ancillary chamber giving access to an enclosure without changing the conditions in it and restricting leakage of air from or into the enclosure (source: BS 5643:1984).

Air Movement

That flow element of a microclimate of an enclosure that relates to velocity and direction of air (source: BS 5643:1984).

Air Pollution

The contamination of air by noxious gases or particulates (source: BS 5643:1984).

Air Space

A volume of air that may or may not be completely enclosed (source: BS 5643:1984).

Air Temperature

See Temperature, Air

Air Terminal Device

A device locate in an opening provided at the boundaries of the treated space in order to ensure a predetermined air movement within the space (source: BS 5643:1984).

Air Transport Factor

The ratio between the rate of sensible heat removal from a ventilated or air conditioned space and the power input to the supply, return, recirculating and extract fan motor(s) (source: BS 5643:1984).

Air Treatment

A process by which one or more of the following characteristics of air are modified: temperature, humidity or cleanliness (source: BS 5643:1984).

Air Vessel

A vessel containing air fitted to the delivery side of a reciprocating water pump to smooth out discharge pulsations (source: BS 5643:1984).

Air Washer

A device for intimately mixing water and air, the air leaving the device at a condition approaching saturation (source: BS 5643:1984).

Air Washer, Capillary Cell

An air washer having a series of pads sprayed with water through which the air passes (source: BS 5643:1984).

Air Washer, Spinning Disc

An air washer that utilises a spinning disc to produce a fine spray of water through which the air passes (source: BS 5643:1984).

Air Washer, Spray

An air washer with one or more banks of nozzles spraying atomized water into or with the air stream (source: BS 5643:1984).

Air Washer, Saturation Efficiency

The proportion of water added to the air leaving the washer expressed as a percentage of the amount of water that could have been added if the air had left the washer in a fully saturated condition (source: BS 5643:1984).

Air/Water System

See System, Air/Water.

All Air System

See System, All Air.

All Water Fan Coil System

See System, All Water Fan Coil.

Alternating Current Fans

Fans of various types driven by an AC (alternating current) motor providing air movement in heating, cooling and ventilation systems.

Altitude, Solar

See Solar Altitude.

Altitude Gauge

See Gauge, Altitude.

Ambient Temperature

The temperature of the surrounding atmosphere.

American National Standards Institute (ANSI)

The American National Standards Institute is a private organisation that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE)

The American Society of Heating, Refrigeration and Air-conditioning Engineers.

American Society of Mechanical Engineers (ASME)

The American Society of Mechanical Engineers is a global professional association seeking to advance heating, ventilation, air conditioning and refrigeration (HVAC & R) systems design and construction.

Ammonia (NH_3)

A primary refrigerant used in many industrial refrigeration systems. Refrigerant number 717 (R717).

Amines, Filming

Compounds containing nitrogen that form a protective film on metal surfaces in closed water or steam systems (source: BS 5643:1984).

Amines, Neutralizing

Compounds containing nitrogen that reduce corrosion within water or steam systems by raising pH and neutralising carbon dioxide (source: BS 5643:1984).

Analyser, Refrigerant

In an absorption refrigerating system a small fractionating column between the generator and the rectifier or condenser (source: BS 5643:1984).

Anchor, Equipment

In a pipeline, a securing device to maintain a point fixed both in position and direction under the design condition of temperature and loading (source: BS 5643:1984).

Anchor, Pipe

A type of pipe support that restrains movement (source: BS 5643:1984).

Ancillary Load

Load created by secondary equipment (e.g. lighting, evaporator fan motors).

Anechoic

See Non-reverberant (Anechoic).

Anemometer

A device for measuring air or gas velocities (source: BS 5643:1984).

Angle of Divergence

The undivided angle of the spread of a jet of air issuing from a grille (source: BS 5643:1984).

Angle Screw-down Stop Valve

See Stop Valve, Angle Screw-down.

Anodic Protection

A system for passivating steel to make it the anode of a protective system

Anthracite

See Coal, Anthracite.

Anti-vibration Mounting

A resilient support designed to attenuate the transmission of vibration between machinery and the structure on which it is supported (source: BS 5643:1984).

API

American Petroleum Institute.

Apparatus Dew Point

The point on a psychrometric chart where the straight line passing through the state points representing the air entering and air leaving a cooling coil or air washer cuts the saturation line (source: BS 5643:1984).

Appliance, Balanced Flue

See Balanced Flue Appliance.

Appliance, Domestic Heating

See Domestic Heating Appliance.

Application

Location or site where an air conditioning/cooling system or unit is to be installed.

Apportioning Heat Meter

See Meter, Heat Apportioning.

Articulated Bellows

See Bellows, Articulated.

Ash

The solid matter remaining after the incineration of organic material (source: BS 5643:1984).

Aspect Ratio

The ratio of breadth to width of a rectangular duct (source: BS 5643:1984).

Assembly

Discrete unit with defined function (e.g. a condensing unit) made up from several components. Assemblies are often skid mounted and connected together on-site to make a complete system.

Assisted Circulation Boiler

See Boiler, Assisted Circulation.

Assmann Psychrometer

See Psychrometer, Assmann.

Atmospheric Condenser

See Condenser, Atmospheric.

Atmospheric Pressure

The pressure exerted on the surface of the earth by the weight of air above that surface at any given point in the Earth's atmosphere. The standard atmosphere (symbol: atm) is equal to 101.325 kPa.

Atomisation

a) Reduction of liquid fuel to finely divided droplets prior to combustion (source: BS 5643:1984).
b) Reduction of water in an air washer into fine droplets to assist saturation of the air (source: BS 5643:1984).

Atomising Oil Burner

See Oil Burner, Atomising.

Atomising Pressure Jet Oil Burner

See Oil Burner, Atomising Pressure Jet.

Attemperator

A desuperheating device to permit the control of the final superheated steam temperature (source: BS 5643:1984).

Attenuation, Sound

See Sound Attenuation.

Automatic Air Valve

See Valve, Automatic Air.

Automatic Control Valve

See Valve, Automatic Control.

Automatic Roll Air Filter

See Air Filter, Automatic Roll.

Auxiliary Switch

See Switch, Auxiliary.

AutoCAD

A 2D drawing software package used by J & E Hall International to create 2D Piping and Instrumentation Diagrams.

Auto-ignition Temperature of a Substance

Lowest temperature at or above which a chemical can spontaneously combust in a normal atmosphere without an external source of ignition, such as a flame or spark.

Averaging Relay

See Relay, Averaging.

Axial Bellows

See Bellows, Axial.

Axial Flow Fan

See Fan, Axial Flow

Axial Velocity

See Velocity, Axial.

Azeotrope

A mixture, of two or more refrigerants, that has a constant boiling point because the vapour has the same composition as the liquid mixture. The boiling point of the mixture may be higher or lower than that of any of its individual components. The components of the mixture cannot be separated by simple distillation. Azeotropic refrigerants can be charged in vapour or liquid form and include R500 and R502.

See also:

Near Azeotrope

Azimuth, Solar

See Solar Azimuth.

Bb

Bacharach Number

A number on a scale that indicates the level of discolouration of a standard filter paper by carbon in flue gases drawn in under standard conditions (source: BS 5643:1984).

Back Boiler

See Boiler, Back.

Back Pressure

A resistant pressure exerted by liquid or gas against the forward motion or flow of an exhaust or pipe system (e.g. the static pressure existing at the outlet of an operating pressure relief device caused by pressure in the discharge line).

Back-pressure Regulation Valve

See Valve, Back-pressure Regulation.

Background Heating

See Heating, Background.

Background Central Heating

See Heating, Central, Background.

Backward Curve Fan

See Fan, Backward Curve.

Base Load

The level of cooling load that represents the minimum load under normal operating conditions.

Baudelot Cooler

A liquid cooler in which heat is removed from a liquid flowing in a thin film over the external surface of a cooling coil through which refrigerant is circulated.

Building Energy Management System (BEMS)

Building Energy Management System is a computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems and security systems. Designed to enhance system performance, drive down operational costs and aid decision making.

Bill of Materials (BOM)

List of components required to build an assembly, for example, a package unit.

Blend

A refrigerant mixture of two or more refrigerants blended in a specific ratio which can be separated by distillation. Regular blends may have up to 10°C or more temperature glide.

Block Valve

Also known as: Companion Valve

Pairs of mating stop valves, isolating sections of systems arranged so that these sections may be joined before opening these valves or separated after closing them.

Boiler, Back

Boiler, Vertical

Boiler, Vertical Cross-tube

Boyle's Law (sometimes referred to as the Boyle-Mariotte law)

For a fixed amount of a gas kept at a fixed temperature, pressure and volume are inversely proportional, while one increases, the other decreases.

$$pV = k$$

Where:

p = system pressure
V = volume of gas
k = constant representative of the pressure and volume of the system.

Brazed Joint

A gas-tight joint obtained by brazing the metal parts together.

Refer to J & E Hall International Engineering Standard:

JEH-ES-13-002 Standard for Face-fed Capillary Brazing

Brazing

A process of joining metals in which during or after heating molten filler, metal is drawn by capillary attraction into the space between closely adjacent surfaces of the parts to be jointed. In general, the melting point of the filler metal is above 450 ºC, but always below the melting temperature of the parent metal. The parent metals do not participate by fusion in making the joint.

Building Research Establishment Environmental Assessment Methodology (BREEAM)

Building Research Establishment Environmental Assessment Methodology is the world's longest established and most widely used method of assessing, rating and certifying the sustainability of buildings www.breeam.org.

Brine

An aqueous solution of a salt having a freezing point lower than that of pure water.

Calcium chloride ($CaCl_2$), sodium chloride (NaCl) and potassium carbonate (K_2CO_3) are brines, which are commonly used as secondary refrigerants.

See also:

Secondary Refrigerants

British Thermal Unit (BTU)

The imperial measurement for the quantity of heat required to be given to or taken from 1lb. of water in raising or lowering its temperature by 1°F. This term is not commonly used other than on some equipment imported from the Far East or the USA.

British Standards Institute (BSI)

The British Standards Institute.

British Standard Pipe (BSP)

British Standard Pipe thread. Thread form used in the United Kingdom to join pipes.

Refer to J & E Hall International Engineering Standard:

JEH-ES-07-008 ISO and NPT Pipe Threads

Bubble Point

Liquid saturation temperature of a refrigerant at the specified pressure and the temperature at which a liquid refrigerant first begins to boil.

NOTE: The bubble point of a zeotropic refrigerant blend, at constant pressure, is lower than the dew point.

Bursting Disc

Disc or foil, which bursts at a predetermined differential pressure.

See also:

Pressure Relief Device

Cc

Calcium chloride

Aqueous brine solution commonly used as a secondary refrigerant. Chemical formula $CaCl_2$

Canned Rotor Motor-compressor

Motor-compressor within a sealed housing not enclosing the motor windings and having no external shaft.

Capacity Control

A system to reduce the cooling capacity of a refrigeration plant.

Capillary Tube

A tube having a small diameter bore, connecting the temperature sensing phial with the bellows or the diaphragm of a control device.

Carbon Usage Effectiveness (CUE)

Carbon usage effectiveness (CUE) indicates the ratio of total CO_2 emissions from the data centre to total IT equipment energy consumption. It is found by dividing energy consumption (converted to CO_2 emissions) by IT energy consumption.

Cascade System

Two or more independent refrigeration circuits where the condenser of one system rejects heat directly to the evaporator of another.

Cassette Unit

Cassette air conditioning units are designed for commercial and residential applications. Ideal for large open plan areas or irregular shaped rooms they fit conveniently and discreetly into any area with a false or suspended ceiling.

Cathodic Protection

A means of protecting metal against corrosion by using a sacrificial metal anode to control the electrochemical potential.

Refer to J & E Hall International Engineering Standard:

JEH-ES-15-003 Cathodic Anti-corrosion Protection

Caution

A hazard classification, part of system of safety warnings and symbols based on:

- BS EN ISO 7010: Graphical symbols. Safety colours and safety signs. Registered safety signs;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.

⚠ CAUTION

This indicates a hazard with a low level of risk, which if not avoided, will result in minor or moderate injury if instructions, including recommended precautions, are not followed. In addition, there is a potential risk of damage to the component, product or process.

Instructions, which describe a CAUTION, are prefixed by this symbol.

CE Mark

NOTE: 1 January 2021, the UKCA mark will start to replace the CE mark for goods sold within Great Britain

CE (*Conformité Européenne*) marking is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The CE mark (shown below) certifies that a product has met EU consumer safety, health or environmental requirements.

Fig 1 CE Mark

Centigrade

A scale of temperature in which the freezing and boiling points of water at atmospheric pressure are fixed at 0 ºC (273.15 K) and 100 ºC (373.15 K) respectively.

Centrifugal Compressor

A compressor with a rotating wheel, which pushes the refrigerant outwards towards the rim of the wheel and from there to the condenser. It compresses gas using centrifugal force.

Centrifugal Fan

A centrifugal fan is a mechanical device for moving air or other gases.

Chlorofluorocarbons (CFCs)

Chlorofluorocarbons (CFCs) have been widely used as refrigerants. The manufacture and use of such compounds has been phased out, banned from the year 2000, and has been replaced with zero Ozone depleting products such as hydrofluorocarbons (HFCs).

Cubic Feet per Minute (CFM)

The abbreviation for cubic feet per minute, the imperial measurement for the rate of air flow in an air conditioning system. This term is not commonly used.

Change of State

The process of changing from one state of aggregation to another, such as the change from the solid state to the liquid state or from the liquid state to the gas or vapour state.

Changeover Device

Control valve arranged so that only one of two devices can operate at any one time, with changeover between devices effected by orientation of the control valve.

Charging Connection

Device to enable a refrigerating system to be charged with refrigerant.

Charles's Law

At constant pressure, the volume of a gas increases or decreases by the same factor as its temperature on the absolute temperature scale. As absolute temperature increases, the volume of the gas increases proportionally.

$V_1/T_1 = V_2/T_2$ or $V_2/V_1 = T_2/T_1$ or $V_1T_2=V_2T_2$

Where:

V_1 is the volume of the gas at absolute temperature T_1
V_2 is the volume of gas at absolute temperature T_2.

Check Valve

Also known as: Non-return Valve

Valve, which permits flow in one direction only.

Chiller, Water

A refrigeration system used to produce chilled water.

Chilled Water

Cold (refrigerated - chilled) water, often used as a secondary refrigerant to transfer 'cold' to end-user processes.

Chilled Water Return (CWR)

Chilled water return to a chiller.

Chilled Water Supply (CWS)

Chilled water supply to a cooling unit.

Chilled Water System

A type of air conditioning system using water (or glycol solutions) as a secondary cooling medium. The primary cooling medium (refrigerant) is contained in a chiller, which is located remotely. The chiller cools the water, which is then piped to the air conditioner to cool the space.

Chiller

A chiller is a machine that removes heat from a secondary cooling medium (water, glycol solution, etc.) via a vapour-compression or absorption refrigeration cycle. The secondary cooling medium can then be circulated through a heat exchanger to cool air or equipment as required.

Chartered Institution of Building Services Engineers (CIBSE)

Chartered Institution of Building Services Engineers www.cibse.org.

Cistern (Tank)

Construction Industry Training Board (CITB)

Construction Industry Training Board www.citb.co.uk.

Clean Room

A clean room is an environment, typically used in manufacturing or scientific research, with a low level of environmental pollutants such as dust, airborne microbes, aerosol particles and chemical vapours.

Close Control/Climate Control

See Precision Air Conditioning (PAC) and Precision Air Conditioning.

Closed System

Refrigerating system in which all refrigerant-containing parts are made tight by flanges, screwed fittings or similar connections.

Coefficient of Performance (COP)

The ratio of the cooling capacity to the absorbed power of a compressor. A measure of compressor efficiency.

Coefficient of System Performance (COSP)

The ratio of the cooling capacity to the absorbed power of the whole refrigeration system. This measure includes the effect of the power consumption of components such as fans and pumps, as well as the compressor. The measure of plant efficiency.

Coil

A heat exchanger constructed from suitably connected bent and straight pipes or tubes configured into a compact shape and used to cool or heat air. Liquid refrigerant inside the coil is vaporised by heat absorbed from the air outside the coil.

Coil Block

Heat exchanger component of an air cooler constructed from suitably connected bent and straight pipes or tubes. Liquid refrigerant inside the coil block is vaporised by heat absorbed from the air outside the coil block.

Cold Aisle

Cold aisle is a layout design for server racks and other computing equipment in a data centre. Cold aisle data centre design involves lining up server racks in alternating rows with cold air intakes facing one way and hot air exhausts facing the other. The rows composed of rack fronts are called cold aisles. See Data Centre Aisle Containment for more information.

Cold Room

Room or cabinet, maintained by a refrigerating system at a temperature lower than ambient temperature.

Cold Room/Store

Room or cabinet, maintained by a refrigerating system at a temperature lower than ambient temperature.

Comfort Air Conditioning

Method of air treatment designed to satisfy the comfort requirements of the occupants.

Commercial Air Conditioning

Air conditioning for large buildings such as hotels, hospitals and other commercial buildings, providing suitable ventilation and space conditioning.

A service required after installation that ensures equipment is set up to function correctly, as per the specification and to maximise system efficiently in order to provide optimal performance. Also, see Commissioning.

Companion Valve

See: Block Valve.

Competence

Ability to perform satisfactorily the activities within an occupation.

> **NOTE: Levels of competence are defined in BS EN 13313.**

Component

Individual functional item or sub-assembly of a refrigerating system.

> **NOTE: Does not include parts of sub-assemblies e.g. seals, fasteners.**

Compression

Process by which the pressure of a gas is increased by reducing its volume.

Compression Joint

Joints, which achieve gas tightness by deformation of a compression, ring.

Compression Ratio

The ratio of compressor discharge pressure to suction pressure, using pressure measured in absolute units.

Compression Refrigeration System

A system in which the refrigerant gas or vapour is compressed by a mechanical device – the compressor.

Compressor

The mechanical pump in a refrigeration system which reduces the volume of the refrigerant vapour, thereby increasing its temperature and pressure.

See also:

Canned Rotor Motor Compressor.

Non-positive Displacement Compressor.

Open Compressor.

Positive Displacement Compressor.

Compressor Capacity

Compressor capacity (kW) = Evaporator duty (kW).

Compressor capacity can also be expressed as a percentage of compressor maximum load for a specific set of running conditions. For example, if an eight cylinder reciprocating compressor is pumping refrigerant in only two cylinders, the compressor is said to be operating at 25 % capacity. For a screw compressor this must not be confused with slide valve position or percentage slide travel.

See also:

Evaporator Duty

Compressor Energy Efficiency

The ratio of the power that would be used by in an ‘ideal’ or isentropic compressor to the actual power used. A measure of the energy efficiency of a compressor.

See also:

Isentropic Compressor

Compressor Maximum Load

The greatest evaporator duty (kW) which the compressor can provide at specific suction and discharge pressures. This also represents the maximum quantity of refrigerant vapour that the compressor can pump at the given suction and discharge pressures, measured in kg/s.

See also:

Compressor Minimum Load

Evaporator Duty

Compressor Unit

Combination of one or more compressors and the regularly furnished accessories.

Condensate

The liquid obtained as a result of removing the latent heat of evaporation from a vapour.

Condensation

Change of state of a vapour into a liquid by extracting heat from the vapour.

Condenser

Heat exchanger in which vaporised refrigerant is liquefied by removal of heat.

Condenser, Water Cooled

A heat exchanger using cooling water to condense refrigerant vapour.

Condensing Pressure

The pressure at which the refrigerant condenses to liquid form.

Condensing Temperature

The temperature at which the refrigerant condenses to liquid form.

Condensing Unit

Combination of one or more compressors, condensers, liquid receivers (when required) and the regularly furnished accessories.

Conduction

The transfer of heat by the movement of electrons or by the vibration of molecules through contact of two or more bodies of differing temperatures.

Constant Air Volume (CAV)

Constant Air Volume (CAV) is a type of heating, ventilating and air-conditioning (HVAC) system. In a simple CAV system, the supply air flow rate is constant, but the supply air temperature is varied to meet the thermal loads of a space.

Contractor

The company or organisation employed by J & E Hall International under a purchase order to carry out a specific task.

Control Valve

A valve that modules the flow in a pipeline. Examples are solenoid valves, check valves and regulating valves.

Controller

A device that controls the operation of part or all of a system. It may simply turn a device on and off, or it may more subtly modulate the set point of components. Most controllers are automatic but have user input such as temperature set points, e.g. a thermostat. Controls may be analogue or digital.

Controls

A control system that applies regulation to a heating and/or air conditioning system. A sensing device is used to compare the actual state (e.g. temperature) with a target state. Also, see Controls.

Control, Unison

Convection

The process of transferring heat by the movement of heated gas, vapour or liquid.

Cooled Medium

The fluid cooled by the primary refrigerant as it flows through the evaporator.

Cooled Space

Cabinet, room or building maintained by a refrigerating system at a temperature lower than ambient temperature. May also be known as a cold store, cold chamber, cold room, chill room or chill warehouse.

Cooling Coil

A heat exchanger made of tubing formed into a compact shape by spiral or serpentine configuration, intended to reduce the temperature of fluid passing in or around or through it.

Cooling Duty

The instantaneous cooling load of a refrigeration system.

Cooling System

The part of the refrigerating system that includes the evaporator and any secondary system for the purposes of cooling air or other substances.

Cooling Tower

A water conservation device used to supply water for cooling condensers.

Coefficient of Performance (COP)

Coefficient of performance is the ratio of the refrigerant effect (total capacity) versus the work by the compressor over a unit of time; the higher the number the more efficient the system.

Coefficient of System Performance (COSP)

Coefficient of performance is the ratio of the refrigerant effect (total capacity) versus the work by the system over a unit of time; the higher the number the more efficient the system.

Corridor

An enclosed passageway that limits travel to a single path.

Corrosion

Material wastage or deterioration as a result of a reaction with the environment (e.g. oxidation, erosion, wear and abrasion).

Refer to J & E Hall International Engineering Standards:

JEH-ES-15-002 Guide to Corrosion and its Prevention.

JEH-ES-15-003 Cathodic Anti-corrosion Protection for Shell and Tube Condensers.

Computer Room Air Conditioning (CRAC)

Computer Room Air Conditioning unit ((see Precision Air Conditioning (PAC)).

Computer Room Air Handling (CRAH)

Computer Room Air Handling unit.

Crawl Space

Space that is in general accessed for maintenance only and where it is not possible to walk or access by walking.

Critical Pressure

The pressure above which the liquid and vapour phases of a substance cannot exist together in equilibrium.

Critical Temperature

The temperature above which the liquid and vapour phases of a substance cannot exist together in equilibrium.

Cross-ventilation

Customer

The company or organisation employing J & E Hall International under a purchase order, either placed directly or via a third party, to carry out a specific task and who takes ownership of the equipment or service supplied by J & E Hall International.

Cylinder

A container used for the transportation of refrigerant.

Dd

Daily Service Tank

Dalton's Law

The total pressure of a mixture of gases in a closed vessel is equal to the sum of the partial pressures exerted by each individual gas.

$$P_{total} = p_1 + p_2 + \ldots p_n$$

Where:

p_1, p_2 and p_n represent the partial pressure of each component.

Also, see:

Partial Pressure

Damper

A modulating device for controlling airflow rates through ductwork or air handling equipment.

Danger

A hazard classification, part of system of safety warnings and symbols based on:

- BS EN ISO 7010: Graphical symbols. Safety colours and safety signs. Registered safety signs;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.

DANGER

This indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury if instructions, including recommended precautions, are not followed.

Instructions, which describe a DANGER, are prefixed by this symbol.

Data Centre

A data centre is a facility used to house computer systems and associated components, such as telecommunications and storage systems.

Dead-zone

Also known as: Neutral Zone.

The control band within which a change of value of an input signal, for example, the control condition, to an element or system may take place without causing any perceptible change in output signal.

Decant Receiver

Clean empty cylinders for temporary storage of refrigerant during maintenance.

Decibel (dB)

Unit used for measuring relative loudness of sounds.

Defrost Cycle

Sequence of operations required to defrost an air cooler.

Defrosting

Process of melting frost and ice deposited on an air cooler.

Refer to J & E Hall International Engineering Standards:

JEH-ES-05-001 General Guide to Air Cooler Defrosting

JEH-ES-05-002 Automatic Hot Gas Defrosting

Degree of Superheat

The difference between the temperature of a vapour at a given pressure and the temperature corresponding to saturation at this pressure.

Dehumidification

The process of removing moisture from the air within a conditioned space to maintain the required humidity level.

Density

The weight or mass per unit volume of a fluid or gas. SI unit: kg/m^3 (kilogram per cubic metre).

Design Conditions

Specified environmental conditions, such as temperature and humidity, required to be produced and maintained by a system.

Design Pressure

The pressure value used to determine the necessary material, thickness and construction for a component to maintain its pressure integrity.

The design pressure should never be less than the maximum working pressure. Design pressure and maximum working pressure are normally equal but may differ for reasons unrelated to safety.

Dew Point

This the temperature at which air becomes 100 % saturated with water vapour. If the temperature is lowered, or the pressure increased without increasing temperature, condensation occurs.

Differential Pressure

The difference between pressures measured at two points in a fluid.

Differential Pressure Control

Other name: Differential Pressure Switch

A control containing a pair of electrical contacts wired to changeover at a predetermined difference between two different pressures. Depending on the application, the switch contacts may be wired to open (break circuit) on falling differential pressure or close (make circuit) on rising differential pressure, or vice versa.

DIN

Deutsches Institut für Normung (German Institute for Standardisation).

Direct Connection

Connection between rooms where the dividing wall contains an opening, including those, which can optionally be shut by a door, window or hatch.

Direct Expansion Systems (DX)

This is a system using refrigerant, which passes through an expansion device prior to entering the evaporator. The system is used to extract heat in the evaporator and reject the waste heat through the condenser. This type of system is generally used in chillers, refrigerant based air conditioning systems and refrigeration equipment.

Direct System

The evaporator or condenser of the refrigerating system is in direct contact with the air or the substance to be cooled or heated. Systems in which a secondary coolant is in direct contact with the air or the goods to be cooled or heated (spray or ducted systems) shall be treated as direct systems.

Discharge Line

Piping that conveys refrigerant gas from the compressor discharge to the inlet of the condenser.

Discharge Pressure

The pressure in the system measured at the outlet from a compressor.

Disposal

Conveying a product to another party, usually for recycling or destruction.

DN

Nominal Diameter (from the French Diamètre Nominal). Nominal inside diameter of a pipe or tube.

Drawing Office (DO)

The department responsible for creating engineering drawings. Within J & E Hall documentation, DO refers to the Drawing Office at Questor, Dartford.

Refer to J & E Hall International Engineering Standard:

JEH-ES-19-103 Mechanical and Electrical Drawing Office Standard Procedures.

Down Flow

Refers to a type of air conditioning system that discharges air downward, directly beneath a raised floor, commonly found in computer rooms and modern office spaces.

Drain Line

Pipe or tube connected to a drip tray to remove melt water from the cooled space.

Drip Tray

Device mounted below an air cooler to collect frost and ice melted during defrosting.

Drop-in

A gas that can be retrofitted into a refrigeration system designed for another, without major system changes. For example, R422D is a drop-in replacement for R22 in many applications. However, hydrocarbon refrigerants are NOT drop-in alternatives for most fluorocarbon refrigerants due to substantial system changes needed to manage their differing characteristics (e.g. flammability).

Dry Bulb Temperature

The actual temperature of the air measured with a dry bulb thermometer.

See also:

Wet Bulb Temperature

Dual Pressure Relief Device

Two pressure relief devices (valves or bursting discs) mounted on a three-way valve that allows one device to remain active whilst the other is isolated.

Duct

Ducts are used in heating, ventilation and air conditioning (HVAC) to deliver and remove air including supply air, return air and exhaust air.

Duct Sizing, Velocity Reduction Method

Ee

European Community (EC)

European Community. One of three pillars of the European Union formed under the Maastricht Treaty in 1993 from the foundations of the European Economic Community (EEC) and other European communities.

Electronically Commutated Fan

Electronically Commutated (EC) fans use brushless DC motors, which include in-built electronics to convert the AC supply to DC without the need for a separate DC supply. EC fans provide a more efficient (up to 30%) means of airflow through Precision Air Conditioning (PAC) units with the additional benefit of variable speed control via an output signal from the unit controller. Also, see EC Fan upgrades.

Economiser

An economiser is a mechanical device used to reduce energy consumption. Economisers recycle energy produced within a system or optimise environmental temperature differences to achieve efficiency improvements.

European Economic Area (EEA)

The European Economic Area. Single European market open to EFTA members.

Energy Efficiency Ratio (EER)

Energy Efficiency Ratio (EER) is a measure of system efficiency at a given set of rating conditions. It is a ratio calculated by dividing the cooling capacity in kW by the power input in kW.

European Free Trade Association (EFTA)

The European Free Trade Association allows member countries to participate in the European single market without joining the EU.

Electronic Expansion Valve (EEV)

An expansion valve controlled by a microprocessor and able to operate under relatively low and varying conditions of pressure difference.

This performs the same function as the TEV but provides closer control as the DC stepper motor opens and closes the valve in response to an output from the controller; maintaining very close control of the evaporator superheat. Also, see Electronic Expansion Valves.

End User

The person or persons who operate the product, in this case a refrigeration plant. The end user is not necessarily the plant's owner or purchaser, though he or she is responsible for the safe operation of the plant, maintenance and repair, either directly or by delegating this activity to others.

Energy

The capacity to do work. SI unit: kW (kilowatt).

Energy Reuse Effectiveness (ERE)

Is the ratio of energy emitted from the data centre and reused elsewhere to total energy consumed. It is found by diving the amount of energy reused by the amount of energy consumed by the data centre overall.

Energy Reuse Factor (ERF)

Is the ratio of the data centre energy that is reused elsewhere in the facility and the total energy brought into the data centre control volume (including IT, cooling, power, lighting etc.).

Energy Technology List (ETL) / ECA Scheme

The Enhanced Capital Allowance (ECA) Scheme is a key part of the Government's programme to manage climate change. It provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria.

Energy, Useful

Enthalpy

The thermodynamic property of a substance defined as its total internal energy plus the total heat & heat content Pv/J. Sometimes called total heat and heat content.

Entropy

The rate at which heat is absorbed into an object.

Equipment

Any item or assembly, such as a compressor, vessel, condenser or control panel, that is part of the refrigeration system. Also includes special fittings required to connect to these items.

Equaliser (Unloader)

Escape Duct

Duct designated as an emergency exit.

Escape Route

Designated and sign posted exit route in an emergency.

Ester Oil

A general term that applies to a family of synthetic refrigeration oils, based on the chemistry of polyol esters. Generally used with HFC refrigerants. Ester oils are slightly hygroscopic and should be stored non-porous containers.

Estimated Refrigerant Charge

The quantity (kg) of refrigerant calculated by the design engineer to achieve the required refrigeration duty.

Ethyl Alcohol

Alcohol commonly used in refrigeration. Commonly referred to as industrial methylated spirit, chemical formula C_2H_5OH.

European Union (EU)

The European Union is an economic and political union of 27 member states, located primarily in Europe. Formed, by combining the three pillars established by the Maastricht Treaty in 1993 into a single entity, by ratification of the Lisbon Treaty in 2009.

European Seasonal Energy Efficiency Ratio (ESEER)

As with EER, the Seasonal Energy Efficiency Ratio is a measure of equipment energy efficiency, but defined to suit the Europe market. Rather than using a single condition (EER) the ESEER / SEER assumes four seasonal conditions for variable load performance of chillers, etc. and provides a suitable rating number for the equipment.

Evaporating Pressure

The pressure at which the refrigerant evaporates to vapour form.

Evaporating Temperature

The temperature at which a given refrigerant vaporises within an evaporator.

Evaporative Condenser

A condenser in which refrigerant within tubes is cooled by a falling water spray and a counter current flow of air.

Evaporator

A heat exchanger in the refrigeration system in which liquid refrigerant is vaporised by absorbing heat from the cooled medium.

Evaporator Coil

An evaporator coil is usually located indoors as part of a split unit or within an air handler or duct system. Inside the coil, refrigerant evaporates as it absorbs heat from the air that passes over it.

Evaporator Duty

Evaporator duty (kW) = Compressor duty (kW)

The refrigeration supplied by the compressor for specific suction and discharge pressures. This can also be seen as the quantity of heat extracted from the cooled medium by the refrigerant circulated through the evaporator.

Evaporator Load

The evaporator load is an indication of the amount of refrigeration required, measured in kilocalories per hour. The refrigeration (kW) required at a given evaporator pressure. This can also be seen as the heat input to the evaporator.

Exit

Opening in the outer wall, with or without a door or gate.

Exit Passageway

Passageway immediately in the vicinity of the exit through which people leave the building.

Expansion Valve

A device that regulates the amount of refrigerant flowing from the liquid line into the evaporator. Can be a thermostatically operated valve, a capillary tube or a fixed orifice device. The device controls the flow of refrigerant to the evaporator.

See also:

Regulator

Expansion Vessel

Expansion Tank

Ex d

Flame proof or explosion proof within the confines of European standards EN60079. An enclosure that can withstand the pressure developed during the confined explosion of an explosive mixture and which prevents transmission of the explosion to the explosive atmosphere surrounding the enclosure.

Ex e

Increased safety within the confines of European standards EN60079 applied to electrical apparatus that does not produce arcs or sparks in normal service, in which additional measures are applied so as to give increased security against the possibility of excessive temperatures.

Explosive Gas Atmosphere

A mixture in air of flammable materials in the type of gas vapour or mist in which, after ignition, combustion spreads almost instantaneously through the unconsumed mixture.

Ff

Fan, Axial Flow

A fan having a cylindrical casing surrounding the impeller. Air enters and leaves the impeller in a direction substantially parallel to the common axis of the casing and the impeller. The pitch angle of the impeller blades can be fixed, adjustable with the fan at rest, or varied with the fan running.

Fan, Tangential Flow (Cross-flow)

F Gas

Fluorinated gases ('F-gases') are a family of man-made gases used in a range of air conditioning and refrigeration applications. There are three types: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). These were produced in response to the need to eliminate ozone depleting gases.

F Gas Regulation

EU regulation introduced into European Law in 2007. Impacts the use of fluorine based refrigerants. Regulation leads to record keeping, leak detection and competence levels for engineers. See F Gas Compliance

F Gas Legislation

European legislation that details the obligations when using substances controlled under the terms of the Kyoto Protocol.

See also:

Kyoto Protocol

Factory Made

Manufactured at a dedicated production location under control of a recognised quality system.

Fahrenheit

A scale of temperature in which the freezing and boiling points of water at atmospheric pressure are fixed at 32.0 °F (273.15 K) and 212.0 °F (373.15 K) respectively.

Fan

Component of an air cooler comprising a motor and revolving vane or vanes to circulate air from the cooled space through the air cooler.

Fan, Axial Flow, Variable Pitch

Fan, Backward Curve

Fan Coil Unit (FCU)

A fan coil unit (FCU) is normally a chilled water device consisting of a heating and/or cooling coil, fan, valve/s and local controller. It forms part of a larger HVAC system found in residential, commercial and industrial buildings.

Fault Diagnosis

The process of using monitoring data to identify operating problems in a refrigeration system.

Functional Design Description (FDD)

A document which provides an overview of system operation, describes the operating states: starting, normal operation, controlled stop, crash stop etc, and includes other specific information, refrigerant leak detection for example.

Filter

Device to remove solid material from a fluid or remove gases from a mixture of gases.

Filter Medium

Portion of a filtrating system that provides the liquid-solid separation, such as close-woven textiles, metal screens, papers, non-woven fabrics, granular beds, or porous media.

Filter-Drier

A device within a refrigeration system normally containing a desiccant designed to remove H_2O.

Fin

Thin piece of metal attached to a pipe, tube, or other surface in order to increase the heat transfer area.

Finned Coil

A heat exchanger, which utilises a finned extended surface on the vapour side to transfer heat between a liquid and a vapour.

First Law of Thermodynamics

States that different forms of energy are mutually interconvertible and that a definite numerical ratio exists for each conversion.

Flange

Disc rim on the end of a pipe for coupling pipes, usually by bolts.

Flanged Joint

Joint made by bolting together a pair of flanged ends.

Flared Joint

Metal-to-metal compression joint in which a conical spread is made on the end of the tube.

Flash-gas

The vapour formed as a result of a reduction in pressure of a volatile liquid, which has no sub-cooling.

Float Valve

A valve actuated by a float that is responsive to a change in liquid level.

Floating Head Pressure

A refrigeration system that allows the head pressure to vary in line with ambient temperature conditions.

Flooded Evaporator

An evaporator in which the heat transfer surfaces are always wetted by evaporating liquid refrigerant.

Flow

Continuous motion of a fluid in pipes, ducts, channels, or through openings.

Flow, Viscous (Laminar)

Flow Regulator

A control valve, which regulates the flow of liquid through the device and is actuated by flow rate changes to maintain a predetermined flow rate.

Fluorocarbon

A chemical containing fluorine and carbon. Most refrigerants are classified as fluorocarbons – CFCs, HCFCs, HFCs and HFOs are all identified as this.

Foaming

Formation of a foam or froth of oil refrigerant due to rapid boiling out of the refrigerant dissolved in the oil when the pressure is suddenly reduced.

Footprint

The area or space that an air conditioning unit takes up when applied.

Forced-feed Oil Lubrication

A lubrication system in which oil is provided by an internal or external mechanical oil pump.

Fractionation

Change in composition of a refrigerant mixture by evaporation of the more volatile component(s) or condensation of the less volatile component(s).

Free Cooling

This may apply to a system using fresh air for cooling the space or a water cooled or glycol cooled system with an additional coil that provides chilled water cooling when the outdoor ambient is cold; thereby reducing or eliminating compressor operation.

Furnace

A component of an HVAC system that adds heat to air or an intermediate fluid by burning fuel (natural gas, oil, propane, butane, or other flammable substances) Abbreviated PTAC packaged unit.

Fusible Plug (Fusible Component)

A safety device having a low temperature or melting point element to release pressure at a predetermined temperature.

Gg

Gas

State of matter in which substances exist in the type of non-aggregated molecules and which, within acceptable limits of accuracy, satisfy the ideal gas laws; usually a highly superheated vapour.

Gas Cooler

Heat exchanger in a trans-critical system in which supercritical refrigerant is cooled by removal of heat.

Gauge Pressure

The difference between the absolute pressure in the system and the atmospheric pressure surrounding the system, as measured and indicated by a pressure gauge.

NOTE: All pressures are gauge pressures, unless otherwise indicated.

Gauge, Tank Contents

Gland

Device for preventing leakage at a machine joint, such as where a shaft emerges from a vessel containing a fluid under pressure.

Glide

The different boiling temperatures of the various components of a refrigerant blend, leading to a change in the relative components of the blend across a temperature range.

Glycol

A type of secondary refrigerant.

See also:

Ethylene glycol, chemical formula $HO.CH_2.CH_2.OH$

Propylene glycol, chemical formula $CH_3CH(OH)CH_2OH$

Calcium chloride, chemical formula $CaCl_2$

Potassium carbonate, chemical formula K_2CO_3

Sodium chloride, chemical formula NaCl

Ethyl alcohol (denatured alcohol, commonly referred to as industrial methylated spirit), chemical formula C_2H_5OH

Methyl alcohol (methanol), chemical formula CH_3OH

Glycol-cooled System

A type of air conditioning system using a water/glycol solution as a condensing medium. Typically, the glycol-cooled condenser is located inside the air conditioner with the rest of the refrigeration components. Water/glycol is piped to the unit from a dry cooler or other suitable source. The glycol keeps the solution from freezing during winter operation.

Grate, Vibrating

Grinding

A machining process that uses an abrasive wheel as the cutting tool to remove surface irregularities.

Global Warming Potential (GWP)

Global Warming Potential. Represents the ‘strength’ of a gas in terms of impact on global warming in comparison to CO_2 which as a GWP = 1.

Hh

HallScrew Compressor

HallScrew compressors form a family of positive displacement, oil injected, single screw compressors designed on the Zimmern pattern.

Hallway

Corridor for the passage of people.

Halocarbon and Hydrocarbon Refrigerants (HCFC)

A type of refrigerant with a chemical compound made up of carbon, hydrogen and halogen atoms and classified as follows:

CFC (Chlorofluorocarbons): fully-halogenated hydrocarbon containing only chlorine, fluorine and carbon. Now completely banned under the terms of the Montreal Protocol.

HCFC (Hydrochlorofluorocarbons): halocarbon containing hydrogen, chlorine, fluorine and carbon. To be phased out by 2015 under the terms of the Montreal Protocol.

HFC (Hydrofluorocarbons): halocarbon containing only hydrogen, fluorine and carbon. Use covered by the terms of the Kyoto Protocol.

PFC (Perfluorocarbons): fully fluorinated halocarbon containing only fluorine and carbon. Use covered by the terms of the Kyoto Protocol.

HC (Hydrocarbon): hydrocarbon containing only hydrogen and carbon.

Head (Static)

Pressure of fluid expressed in terms of height of column of the fluid, such as water or mercury.

Head (Velocity)

In flowing fluid, height of fluid equivalent to its velocity pressure.

Head Loss

During flow, the reduction in the head velocity.

Head Pressure

Also known as: Discharge Pressure.

Pressure at compressor outlet. Approximately equal to (and usually synonymous with) the condensing pressure.

Head Pressure Control

Also known as: Condensing Pressure Control.

Control of the condenser pressure at a predetermined high pressure (under the prevailing load and temperature conditions).

Header

Pipe or tube component of a refrigerating system to which several other pipes or tubes are connected (e.g. discharge header).

Heat

A basic type of energy, which is characterised by its ability to pass from a body at one temperature only to a body at a lower temperature. It may appear as sensible heat or latent heat.

Heat Capacity

The amount of heat needed to raise the temperature of a given mass by 1 degree Kelvin.

Heat Exchanger

A device in which heat is transferred from a fluid at one temperature to another fluid at lower temperature.

Heat, Latent

The heat-energy liberated or absorbed when a substance changes state at a constant pressure and temperature. The change in heat energy cannot be recorded or perceived by human senses so is said to be latent (hidden).

Heat Loss, Ventilation

Heat Pump System

A refrigerating system designed to make optimum use of the heat rejected by the system, e.g. for space heating.

Heat Recovery

Utilisation of 'waste' heat from a process (usually to conserve energy).

Heat Transfer

Heat transfer describes the exchange of thermal energy between two interacting media passing through a heat exchanger, such as refrigerants, air and water.

See also:

- Conduction
- Convection
- Radiation

Heat Transfer Medium

Fluid for the transmission of heat usually without any change in its phase (e.g. brine, water, air) or with a change in its phase at the same pressure (e.g. R744).

Heater, Unit Air

Heat, Useful

Heating, Background

Heating, Central, Background

Hemi-anechoic Chamber

A room designed to completely absorb reflections of either sound or electromagnetic waves. Hemi-anechoic chambers have a solid floor that acts as a work surface for supporting heavy items such as large air conditioning units for testing sound levels.

Hermetic Motor-compressor

Combination of a compressor and electrical motor, both of which are enclosed in the same housing, with no external shaft or shaft seals, the electrical motor operating in a mixture of oil and refrigerant vapour.

Hydrofluorocarbon (HFC)

Hydrofluorocarbon (e.g. R134a), zero ODP, high global warming refrigerant gas.

Hydrofluoroolefin (HFO)

Hydrofluoroolefin (e.g. R1234ze), zero ODP, low global warming, 4th generation refrigerant gas.

High Pressure (HP) Cut-out

A pressure control containing a pair of electrical contacts wired to open (break circuit - cut-out) when the sensed pressure rises above the control setting.

See also:

Pressure Control

High Pressure Float Valve

Also known as: High Side Float Valve.

A controlling device (expansion valve) that regulates the flow of liquid refrigerant from a higher pressure section of the system into a lower pressure section and is actuated toward open by a rising liquid upstream of the valve.

See also:

Low Pressure Float Valve

High Pressure Side (HP Side)

The section of a refrigerating system subject to condensing pressure.

The high pressure (HP) side extends from the compressor discharge to the inlet to the regulator, the mechanical or electro-mechanical device that separates the HP side from the low pressure (LP) side.

High Temperature (LT) Cut-out

A temperature control containing a pair of electrical contacts wired to open (break circuit - cut-out) when the sensed temperature rises above the control setting.

See also:

Low Temperature Cut-out

Temperature Control

Hot Aisle

A hot aisle is a layout design for server racks and other computing equipment in a data centre. Hot aisle data centre design involves lining up server racks in alternating rows with cold air intakes facing one way and hot air exhausts facing the other. The rows the heated exhausts pour into are called hot aisles. See Data Centre Aisle Containment for more information.

Hot Gas Bypass

A capacity control technique where compressed refrigerant vapour is passed straight back to the compressor suction inlet.

Hot Gas Bypass Regulator

A controlling device that regulates the flow of refrigerant hot gas through the device from a higher pressure section of the system into a lower pressure section and is actuated toward open by a pressure falling below regulator set point downstream of the regulator orifice.

Health and Safety Executive (HSE)

The Health and Safety Executive.

Human Machine Interface (HMI)

The control interface between the plant and the operator, used for J & E Hall International Fridgewatch Controllers.

Humidification

The process of adding moisture to the air within a space.

Humidity

A quantity representing the amount of water vapour in the atmosphere or a gas.

Heating, Ventilation and Air Conditioning (HVAC)

Heating, Ventilation and Air Conditioning is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality.

Hydrocarbon Refrigerant (HC)

A family of chemicals containing only carbon & hydrogen that are suitable for use as a refrigerant. Common examples include propane (R290), isobutane (R600a) and the CARE range. Zero ODP, very low GWP.

Hygroscopic

A hygroscopic substance has a tendency to attract water from the surrounding environment through either absorption or adsorption. All refrigeration oils are hygroscopic.

Ii

ID

Inside Diameter. The measured inside diameter of a pipe or tube.

Independent Inspector

An independent inspector is a competent person independent of immediate commercial and production responsibilities for the installation.

Indirect System

The evaporator cools or the condenser heats the heat-transfer medium, which passes through a closed circuit containing heat exchangers that are in direct contact with the substance to be treated.

Instruction Manual

A technical manual that applies to the day-to-day use, maintenance and handling of a product, in this case the refrigeration plant and its individual components.

Instrument

A device, which monitors a control parameter and displays the result locally or remotely. May also provide a feedback signal to control the process.

Insulation

The means for confining as far as possible a transmissible phenomenon (e.g. heat, electricity, sound, vibration) to a particular channel or location in order to obviate or minimise loss, damage or annoyance.

Refer to J & E Hall International Engineering Standards:

JEH-ES-14-001 Guide to Principles of Insulation and Insulation Material Properties.

JEH-ES-14-002 Specification for the Insulation of Pipes and Vessels.

Insulation System

The materials used to insulate the refrigerating plant piping and vessels, including insulation material, vapour barrier, cladding and associated installation material including supports.

Intermediate Pressure Section

The section of a multi-stage refrigerating system subject to intermediate pressure.

Internal Gross Volume

Volume calculated from the internal dimensions of a vessel, no account being taken of the volume of any internal parts.

Internal Net Volume

Volume calculated from the internal dimensions of a vessel and excluding the volume of the permanent internal parts.

Intrinsically Safe (IS)

Intrinsically safe electrical apparatus in which the circuits themselves are incapable of causing ignition of a flammable gas.

Inverter Compressor

This type of compressor uses an inverter drive to control the compressor motor speed to modulate capacity as demand varies.

Institute of Refrigeration (IOR)

The Institute of Refrigeration ((also known, in French, as the Institut International du Froid (IIF)), is an independent intergovernmental science and technology based organization which promotes knowledge of refrigeration and associated technologies and applications on a global scale that improve quality of life in a cost effective and environmentally sustainable manner.

International Protection Rating (IP Code

International Protection rating. Degree of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact and water in electrical enclosures.

Refer to J & E Hall International Engineering Standard:

JEH-ES-11-001 Guide to the Protection Classification of Electrical Enclosures

Isentropic Efficiency

The ratio of the work input required to raise the pressure of a gas to a specified value in an isentropic (constant enthalpy) manner to the actual work input. A term that is synonymous with compressor energy efficiency.

See also:

Compressor Energy Efficiency

ISO

International Organisation for Standardisation (from the French *Organisation Internationale de Normalisation*).

Isolating Valve

Valve, which prevents flow in either direction when closed.

Jj

Jet

A fluid stream issuing from a slot, orifice or nozzle (source: BS 5643:1984).

Jet, Isothermal

A jet of air having the same temperature as the ambient air (source: BS 5643:1984).

Jet Angle

The angle at which a jet or jets of air will diverge in free-space (source: BS 5643:1984).

Jet Drop

The downward change in direction of an air jet that has a temperature different from that of the ambient air (source: BS 5643:1984).

Jet Envelope

The boundary between the air jet and the surrounding air (source: BS 5643:1984).

Jet Rise

The upward change in direction of an air jet that has a temperature different from that of the ambient air (source: BS 5643:1984).

Jet Spread

The divergence, generally conical in shape, of a jet from the point of origin (outlet) (source: BS 5643:1984).

JIS

Japanese Industrial Standards.

Joint

A rigid or flexible connection between two adjacent pipes or ducts or their respective fittings or accessories, providing a continuous leak-proof seal (source: BS 5643:1984).

Joint, Capillary

A pipe joint used with copper and some other compatible metals in which molten solder is drawn by capillary action into the annular space between the outside of the pipe and the inside of the fitting (source: BS 5643:1984).

Joint, Compression

A pipe joint used with copper and some other materials in which the tightening of a nut causes a shaped olive to bear on the outside of the pipe and seal the joint (source: BS 5643:1984).

Joint, Flanged

A pipe or duct joint in which flanges on the ends of the adjacent components abut and are bolted together, usually with a gasket between the flange faces (source: BS 5643:1984).

Joint, Screwed

A pipe joint in which the male thread on one component is screwed into the female thread on the other component, usually with a suitable jointing compound on the threads (source: BS 5643:1984).

Joint Ring

Gasket in the type of a torus used for a seal between flanges or joints.

Joint, Slip

A duct joint in which the end of one component slips inside the end of the other and is secured by screws or bolts (source: BS 5643:1984).

Joint, Spigot and Socket

A pipe joint in which a spigot on one component slips inside a socket on the other component and is secured by filling the annular space with appropriate material (weld) (source: BS 5643:1984).

Jointing Compound

See Jointing Medium.

Jointing Medium

Material used for making a pressure-tight joint between two surfaces (source: BS 5643:1984).

Junction Box

Group of electrical terminals housed in a protective box or container.

Kk

Katathermometer

An instrument used to assess the cooling effect of an air current (source: BS 5643:1984).

Kelvin

Scale of temperature in which the freezing and boiling points of water at atmospheric pressure are fixed at 273.15 K and 373.15 K respectively. One of the seven SI base units.

Kilowatt (kW)

Measure of energy flow used to express the cooling capacity, heating capacity and power consumption of an air conditioning system.

Kinetic Energy

See Energy, Kinetic.

Kyoto Protocol

International treaty designed to control the emission of greenhouse gases including HFC's and PFC's believed to cause global warming.

LI

Label

Any label, plate or sign that is mounted to or near a pipe, valve, instrument or item to identify it and/or its content.

Refer to J & E Hall International Engineering Standards:

JEH-ES-07-006 Pipeline Marking

JEH-ES-09-001 Valve, Instrument and Equipment Tagging

JEH-ES-09-002 Refrigeration System Nameplates

JEH-ES-09-003 Pressure Vessel Nameplates

Lagging

See Thermal Insulation.

Lagging Cleats

A frame used to support lagging (source: BS 5643:1984).

Laminar Flow

See Flow, Laminar.

Latent Cooling

A method of cooling that involves the evaporation of a liquid (and hence the use of latent heat).

See also:

Heat, Latent.

Latent Cooling Capacity

The amount of energy added or removed from the air in order to increase or reduce the moisture content of the air during the air conditioning process. It is measured in kg/kg of dry air.

Latent Heat

See Heat, Latent.

Leak Test

Procedure to detect and locate the source of a refrigerant leak.

Lighting Troffer, Air

An air inlet or extract device combined with a luminaire (source: BS 5643:1984).

Limit Charged System

Refrigerating system in which the internal volume and total refrigerant charge are such that, with the system idle, the allowable pressure will not be exceeded if complete evaporation of the refrigerant charge occurs.

Limit Control

Control used to open or close electrical circuits as temperature or pressure limits are reached.

Limit Switch

See Switch, Limit.

Linear Air Terminal Device

A grille with an aspect ratio of 10 : 1 or greater (source: BS 5643:1984).

Linear Variable Displacement Transducer (LVDT)

The linear variable differential transducer (LVDT) is a type of electrical transducer used for measuring linear displacement (position).

Liquid

State of matter intermediate between crystalline substances and gases in which the volume of a substance, but not the shape, remains relatively constant.

Liquid Immersion Freezer

See Freezer, Liquid Immersion.

Liquid-in-glass Thermometer

See Thermometer, Liquid-in-glass.

Liquid Level Cut-out

Liquid level actuated device designed to prevent unsafe high or low liquid levels.

Liquid Level Indicator

A device for measuring and indicating the height of the surface of fluid in a container above the bottom of the container or an arbitrary zero datum (source: BS 5643:1984).

Liquid Level Indicator, Dipstick

A liquid level indicator in which the level of liquid is measured by the wetting of a calibrated rod inserted into the liquid from the top of the container (source: BS 5643:1984).

Liquid Level Indicator, Float Gauge, Cable Operated

A liquid level indictor in which the surface of the liquid is detected by a float coupled to the indicating element by a taunt guided cable (source: BS 5643:1984).

Liquid Level Indicator, Float Gauge, Magnetically Operated

A liquid level indictor in which the position of the float is transmitted from the inside the container by a magnetic device to an indicator outside the container (source: BS 5643:1984).

Liquid Level Indicator, Hydrostatic

A liquid level indictor in which the hydrostatic pressure generated by the liquid inside the container actuates the indicating element (source: BS 5643:1984).

Liquid Level Indicator, Sight Tube

A liquid level indictor in which a vertical transparent tube, open at the top, is connected to the bottom of the container full of liquid. The tube is provided with a vertical calibrated scale, the meniscus of the liquid within the tube being the level mark (source: BS 5643:1984).

Liquid Line

Piping that connects the condenser or liquid receiver to the evaporator and carries liquid refrigerant to the expansion device.

Liquid Level Transmitter

Device that senses liquid level and relays the level position by means of electrical, electronic or pneumatic signal.

Liquid Receiver, Refrigerant

A vessel permanently installed in the high pressure side of a system to provide a reserve of liquid refrigerant.

For systems with low pressure (LP) control, the liquid receiver takes the excess charge under low load conditions.

Liquid Separator, Refrigerant

A vessel permanently installed in the low pressure side of the system for the purpose of trapping saturated refrigerant (unvaporised droplets) (source: BS 5643:1984).

Liquefied Petroleum Gas (LPG)

See Gas, Liquefied Petroleum.

Liquefaction

When heat is removed from a vapour, its temperature is lowered until it reaches the value corresponding to the pressure, after which further removal of heat will cause it to liquefy. Alternatively, if the pressure is increased combined with a removal of heat, the gas can be liquefied without reducing its temperature.

Live Steam

See Steam, Live.

Load

Amount of heat per unit time imposed on a refrigeration system by the required rate of heat removal.

Load, Connected

The aggregate of the maximum demand of individual units connected to a system, exclusive of distribution losses (source: BS 5643:1984).

Load, Cooling

The amount of heat to be removed by a refrigeration plant to meet the specified conditions (source: BS 5643:1984).

Load, Heat

The amount of heat to be inputted to a system at the point of generation or by the appliance (source: BS 5643:1984).

Load, Peak

The maximum output required of a supply source (source: BS 5643:1984).

Load, Refrigerating

The rate of heat transfer to the evaporator in a refrigerating system (source: BS 5643:1984).

Load Density

The average maximum heat demand over a specific area in a heating scheme (source: BS 5643:1984).

Load Factor

The ratio of the average load to the maximum demand (source: BS 5643:1984).

Load Pattern

The change of load with time (source: BS 5643:1984).

Lobby

Entrance hall or large hallway serving as a waiting room.

Local Air Velocity

The velocity at a specific point in an air stream, for example, near a solid surface or at the outlet of a grille (source: BS 5643:1984).

Lock-shield Valve

See Valve, Lock-shield.

Log, Mean Temperature Difference

See Temperature Difference Log, Mean.

Local Air Velocity

Locked Valve

Valve sealed or in other ways constrained, so that it can only be operated by a competent person.

Logbook

Record of events and data pertinent to a machine operation.

Louvre

An assembly of sloping vanes intended to permit air to pass through (source: BS 5643:1984).

Low Pressure Control

A pressure responsive control device connected to the low pressure side of a refrigeration system (source: BS 5643:1984).

Low Pressure Hot Water

See Heating System, Low Pressure Hot Water.

Low Pressure (LP) Cut-out

A pressure control containing a pair of electrical contacts wired to open (break circuit - cut-out) when the sensed pressure falls below the control setting.

See also:

Pressure Control

Low Pressure Float Valve

Also known as: Low Side Float Valve.

A controlling device (expansion valve) that regulates the flow of liquid refrigerant from a lower pressure section of the system into a higher pressure section and is actuated toward closed by a rising liquid downstream of the valve.

See also:

High Pressure Float Valve

Low Pressure Side (LP Side)

The section of the refrigerating system subject to evaporating pressure.

The low pressure (LP) side extends from the regulator outlet to the mechanical or electro-mechanical device, which separates the high pressure (HP) side from the LP side, to the suction inlet to the compressor.

Low Pressure Stage

The part of a single stage refrigerant system from the outlet of the expansion device to the compressor suction inlet. On a multi-stage system, it is the part where the lowest temperature is achieved.

Low Temperature

A temperature below freezing.

Low Temperature (LT) Cut-out

A temperature control containing a pair of electrical contacts wired to open (break circuit - cut-out) when the sensed temperature falls below the control setting.

See also:

High Temperature Cut-out

Temperature Control

Lower Explosive Limit (LEL)

The volume of flammable gas or vapour in air below which an explosive gas atmosphere will not be formed.

Lower Flammability Limit (LFL)

Minimum concentration of refrigerant that is capable of propagating a flame within a homogeneous mixture of refrigerant and air.

Lubricated Plug Cock or Valve

See Valve, Plug, Lubricated.

Mm

Machinery Room

Complete enclosed room or space, vented by mechanical ventilation and only accessible to authorised persons, which is intended for the installation of components of the refrigerating system or of the complete refrigerating system. Other equipment may also be installed provided it is compatible with the safety requirements for the refrigerating system.

Main

Pipe for distributing or collecting flowing fluid to or from various branches.

Main Pressure Bearing Part

Components of a pressure vessel retaining the pressure and contributing to the vessel strength such as shell, tube sheet, end plate, dished ends, connection or fitting.

Make-up Air Unit (MUA)

Intake supply fan to replace air exhausted from a building. MUA may be heated or cooled so that the air coming in does not have a major impact on the building air conditioning systems, but is not designed to cool or heat the building.

Manifold

Portion of a main in which several branches are close together. Also, a single piece in which there are several fluid paths.

Mass

Quantity of matter in a body; measured in terms of resistance to acceleration by a force. In SI the standard unit of mass is the kilogram (kg).

Mass Flow Rate

Mass of a substance flowing per unit time.

Material Safety Data Sheet

A document which provides all necessary information for prevention, safety, storage, transportation, labelling, use and disposal of substances and preparations, which present a risk to health, safety or environment.

Refer to J & E Hall International Engineering Standard:

> JEH-ES-10-004 Guide to the Interpretation of a Material Safety Data Sheet

Maximum Allowable Pressure (PS)

The pressure that shall not be exceeded when the system is in operation or at rest except within the operating range of any necessary pressure relief device. The pressure at which a pressure relief device begins to operate shall not exceed the maximum allowable pressure. It may be differently specified for the high and low pressure sides of the refrigerating system.

> **NOTE: The pressure equipment directive 97/23/EC identifies the maximum allowable pressure by the symbol “PS.” The subscript “max” is added to the symbol for maximum values.**

Maximum Design Temperature

Highest temperature that can occur when the refrigerating system is operating, when idle or during testing under test conditions.

> **NOTE: This temperature is equivalent to the maximum allowable temperature as defined in article 1.2.4 of the PED.**

Maximum Opening Pressure (MOP)

Maximum Operating Pressure (MOP) refers to the maximum value that suction pressure is permitted to rise to before the valve begins to close and restrict refrigerant flow

Melt Water

Frost and ice melted during defrosting.

Meter, Venturi

Methyl Alcohol (Methanol)

Alcohol commonly used in refrigeration. Chemical formula CH_3OH

Microchannel Coil

The Microchannel coil design is based on technology from the automotive industry. It is constructed of parallel flow aluminium tubes that are mechanically brazed to enhanced aluminium fins, resulting in better heat transfer and a smaller, lighter, corrosion resistant coil.

Mineral Oil

Refrigeration oil generally used with CFC and HCFC refrigerants. Mineral oil is not compatible with HFC refrigerants.

Minimum Design Temperature

Lowest temperature that can occur when the refrigerating system is operating, when idle or during testing under test conditions.

> **NOTE: This temperature is equivalent to the minimum allowable temperature as defined in article 1.2.4 of the PED.**

Mobile System

Refrigerating system, which is normally in transit during operation.

> **NOTE: Mobile systems include the following: refrigerating systems in vessels e.g. refrigerated cargo systems in ships, refrigerating systems in fishing boats, air conditioning on board, refrigerating systems for provisions; transport refrigerating systems, e.g. transport of refrigerated cargo by road, train and containers.**

Moisture

Water vapour; or water in a medium such as soil or insulation; but not bulk water or flowing water.

Moisture Indicator

Device indicating the moisture content of a substance.

Monitoring (of plant)

The process of taking measurements of key operating parameters such as temperatures and pressures in order to appraise the operating state of the refrigeration system.

Montreal Protocol

International treaty designed to protect the ozone layer by phasing out the production of a number of CFC's and HCFC's believed to be responsible for the depletion of the ozone layer.

Mechanical Vapour Recompression (MVR)

Mechanical Vapour Recompression is a technique used in open cycle heat pumps. The latent energy content of low pressure vapour is utilised by compressing the vapour to a more useful higher condensing temperature.

Nn

N+1

N+1 redundancy is a type of resilience that ensures system availability in the event of component failure. Components (N) have at least one independent backup component (+1).

Nameplate

Any label, plate or sign that is mounted to or near an item of equipment, which displays important information for its identification and safe operation.

Refer to J & E Hall International Engineering Standards:

- JEH-ES-07-006 Pipeline Marking
- JEH-ES-09-001 Valve, Instrument and Equipment Tagging
- JEH-ES-09-002 Refrigeration System Nameplates
- JEH-ES-09-003 Pressure Vessel Nameplates

Natural Circulation

Circulation that depends on states or conditions such as thermal currents or differences in level (head) (source: BS 5643:1984).

Natural Circulation Boiler

See Boiler, Natural Circulation.

Natural Convector

See Convector, Natural.

Natural Draught

See Draught, Natural.

Natural Gas

See Gas, Natural.

Natural Refrigerant

Non-fluorochemical refrigerants, such as ammonia (R717), carbon dioxide (R744) and hydrocarbons such as propane (R290) or isobutane (R600a). These products exist naturally in the environment. Alternative to fluorochemical refrigerants, often used due to their low direct GWP and ODP potential. (However, it should be noted that commercial production of natural refrigerants is normally via man-made synthesis.)

Natural Ventilation

See Ventilation, Natural.

Natural Water

See Water, Natural.

Near Azeotrope

A mixture of two or more refrigerants with different boiling points that, when in a totally liquid or vapour state, act as one component. However, when changing state the individual refrigerants evaporate or condense at different temperatures. Near azeotropic mixtures have a temperature glide of less than 5.5 ºC and should be charged in the liquid state to assure proper mixture. Near-azeotropic refrigerants include: R-404A and R-410A

See also:

- Azeotrope
- Zeotrope

Needle Valve

See Valve, Needle.

Negative Pressure

See Pressure, Negative.

Net Calorific Value

See Calorific Value, Net.

Net Energy

See Energy, Net.

Net Heat Loss

See Heat Loss, Net.

Neutralising Amines

See Amines, Neutralising.

Neutral Zone

See: Dead-zone

New Energy

See Energy, Neutral.

Noise

Sound which is undesired by the recipient (source: BS 5643:1984).

Noise Criteria

See Noise Rating.

Noise Level, Generated

See Generated Noise Level.

Noise Rating

An agreed set of empirical curves relating to octave band sound pressure level to the centre frequency of the octave bands, each of which is characterised by a 'noise rating' (source: BS 5643:1984).

Nominal Size (DN)

Numerical designation of size, which is common to all components in a piping system other than components, indicated by outside diameters or by thread size. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions. The nominal size is designated by DN followed by a number.

Non-condensable gas

A gas in a refrigeration system that does not condense at the temperature and partial pressure that exists in the condenser, therefore leading to a higher head pressure. This is often the case if air has leaked into a system and lowers system efficiency and leads to longer term reliability issues.

Non-positive Displacement Compressor

Compressor in which compression is obtained without changing the internal volume of the compression chamber.

Non-return Valve

See: Check Valve

NOTE

Part of system of safety warnings and symbols based on:

- BS EN ISO 7010: Graphical symbols. Safety colours and safety signs. Registered safety signs;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.

  NOTE: draws attention to important additional information.

Nominal Pipe Size (NPS)

Nominal Pipe Size (American). Nominal inside diameter of a pipe or tube.

National Pipe Thread (NPT)

National Pipe Thread (American). Thread from used in the United States of America to join pipes.

Refer to J & E Hall International Engineering Standard:

JEH-ES-07-008 ISO and NPT Pipe Threads

Oo

Occupied Space

Complete enclosed space, which is occupied for a significant period by people. Where the spaces around the apparent occupied space are, by construction or design, not adequately tight, these are also considered as part of the occupied space. These can be for example voids above false ceilings, crawl ways, ducts and movable partitions. The occupied space may be accessible to the public (for example, a supermarket) or only to trained persons (for example, area reserved for cutting up of meat). In an occupied space, both parts of a refrigerating system or the complete refrigerating system may be located/installed.

Outside Diameter (OD)

Outside Diameter. The measured outside diameter of a pipe or tube.

Ozone Depletion Potential (ODP)

The Ozone Depletion Potential is an indication of the effect a gas has in terms of breaking down the ozone layer measured on a scale from 0 to 1 with 0 being non-depleting and 1 being the highest depleting.

Oil Charge

Normal quantity of oil in a refrigeration system.

Oil Drain Float Valve

Also known as: Oil Purge Valve

Valve for draining out the oil from a collection point in the system.

Oil Return

Migration of oil from the evaporator to the crankcase of the compressor.

Oil Separator

A device designed to separate oil from the refrigerant.

Open Air

Unenclosed space, whether roofed or not.

Open Drive Compressor

Compressor having a drive shaft penetrating the refrigerant-tight housing.

Office of Public Sector Information (OPSI)

The Office of Public Sector Information.

O-Ring

Ring gasket of circular cross section; a torus.

Outside Air

Air from outside the building.

Overflow Valve

Pressure relief device discharging to a part of the refrigerating system with lower pressure.

Pp

Packaged

A refrigeration plant of standard 'off-the-shelf' design.

Packaged Unit

A self-contained air handling unit made specifically for outdoor installation; it includes all heating and cooling devices pre-assembled prior to installation.

Polyalkylene Glycol (PAG)

Polyalkylene Glycol is a type of synthetic compressor lubricating oil used on some HFC refrigeration systems.

Partial Pressure

In a mixture, the pressure a gas would exert if it alone occupied the volume. The total pressure of a gas mixture is the sum of the partial pressures of each individual gas in the mixture.

Also, see:

Dalton's Law

Part-load Operation

Operation of a refrigeration plant below the peak load capability.

Peak Load

The maximum cooling load encountered in a particular refrigeration application.

Pressure Equipment Directive (PED)

The Pressure Equipment Directive regulations.

Pipe Fitting

Proprietary parts used to join, adapt or adjust other parts of the piping.

Pipe Schedule

Pipe size system listing outside diameters and wall thicknesses for a variety of pressures.

Pipe Thread End

Pipe end with straight or tapered threads that achieves gas tightness with filling material or deformation of thread form.

Piping and Instrumentation Diagram (P&ID)

A schematic diagram which shows the piping of the process flow together with the installed equipment and instrumentation.

Piping/Pipework

All piping covered in the scope of EN 14276-2 such as pipes or tubes (including hoses, bellows, fittings, or flexible pipes) for interconnecting the various parts of a refrigerating system.

Pipeline Marking

A system of labelling/tagging and colour coding designed to identify the contents of a pipeline.

Refer to J & E Hall International Engineering Standard:

JEH-ES-07-006 Pipeline Marking

Plate Heat Exchanger

A heat exchanger, which utilises plates in a frame to transfer heat between two liquids.

Plenum Space

An enclosed space inside a building or other structure, used for airflow. Often refers to the space between a dropped ceiling and the structural ceiling, or a raised floor and the hard floor. Distinct from ductwork as a plenum is part of the structure itself. Cable and piping within a plenum must be properly rated for its fire and smoke indices. See also: plenum chamber psychrometric.

Programmable Logic Controller (PLC)

A programmable logic controller (PLC) is an industrial solid-state computer that monitors inputs and outputs, and makes logic-based decisions for automated processes or machines.

Polyol Ester (POE)

Polyol Ester is a type of synthetic compressor lubricating oil used on most HFC refrigeration systems.

Polishing

The process of using abrasion or chemical action to create the required surface finish, normally with significant specular reflection and minimal diffuse reflection.

Positive Displacement Compressor

Compressor in which compression is obtained by changing the internal volume of the compression chamber.

Portable Document Format (PDF)

A file format developed by Adobe in the 1990's to present documents, including text formatting and images, in a manner independent of application software, hardware and operating systems.

Potassium Carbonate

Aqueous brine solutions commonly used in refrigeration. Chemical formula K_2CO_3.

Precision Air Conditioning (PAC)

Precision Air Conditioning systems are primarily designed for process cooling such as data centre equipment or manufacturing rather than for the comfort of people. These systems offer excellent reliability and typically have a high ratio of sensible-to-total cooling capacity (COP).

Pressure

The force per unit area exerted by a fluid or a gas. Symbol: P. SI unit: Pa (Pascal) = 1 N/m^2 (Newton per square metre).

See also:

- Absolute Pressure
- Design Pressure
- Gauge Pressure
- High Pressure Side (HP Side)
- Low Pressure Side (LP Side)
- Maximum Allowable Pressure (PS)
- Partial Pressure
- Strength Test Pressure
- Tightness Test Pressure
- Vapour Pressure

Pressure, Back

Pressure and Strength Tests

Tests designed to prove the integrity of a system prior to evacuation and the addition of refrigerant.

Pressure Control

Other names: Pressure Switch, Pressure stat.

A control device containing an electrical switch (or switches), the contacts of which changeover at a predetermined pressure. Depending on the application, the switch contacts may be wired to break circuit on falling pressure (make on rise) or vice versa.

See also:

High Pressure (HP) Cut-out

Low Pressure (LP) Cut-out

Pressure Drop/Loss

Loss in pressure, as from one end of a refrigerant line to the other, from friction, static, heat, etc. Alternatively, the difference in pressure between two points in a flow system, usually caused by frictional resistance to fluid flow in a conduit, filter, or other flow system. Compare pressure loss.

Refer to J & E Hall International Engineering Standard:

JEH-ES-02-003 Pressure Loss Through Pipes

Pressure Integrity

The capability to prevent an unintentional release of refrigerant from the system.

Pressure Limiter

Device, which automatically resets.

NOTE: It is called PSH for high pressure protection and PSL for low pressure protection.

Pressure Limiting Device

Pressure switch or cut-out designed to automatically limit the rise of mechanically-imposed pressure.

Pressure Relief Device

Pressure relief valve or bursting disc device designed to relieve excessive pressure automatically.

Pressure Relief Valve

Pressure actuated valve held shut by a spring or other means and designed to relieve excessive pressure automatically by starting to open at a set pressure and re-closing after the pressure has fallen below the set pressure.

Pressure, Saturated Vapour

Pressure, Suction (Back)

Pressure Switch

A control device containing an electrical switch (or switches), the contacts of which changeover at a predetermined pressure. Depending on the application, the switch contacts may be wired to break circuit on falling pressure (make on rise) or vice versa.

See also:

High Pressure (HP) Cut-out

Low Pressure (LP) Cut-out

Pressure, Vapour

The pressure of a vapour in thermodynamic equilibrium with its condensed phases in a closed container.

Pressure, Velocity

Pressure Vessel

Any refrigerant containing parts of a refrigerating system, particularly closed vessels containing fluid at a pressure differing from atmospheric pressure, other than:

- Semi-hermetic and open type compressors;
- Coils (including their headers) consisting of pipes with air as secondary fluid;
- Piping and its valves, joints and fittings;
- Control devices;
- Pressure switches, gauges, liquid indicators;
- Safety valves, fusible plugs, bursting discs;
- Pumps.

NOTE 1: This definition is aligned to directive 97/23/EC.

NOTE 2: The semi-hermetic and open type compressors used in refrigerating systems may be subject to the exclusion article 1.3.10 of the directive 97/23/EC of M29/05/1997 by referring to the working party group guidelines WPG 1/11, 1/12 and 2/34.

Primary Refrigerant

The working fluid in a refrigeration system absorbs heat from the medium to be cooled at the evaporator and rejects that heat at the condenser.

Psychrometric Chart

The psychrometric chart represents factors relating to the condition of air and its change of state, based on 1kg of air.

Psychrometrics

Psychrometrics or **psychrometry** or **hygrometry** are terms used to describe the field of engineering concerned with the determination of physical and thermodynamic properties of gas-vapor mixtures. The term derives from the Greek *psuchron* (ψυχρόν) meaning "cold" and *metron* (μέτρον) meaning "means of measurement".

Power Usage Effectiveness (PUE)

Power usage effectiveness (PUE) is a metric calculated by measuring a data centre's total energy consumption divided by the energy consumption of its IT equipment. PUE values can range from 1.0 to infinity. Ideally, a PUE value approaching 1.0 indicates 100% efficiency, where all energy is used by IT equipment only.

Pump-down

The operation by which the majority of the refrigerant charged is transferred to the condenser or liquid receiver, usually when the plant stops.

Pumps (Secondary Refrigerant)

Liquid pumps that are used to pass secondary refrigerant from the refrigeration plant evaporator to the process where cooling is required.

Purging

Removal of air or non-condensable gases from the high pressure side of the refrigeration circuit.

Qq

Quick-closing Valve

Shut-off device which closes automatically (e.g. by weight, force spring, quick closing ball) or has a closing angle of 130º or less.

Rr

R1234ze (HFO Refrigerant)

One of the 'fourth generation' refrigerants, R1234ze is a hydrofluoroolefin (HFO) based refrigerant rated by the International Panel for Climate Change (IPCC) with a GWP lower than one, better than CO_2. It is seen as a replacement for R134a.

R134a (HFC Refrigerant)

R134a (Tetrafluoroethane) is a haloalkane refrigerant with zero ozone depletion potential designed to replace R12. Its major usage is automotive air conditioning, refrigerators and chillers.

R22 (HCFC Refrigerant)

R22 is a refrigerant gas found in the majority of air conditioning equipment over 10 years old. R22 is a hydrochlorofluorocarbon, which have ozone depleting potential (ODP) if leaked into the atmosphere. The use of R22 for maintenance or repair will be banned from 1st January 2015.

R407 series (HFC Refrigerants)

R407 series is a zeotropic hydro-fluoro-carbon refrigerant and is a blend of difluoromethane (R32) providing the heat capacity, pentafluoroethane (R125) decreasing flammability and tetrafluoroethane (R134a) to reduce pressure. Difluoromethane serves to, pentafluoroethane and tetrafluoroethane. The R407 series was developed as a replacement for the ozone depleting R22.

R410A (HFC Refrigerant)

R410A is one of the third generation hydro-fluoro-carbon refrigerants designed to replace earlier ozone depleting substances. It is a zeotropic, but near-azeotropic mixture of difluoromethane (CH2F2, called R32) and pentafluoroethane (CHF2CF3, called R125), which is used as a refrigerant in air conditioning applications.

Rack

A computer rack (commonly called a rack) is a metal frame used to hold various hardware devices such as servers, hard disk drives, modems and other electronic equipment.

Radiation

The process of transferring heat in the type of waves similar to the transmission of light. For maximum transfer of heat there should be a perfect vacuum between the hot and cold bodies.

Range

Difference between the highest and lowest operational values, such as pressure, temperature or rate of flow.

Rating

Assigned value of those performance characteristics (under standard rating conditions) by which a unit may be selected to fit its application.

Rating Conditions

Set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

RCI (HI) and RCI (LO)

The Rack Cooling Index (RCI) is a metric that measures the percentage of racks in the data centre where the air inlet temperature is at the recommended or allowable level under the guidelines put forth by ASHRAE. RCI (hi) is the metric for racks at the upper limit and RCI (lo) for racks at the lower limit. This metric reveals how uniformly and efficiently a data centre is being cooled.

Receiver

A vessel used to store refrigerant within a refrigeration circuit.

Reclaim

Processing used refrigerants to new product specifications.

Recover

Removing refrigerant in any condition from a system and store it in an external container.

Recovery

Taking used gas out of a fridge system and filling it into packages. Avoids release into the environment – an action that is environmentally irresponsible and illegal in many countries. This process is usually performed by a refrigeration contractor. This occurs during maintenance or when removing a refrigerant permanently due to equipment decommissioning or retrofitting to a new gas.

Recycle

Reducing contaminants in used refrigerants by separating oil, removing non-condensables and using devices such as filters, driers or filter-driers to reduce moisture, acidity and particulate matter. The aim of recycling is to reuse the recovered refrigerant.

Refrigerant

Fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure and rejects heat at a higher temperature and pressure usually involving changes of the state of the fluid.

Refrigerants may be divided into three classes according to their manner of absorption or extraction of heat from the substances to be refrigerated:

- Class 1: This class includes refrigerants that cool by phase change (typically boiling), using the refrigerant's latent heat.
- Class 2: These refrigerants cool by temperature change or 'sensible heat', the quantity of heat being the specific heat capacity x the temperature change. They are air, calcium chloride brine, sodium chloride brine, alcohol and similar non-freezing solutions. The purpose of Class 2 refrigerants is to receive a reduction of temperature from Class 1 refrigerants and convey this lower temperature to the area to be air-conditioned.
- Class 3: This group consists of solutions that contain absorbed vapours of liquefiable agents or refrigerating media. These solutions function by nature of their ability to carry liquefiable vapours, which produce a cooling effect by the absorption of their heat of solution.

See also:

Halocarbon and Hydrocarbon Refrigerant

Primary Refrigerant

Secondary Refrigerant

Refrigerant Accumulator

A vessel in the low pressure side of the refrigeration system to contain surplus liquid refrigerant.

Refrigerant Blend

A refrigerant consisting of a mixture of one or more different refrigerants.

See also:

Azeotrope

Near Azeotrope

Zeotrope

Refrigerant Charge

The quantity (kg) of refrigerant contained within the refrigerating system.

See also:

Actual Refrigerant Charge

Estimated Refrigerant Charge

Refrigerant Detector

Sensing device, which responds to a pre-set concentration of refrigerant gas in the environment.

Refrigerant Flow Control

Valve, which controls the flow of high-pressure refrigerant to the evaporator.

Refrigerated Space

A refrigerated room used for operational or service purposes, examples are: cold store, cold chamber, freezing tunnel, low temperature environmental area.

Refrigerating Equipment

Components forming a part of the refrigerating system, e.g. compressor, condenser, generator, absorber, liquid receiver, evaporator, surge drum.

Refrigerating Installation

Assembly of components of a refrigerating system and all the apparatus necessary for its operation.

Refrigerating Plant

Assembly of components of a refrigerating system and all other apparatus required for its safe and efficient operation.

Refrigerating System

Combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which the refrigerant is circulated for the purpose of extracting and rejecting heat.

Refrigeration System, Absorption

Refrigerating system in which refrigeration is achieved by evaporation of a refrigerant, the vapour then being absorbed or adsorbed by an absorbent or adsorbent medium respectively, from which it is subsequently expelled at a higher partial vapour pressure by heating and then liquefied by cooling.

Refrigeration System, Vapour Compression

A type of refrigeration cycle using a compressor to remove low pressure vapour from an evaporator and deliver it to a condenser at a higher pressure.

Refrigeration Cycle (Vapour Compression Cycle)

The vapour compression refrigeration cycle is accomplished by continuously circulating a constant volume of refrigerant gas in a closed system. By varying pressure and temperature within different parts of the system, the refrigerant absorbs waste heat from the conditioned space in the evaporator and rejects it through the condenser.

Regulator

The regulator in a refrigeration system is the mechanical or electro-mechanical device, which physically divides the high pressure (HP) side from the low pressure (LP) side.

The regulator permits the passage of liquid refrigerant from HP to LP but prevents the passage of high pressure vapour.

See also:

Expansion Valve.

Relative Humidity (%rh)

Relative humidity is the ratio of the partial pressure of water vapour in an air-water mixture to the saturated vapour pressure of water at a prescribed temperature. In prevailing Northern European conditions relative humidity and percentage saturation (ration of moisture content) can be considered the same as the divergence is <1%. In high temperature areas, they should be treated differently as the divergence may be as high as 10%.

Relief Valve

Valve actuated by inlet pressure that opens in proportion to the increase in pressure above the opening pressure.

Remote Electronic Expansion Valve (REEV)

An EEV that can be installed with a remote control panel in purpose designed evaporators. Also, see Electronic Expansion Valves

Retrofit

To remodel the refrigerant system to improve the performance, i.e. fit new refrigerant gas, add energy saving components, etc.

R-number

Official number assigned to a refrigerant upon accreditation by ASHRAE.

Roll Bond Heat Exchanger

Heat exchanger consisting of two plates, which are welded together with the exception of the printed circuit forming the refrigerant passage, which is obtained by inflation under pressure.

Rupture Disk

A non-reclosing pressure relief device, actuated by inlet pressure, designed to relieve excessive pressure by mechanical failure of the disk.

Ss

Safety Switching Device for Limiting Pressure

Pressure actuated device that is designed to stop the operation of the pressure generator.

Saturated

A vapour, which is in equilibrium with its liquid phase at the specified temperature and pressure.

Saturated Suction Temperature (SST)

The condition of the refrigerant vapour which has left the evaporator and is about to enter the compressor.

Saturation Pressure

The pressure at which the liquid phase and vapour phase of a substance will exist together at a specific temperature.

Saturation Temperature

The temperature at which the liquid phase and vapour phase of a substance will exist together at a specific pressure.

Screw Compressor

A compressor utilising the action of two synchronised screws to pressurise the refrigerant vapour. Typical capacities are 50 – 1000kW and they have a modulating performance band of between 10 and 100% making them particularly suitable for use in chillers.

Scroll Compressor

A type of compressor fitted with two compliant scrolls, one fixed and one oscillating to compress refrigerant as it passes between them. Used extensively in air conditioning systems the scroll compressor may be fixed or variable capacity using digital unloading or inverter control.

Sealed System

Refrigerating system in which all refrigerant containing parts are made tight by welding, brazing or a similar permanent connection. No flanged or threaded connections are used.

> **NOTE: A connection that is tightness tested for a leakage rate of less than 3 g refrigerant per year under a pressure of at least 0.25 x PS and where the mechanical joints are prevented from improper use by the need of a special tool, glue etc. is considered as a similar permanent connection. This may include valves with seal cap and capped service ports.**

Seasonal Energy Efficiency Ratio (SEER)

The Seasonal Energy Efficiency Ratio (SEER) rating of a unit is the cooling output during a typical cooling-season divided by the total electric energy input during the same period. The higher the unit's SEER rating the more energy efficient it is.

Second Law of Thermodynamics

States that heat energy may be converted into work only when permitted to pass from a region at one temperature to a region at a lower temperature; and, conversely, heat may be moved from a region at low temperature to one at high temperature only when work is done.

Secondary Cooling or Heating System

System employing a fluid, which transfers heat from the product or spaces to be cooled or heated or from another cooling or heating system to the refrigerating system without compression and expansion of the fluid.

Secondary Refrigerant

These are aqueous solutions of alcohol, brine or glycol, or other process fluid usually specially formulated for low temperature operation. The evaporator is used to cool the secondary refrigerant, which is, in turn, used in another cooling process.

Self-closing Valve

Valve that closes automatically e.g. by weight or spring force.

See also:

Quick-closing Valve

Self-contained Breathing Apparatus

Breathing apparatus, which has a portable supply of compressed air, independent of the ambient atmosphere, where exhaust air passes without recirculation to the ambient atmosphere.

Refer to J & E Hall International Engineering Standard:

JEH-ES-10-002 Guide to Respiratory Protective equipment Selection.

Self-contained System

Complete factory-made refrigerating system in a suitable frame and/or enclosure that is fabricated and transported to site in one or more sections and with refrigerant containing parts, which are connected on site only by companion or block valves.

Semi-hermetic (Accessible Hermetic) Motor-compressor

Combination consisting of a compressor and electrical motor, both of which are enclosed in the same housing, having removable covers for access, but having no external shaft or shaft seals, the electrical motor operating in a mixture of oil and refrigerant vapour.

Sensible Cooling

A method of cooling that does not involve evaporation of a liquid.

Sensible Cooling Capacity

The amount of heat energy removed from the air without changing the actual moisture content of the air.

Sensible Heat

A change in the heat energy of a substance, characterised by a temperature change, which can be recorded and perceived by human senses.

Sensible Heat Ration (SHR)

The ration of sensible heat to total heat.

Server

A server is a system that responds to requests across a computer network to provide, or help to provide, a network service.

Set Point (Set Value)

The value of the controlled condition to which the control mechanism is set.

Shell and Tube Heat Exchanger

A heat exchanger, which utilises a nest of tubes in a baffled shell to transfer heat between two liquids.

Shut-off Device

Device to shut-off the flow of the fluid (e.g. refrigerant, oil, etc.).

Shut-off Valve

Externally actuated valve solely designed to stop flow of the fluid (e.g. refrigerant, oil, etc.) in a pipeline for the purpose of isolating a subsection of the system. Also known as: Stop Valve, Isolation Valve, Block Valve, Service Valve.

SI System

The International System of Units (abbreviated SI from the French *le **S**ystème **i**nternational d'unités*) is a metric system of measurement generally devised around the convenience of the number ten.

Refer to J & E Hall International Engineering Standard:

JEH-ES-02-001 Guide to the International System of Units (SI).

Sight-glass

Transparent tube or window (bull's eye) used to indicate the liquid level in a vessel, pipe or similar fluid-containing equipment.

Single-stage Cycle

A refrigeration cycle using one stage of compression.

Sodium chloride

Aqueous brine solutions commonly used in refrigeration. Chemical formula NaCl.

Soft Soldered Joint

A gas-tight joint obtained by the joining of metal parts with alloys, which melt at temperatures below 200 ºC and below the melting temperatures of the joined parts. The parent metals do not participate by fusion in making the joint.

Soldered Joint

A gas-tight joint obtained by the joining of metal parts with metallic mixtures or alloys which melt at temperatures in general less than 450 ºC and below the melting temperatures of the joined parts. The parent metals do not participate by fusion in making the joint.

Solenoid Valve

A valve, opened or closed by electrically energising or de-energising a solenoid.

SolidWorks

A 3D drawing software package used for creating the 3D model for General Arrangement drawings.

These file extensions are associated with SolidWorks:

SLDASM – SolidWorks Assembly Extension. Native assembly file format.

SLDDRW – SolidWorks Drawing Extension. Native drawing file format.

SLPRT – SolidWorks Part Extension. Part file format.

Special Machinery Room

Machinery room intended only for the installation of the complete refrigerating system or components of the refrigerating system. It is accessible only to competent personnel for the purposes of maintenance and repair.

See also: Machinery Room.

Specific Energy Consumption

A measure of the energy consumption of a refrigeration plant compared to some product related quantity (e.g. energy used per tonne of product).

Specific Gravity

Ratio of the mass of a given volume of a substance to the mass of an equal volume of water, usually at 4 °C.

Specific Heat

Ratio of the quantity of heat required to raise the temperature of a given mass of any substance one degree to the quantity required to raise the temperature of an equal mass of a standard substance one degree (usually water at 15 °C).

Specific Refrigerant Charge

The ratio of the amount of refrigerant contained within a system to the cooling capacity, usually measured in kg/kW.

Split System

A split air conditioning system consists of two main parts: the outdoor (condensing) unit and the indoor unit. Although any size of unit could be defined as a split system, it normally refers to smaller equipment, specifically air to air heat pumps.

Spool Piece

Piece of pipe with flanges on both ends that is inserted into a pipeline in place of a valve or instrument.

Stoker, Underfeed

Strainer

Device, which removes unwanted particulates from the liquid being passed through it.

Strength Test Pressure

The pressure applied to test the refrigeration system or any part of it for strength.

Sub-cooling

The process of cooling a liquid below its condensing or saturation temperature.

Sub-cooled Liquid

Liquid refrigerant at a given pressure that is cooled to a level below the saturation temperature of the refrigerant at that pressure.

Sub-cooler

A heat exchanger used to reduce the temperature of condensed liquid below the current saturation temperature.

Sub cooling

The removal of heat from a liquid to a point lower than the saturation temperature at that pressure. This normally occurs in the condenser heat exchanger.

Substance

Any fluid or gas consisting of particles that move freely among themselves and are capable of being conveyed along a pipe.

Suction Line

Piping that conveys refrigerant gas from the evaporator to the compressor suction.

Suction Pressure

The pressure in the system measured at the inlet to a compressor.

Suction Separator

Also known as: Surge Drum

Vessel containing refrigerant at low pressure and temperature and connected by liquid feed and vapour return pipes to an evaporator(s).

Super Heating

Heating a vapour so that its temperature is higher than the saturation temperature at that pressure, e.g. steam at >100ºC is superheated. This normally occurs in the evaporator.

Superheat

The difference between the temperature of a vapour at a given pressure and the temperature corresponding to saturation at this pressure.

Superheated Vapour

A vapour at a temperature above the boiling point at the prevailing pressure.

Surge Drum

See: Suction Separator

Surge Limit

Pressure at which the volume flow of a centrifugal compressor becomes unstable.

Surge Protection Device

Device which shuts down the compressor after a few surge pulses (e.g. by measuring pressure differences across the compressor or current input to the drive motor).

System, Variable Volume

Tt

Tachometer

An instrument for measuring the speed of rotation of rotating machinery (source: BS 5643:1984).

Take-off

A connection taken from a main supply duct or pipe that enables some fraction of the flow through the duct or pipe to be diverted for a subsidiary service (source: BS 5643:1984).

Tangential Flow (Cross-flow) Fan

See Fan, Tangential Flow (Cross-flow).

Tank (Cistern)

See Cistern.

Tank Contents Gauge

See Gauge, Tank Contents.

Tank, Daily Service

See Daily Service Tank.

Tank, Expansion

See Expansion Tank.

Tag Number

The number assigned to uniquely identify a valve, instrument or item of equipment and as stated on the plant schematic flow diagram, piping and instrumentation diagram (P and ID) and valve, instrument and equipment schedules.

Refer to J & E Hall International Engineering Standard:

JEH-ES-09-001 Valve, Instrument and Equipment Tagging.

Tapping

A female screwed connection to a boiler, heater, tank or other container or vessel for connecting a pipe or nipple (source: BS 5643:1984).

Tapping, Downstream

A small hole in a pipe or duct at a specified distance downstream from a flow measuring device or other instrument used to measure static pressure (source: BS 5643:1984).

Tapping, Flow

a) A tapping in a boiler for connecting the outlet pipe from the boiler (source: BS 5643:1984).
b) A tapping in a heater for the inlet pipe to the heater (source: BS 5643:1984).

Tapping, Return

a) A tapping in a boiler for connecting the return pipe to the boiler (source: BS 5643:1984).
b) A tapping in a heater for the return pipe from the heater (source: BS 5643:1984).

Tapping, Upstream

A small hole in a pipe or duct at a specified distance upstream from a flow measuring device or other instrument used to measure static pressure (source: BS 5643:1984).

Tee

A pipe or duct fitting with a branch flow leaving or joining the main flow (source: BS 5643:1984).

Tee, Square

A tee in which the branch joins into the main at an angle of 90 ° (source: BS 5643:1984).

Tee, Swept

A tee in which the branch has a shaped entry into the main to assist flow (source: BS 5643:1984).

Temperature

The temperature of a substance is a measurement of its heat level measured with respect to an arbitrary zero of absolute zero depending on the scale of temperature. Temperature also determines the direction of heat flow, from a body at high temperature to a body at a lower temperature.

See also:

Ambient Temperature

Maximum Design Temperature

Minimum Design Temperature

Saturation Temperature

Temperature, Air

Dry bulb temperature (unless stated otherwise) (source: BS 5643:1984).

Temperature, Ambient

The temperature of the air surrounding the room, building or equipment under consideration (source: BS 5643:1984).

Temperature, Boiler Flow

The temperature of the water outlet from a hot water boiler (source: BS 5643:1984).

Temperature, Wet Bulb

The temperature of the air measured with a dry bulb thermometer. As the bulb is covered in a film of water, evaporation causes a lowering of the measured temperature if the air humidity is below 100 %. Hence, the wet bulb temperature can, in conjunction with a psychrometric chart, be used to establish relative humidity.

See also: Dry Bulb Temperature

Temperature Control

Also known as: Temperature Switch, Thermostat

A control containing an electrical switch (or switches) the contacts of which changeover at a predetermined temperature. Depending on the application, the switch contacts may be wired to break circuit on falling temperature (make on rise) or vice versa.

See also:

Low Temperature (LT) Cut-out

High Temperature (HT) Cut-out

Temperature Difference

Difference between the temperatures of two substances, surfaces, or environments involving transfer of heat.

Temperature Glide

Temperature difference that occurs between the vapour state and liquid state during evaporation or condensation at constant pressure, i.e. the temperature in the evaporator and condenser is not constant. Temperature glide occurs in near-azeotropic and zeotropic mixtures.

Temperature Lift

The temperature difference between the evaporating and condensing temperatures.

Temperature Limiting Device

Temperature actuated device that is designed to prevent unsafe temperatures.

Temperature Range

The temperature reduction of the cooled stream across the evaporator.

Temperature Switch

See: Temperature Control

Thermal Transmittance (U-Value)

Total Equivalent Warming Impact (TEWI)

The Total Equivalent Warming Impact is the sum of Direct Global Warming, caused by probable leakage of the refrigerant and Indirect Global Warming, caused by the release of CO_2 by power stations generating the electricity to power the refrigeration plant.

Thermal Storage

A system used to store 'cold' for use at some future time (e.g. an ice bank slowly makes ice during the night for use at during peak load conditions).

Thermostat

See: Temperature Control

Thermostatic Expansion Valve (TEV)

A precision control device, designed to control the evaporator superheat by regulating the rate at which liquid refrigerant flows into the evaporator.

Thermo-syphon

A type of natural circulation where the boiling of a fluid causes circulation of that fluid around the circuit through buoyancy forces.

Throttle Valve

A valve used to control flow by means of a fixed or variable constriction within the valve.

Thyristor

A thyristor is a semiconductor device, which can be used to switch electric currents and is often used to control the output of electric heaters.

Tightness Test Pressure

The pressure applied to test the refrigeration system or any part of it for pressure tightness.

Ton of Refrigeration (TR)

The rate of heat transfer equal to 288,000 BTU per 24 hours or 12,000 BTU per hour. It is the equivalent in effect of melting one short ton (2000 lb) of ice in 24 hours.

Toxicity

Ability of a fluid to be harmful or lethal due to acute or chronic exposure by contact, inhalation or ingestion.

NOTE: Temporary discomfort that does not impair health is not considered harmful.

Transcritical Cycle

Refrigerating cycle whose compressor discharges refrigerant at a condition (pressure) above the critical point.

Turning Vane

Turning vanes are devices inside mechanical ductwork used to smoothly direct air inside the duct where there is a change in direction, thus reducing resistance and turbulence.

Two-stage Cycle

A refrigeration cycle using two stages of compression.

Type Approved / Tested Component

A component deemed to comply with a recognised standard by way of an examination having been performed on one or more like samples of the component.

Type Approved Pressure Cut Out

Safety switching device for limiting the pressure that is type approved according to EN 12263, which manually resets without the aid of a tool.

NOTE: It is called PZH for high pressure protection and PZL for low pressure protection.

Type Approved Pressure Limiter

Safety switching device for limiting the pressure that is type approved according to EN 12263, which automatically resets.

NOTE: It is called PSH for high pressure protection and PSL for low pressure protection.

Type Approved Safety Pressure Cut Out

Safety switching device for limiting the pressure that is type approved according to EN 12263, which manually resets only with the aid of a tool

NOTE: It is called PZHH for high pressure protection and PZLL for low pressure protection.

Type Approved Temperature Limiter

Safety switching device for limiting the temperature, which is type, approved and designed to fail-safe so that in the event of a defect or malfunction of the device the power supply will be interrupted.

Uu

UKCA Mark

The UKCA mark is the replacement for CE marking in Great Britain. Applying the UKCA mark is exactly like using the CE logo. The Regulations and Directives which created the legal structure for CE marking have now been adopted into UK law and updated to change the terminology and to bring them completely within the control of the UK government.

U-Value

See Thermal Transmittance (U-Value).

Underfeed Stoker

See Stoker, Underfeed.

Underfloor Air Distribution

A method for providing ventilation and space conditioning by using the air plenum below a raised floor to distribute conditioned air through diffusers directly to the occupied zone. Abbreviated UFAD.

Union

A pipe fitting which forms a screwed joint that can be uncoupled without dismantling adjacent pipework (source: BS 5643:1984).

Unison Control

See Control, Unison.

Unit Air Heater

See Heater, Unit Air.

Unit, Compressor

See Compressor Unit.

Unit, Condensing

See Condensing Unit.

Unloader (Equaliser)

See Equaliser (Unloader).

Upflow Unit

A type of air conditioning system that discharges air into the conditioned space via a top-mounted discharge plenum or through an overhead duct system.

Upstream Tapping

See Tapping, Upstream.

UPS

An uninterruptible power supply (UPS) is an electrical apparatus that provides emergency power to a load when the input power source, typically mains power, fails.

Useful Energy

See Energy, Useful.

Useful Heat

See Heat, Useful.

Vv

Vacuum

State in which the gas pressure is lower than atmospheric pressure.

Vacuum Gauge

See Gauge, Vacuum.

Vacuum Heating System

See Heating System, Sub-atmospheric.

Vacuum Procedure

Procedure to check the gas tightness of an uncharged system by drawing a vacuum.

NOTE: Evacuation also removes moisture from a system.

Vacuum Test

A test to check the gas tightness of a refrigeration system before charging it with refrigerant, by drawing a vacuum upon it.

Valve

Device to regulate or stop the flow of fluid in a pipe or a duct by throttling.

Valve, Automatic Air

A valve used to vent air from a system containing liquid (source: BS 5643:1984).

Valve, Automatic Control

A valve that is part of an automatic control system and is designed to provide special characteristics between valve movement and valve area for the purpose of regulating a process variable (source: BS 5643:1984).

Valve, Back-pressure Regulation

A valve designed to maintain a constant back-pressure irrespective of the flow rate (source: BS 5643:1984).

Valve, Balancing

A pressure-tapped two or three-way valve (source: BS 5643:1984).

Valve, Ball

a) A type of shut-off device having a ported ball that can be turned to move its port or ports relative to the body seat ports to control the flow of liquid (source: BS 5643:1984).
b) A non-return valve in which a ball seats on an orifice within the valve body (source: BS 5643:1984).

Valve, Ball Float

A valve used to maintain a liquid level in a tank or vessel by means of a hollow ball floating on the surface of the liquid (source: BS 5643:1984).

Valve, Block

A valve that controls a section of equipment or building (source: BS 5643:1984).

Valve, Blow-down

A control valve fitted either at a point below the minimum water level in the steam drum or boiler or at the lowest point of the boiler (source: BS 5643:1984).

Valve, Butterfly

A valve in which a disc is rotated about a diametric axis of a cylinder to vary the aperture (source: BS 5643:1984).

Valve, Bypass

A valve in a bypass circuit that controls the proportion of flow therein (source: BS 5643:1984).

Valve, Check

A valve that prevents reversal of flow in a pipeline (source: BS 5643:1984).

Valve, Crown

A stop valve mounted direct onto the outlet from a steam boiler (source: BS 5643:1984).

Valve, Diaphragm

A valve incorporating a diaphragm that isolates the operating mechanism from the fluid passing through the valve (source: BS 5643:1984).

Valve, Discharge

In a piston compressor, the valve that allows compressed refrigerant gas to flow from the cylinder (source: BS 5643:1984).

Valve, Diverter

A three-port valve used to divert a common flow in varying proportions between alternative outlets (source: BS 5643:1984).

Valve, Double-beat

A hollow cylindrical valve for controlling high pressure flow. The seating's at the valve inlet and outlet are of slight different areas so that the closing forces are nearly balanced thereby making the valve easy to operate (source: BS 5643:1984).

Valve, Double-disc

A gate valve in which the gate consists of two discs that a forced apart by a spreading mechanism against both parallel body seats (source: BS 5643:1984).

Valve, Double Regulating

A type of flow regulating valve where the maximum opening can be pre-set to limit the amount of available handwheel operation (source: BS 5643:1984).

Valve, Drain

A valve or cock used to drain liquid from a system (source: BS 5643:1984).

Valve, Draw-off

A valve or cock used to take liquid from a system (source: BS 5643:1984).

Valve, Dump

A valve so arranged that it enables the complete contents of a system, or a discrete part of the contents, to be emptied to waste (source: BS 5643:1984)

Valve, Expansion

A vale for controlling the flow of liquid refrigerant to an evaporator (source: BS 5643:1984).

Valve, Feed-check

A valve that prevents reversal of the flow of feed water into a boiler (source: BS 5643:1984).

Valve, Fire

A valve for the specific purpose of preventing fire or avoiding hazard in the event of fire, for example, the weight-operated valve for shutting off the supply of oil fuel in the event of fire (source: BS 5643:1984).

Valve, Float

A valve actuated by a float that is responsive to a change in liquid level (source: BS 5643:1984).

Valve, Float, High Pressure

A float valve that controls the flow of liquid refrigerant to the evaporator, the float being borne by liquid on the high pressure side of the valve orifice (source: BS 5643:1984).

Valve, Float, Low Pressure

A float valve that controls the flow of liquid refrigerant to the evaporator, the float being borne by liquid on the low pressure side of the valve orifice (source: BS 5643:1984).

Valve, Flow-regulating

A valve which, by manual or automatic means, controls rate of flow (source: BS 5643:1984).

Valve, Foot

A check valve fitted to the bottom of a suction pipe (source: BS 5643:1984).

Valve, Fusible Link

The valve cap in a sprinkler head, held closed by a system of levers and retained in position by soldered links which melt and actuate the sprinkler in the event of fire (source: BS 5643:1984).

Valve, Gate

A valve that provides a straight-through passage for the flow of fluid and in which the passage can be closed by a component (gate) which is guided by the body seats on an axis at right-angles to that of the body ends (source: BS 5643:1984).

Valve, Globe

A valve in which the stem raises or lowers a plug (or disc) onto a seat (or between two seats) fixed to the valve body, thus varying the aperture(s) in the valve (source: BS 5643:1984).

Valve, Governor

A valve used for the automatic regulation of pressure in a gas stream operated by a pressure-sensing device (source: BS 5643:1984).

Valve, Isolating

A valve used to shut-off flow completely, thus isolating part of a system (source: BS 5643:1984).

Valve, Lock-shield

A regulating valve used on heating radiator that has a means of preventing unauthorised interference with the valve setting (source: BS 5643:1984).

Valve, Mixing

A valve with multiple ports in which inlet flows differing in temperature are mixed together whilst maintaining constant rate of flow from the outlet port (source: BS 5643:1984).

Valve, Mixing, Three-way

A mixing valve in which two inlet flows are mixed (source: BS 5643:1984).

Valve, Mixing, Four-way

A mixing valve in which three inlet flows are mixed (source: BS 5643:1984).

Valve, Mixing, Thermostatic

See Valve, Thermostatic Mixing.

Valve, Needle

A type of regulating valve in which the aperture area is varied by a movable conical component (source: BS 5643:1984).

Valve, Packless

A valve without gland packing (source: BS 5643:1984).

Valve, Parallel Slide

A gate valve in which the gate consists of two movable discs, without spreading mechanism, which slide between parallel body seats (source: BS 5643:1984).

Valve, Pilot

A valve regulating fluid flow in a servo system (source: BS 5643:1984).

Valve, Pinch

A straight-through valve in which the valve element consists of a flexible sleeve that is distorted to control the flow of the fluid (source: BS 5643:1984).

Valve, Plug

A form of shut-off device having a plug that can be turned to move its port or ports relative to the body seat ports to control the flow of fluid (source: BS 5643:1984).

Valve, Plug, Lubricated

A plug valve in which lubricant is injected under pressure between the plug face and the body seal (source: BS 5643:1984).

Valve, Pressure Control

A valve the function of which is to regulate pressure and which is operated by a signal from a pressure sensing device (source: BS 5643:1984).

Valve, Pressure Reducing

A valve for maintaining a predetermined downstream pressure (source: BS 5643:1984).

Valve, Pressure Regulating

A valve for monitoring and maintaining a predetermined pressure in a particular part of the system (source: BS 5643:1984).

Valve, Pressure Retaining

A valve for monitoring and maintaining a specific relationship between output and pressure (source: BS 5643:1984).

Valve, Radiator

A valve used to control fluid flow through a radiator (source: BS 5643:1984).

Valve, Reducing

See Valve, Pressure Reducing.

Valve, Regulating

See Valve, Flow Regulating.

Valve, Relief

An automatic, pressure-relieving device (source: BS 5643:1984).

Valve, Safety

A self-acting valve that automatically opens to prevent a predetermined safe pressure being exceeded (source: BS 5643:1984).

Valve, Screw-down Stop

A valve in which the seat disc is lifted from and lowered on to the valve seat by a stem whose axis is perpendicular to the face of the seat (source: BS 5643:1984).

Valve, Screw-down Stop, Angle

A valve in which the body ends are at right-angles to each other, the axis of the valve stem is in line with one body end (source: BS 5643:1984).

Valve, Screw-down Stop, Oblique

A valve in which the body ends are parallel to each other, the axis of the valve stem is oblique to that of the body ends (source: BS 5643:1984).

Valve, Screw-down Stop, Straight Through

A valve in which the body ends are parallel to each other, the axis of the valve stem is in line with both body ends.

Valve, Self-acting, Variable Orifice

A type of flow control valve in which the inlet and outlet are connected by a passage of which the cross-sectional area can be varied by movement of the valve member (source: BS 5643:1984).

Valve, Service

A manually operated stop valve used to isolate part of the system for service or maintenance operations, example: compressor suction and discharge stop valves (source: BS 5643:1984).

Valve, Shunt

A valve used to divert all or part of a flow to a bypass (source: BS 5643:1984).

Valve, Solenoid

A type of valve in which the movement of the valve stem is actuated by a solenoid (source: BS 5643:1984).

Valve, Suction

In a piston compressor, the valve that allows refrigerant vapour from suction to enter the cylinder (source: BS 5643:1984).

Valve, Thermostatic Diverting

A multiport valve that diverts a proportion of flow in response to a signal from a thermostat (source: BS 5643:1984).

Valve, Thermostatic Expansion

An expansion valve in which the position of the stem or needle is determined by the superheat at the valve outlet (source: BS 5643:1984).

Valve, Thermostatic Mixing

A multiport valve that varies the proportion in which two flows are mixed in response to a signal from a thermostat (source: BS 5643:1984).

Valve, Throttling

A valve used to control flow by means of a fixed or variable constriction within the valve (source: BS 5643:1984).

Valve Positioner

A device the purpose of which is to provide a definite relationship between a controller input signal and a valve stem position (source: BS 5643:1984).

Vaporising Oil Burner

See Oil Burner, Vaporising.

Vapour

This term is applied to a gas, which is near its saturation temperature and pressure, below the critical temperature.

The refrigerant above a body of liquid is referred to as refrigerant vapour at the saturation pressure and temperature.

Vapour Barrier/Seal

A vapour seal is an essential part of preventing moisture infiltration into or migration out of a critical space, such as a data processing centre or other room that contains sensitive electronic instrumentation. Essentially, a vapour seal is a barrier that prevents air, moisture and contaminants from migrating through tiny cracks or pores in the walls, floor and ceiling into the critical space. It is also used extensively on pipe insulation to prevent moisture ingress that may cause deterioration of the insulation or freezing in cold conditions.

Vapour Compression Refrigeration System

See Refrigeration System, Vapour Compression.

Vapour Pressure

See Pressure, Vapour.

Vapour Pressure, Saturated

See Pressure, Saturated Vapour.

Vapour, Saturated

See Saturated Vapour.

Variable Air Volume

An HVAC system that has a stable supply-air temperature and varies the air flow rate to meet the temperature requirements. Compared to constant air volume systems, these systems conserve energy through lower fan speeds during times of lower temperature control demand.

Variable Pitch Fan

See Fan, Axial Flow, Variable Pitch.

Variable Speed Drive (VSD)

Also known as: Power Inverter

An electronic device used to vary the speed of an electric motor.

Variable Volume System

See System, Variable Volume

Velocity, Axial

The velocity on the centre line of a pipe or duct (source: BS 5643:1984).

Velocity, Capture

A velocity a which air picks up solid particles (source: BS 5643:1984).

Velocity Contour

A line showing the variation in fluid velocity with increase in distance from a given point of suction (source: BS 5643:1984).

Velocity, Efflux

The velocity of gases issuing from a chimney outlet (source: BS 5643:1984).

Velocity, Face

The axial velocity of air entering or leaving a given effective face area (source: BS 5643:1984).

Velocity, Free-area

The air velocity obtained by dividing the total volume flow rate by the sum of the minimum areas of the opening through which air can pass (source: BS 5643:1984).

Velocity Head

The kinetic energy per unit mass of the fluid resulting from its velocity (source: BS 5643:1984).

Velocity Head Factor

A correction used in flow calculations to allow for the fact that fluid upstream from an obstruction or constriction is not at rest (source: BS 5643:1984).

Velocity, Local Air

See Local Air Velocity.

Velocity Pressure

See Pressure, Velocity.

Velocity Profile

A curve showing the relationship between the radius or distance of a point in a pipe or duct and the local mean velocity component at that point (source: BS 5643:1984).

Velocity Reduction Method

See Duct Sizing, Velocity Reduction Method.

Velocity, Terminal

The air stream velocity at the end of the throw (source: BS 5643:1984).

Vent

A device permitting fluid flow in order to maintain the balance of pressure between the atmosphere and the system (source: BS 5643:1984).

Ventilation

Process of supplying or removing air by natural or mechanical means to or from any space, sufficient for the needs of the occupants of the space (source: BS 5643:1984).

Ventilation, Cross

See Cross Ventilation.

Ventilation, Exhaust

Ventilation in which the exhaust from a process is discharged to atmosphere (source: BS 5643:1984).

Ventilation, Extract

Removing air from an enclosed space, usually by a fan, either directly or through ducting (source: BS 5643:1984).

Ventilation Heat Loss

See Heat Loss, Ventilation.

Ventilation, Industrial Exhaust

The removal of contaminants and/or heat from the atmosphere local to their source rather than by general ventilation (source: BS 5643:1984).

Ventilation, Mechanical

Ventilation by means of one or more fans (source: BS 5643:1984).

Ventilation, Natural

Ventilation using natural motive forces such as the wind or differences in air density (source: BS 5643:1984).

Ventilation, Supply

Mechanical or natural ventilation providing air to an enclosed space, either directly or through ducting (source: BS 5643:1984).

Venturi Meter

See Meter, Venturi.

Vertical Boiler

See Boiler, Vertical.

Vertical Cross-tube Boiler

See Boiler, Vertical Cross-tube.

Vessel

Any part of the refrigerating system containing significate quantities of liquid refrigerant for example condenser, liquid receiver, evaporator and surge drum.

Vessel, Air

See Air Vessel.

Vessel, Expansion

See Expansion Vessel.

Vessel Maximum Operating Pressure

Maximum pressure, which a vessel can withstand without the operation of any safety accessory with a continuous operation of the pressure generator (compressor, heat source etc.).

Vessel Maximum Standstill Pressure

Maximum pressure, which a vessel can withstand without the operation of any safety accessory when the pressure generator (compressor, heat source etc.) is not in operation. This pressure occurs during transportation, storage or shut-down of the pressure generator.

Vibrating Grate

See Grate, Vibrating.

Vibration

Low frequency oscillatory motion (source: BS 5643:1984).

Vibration Control

The use of methods of structural design and other techniques to achieve acceptable vibration levels in buildings (source: BS 5643:1984).

Viscous Air Filter

See Air Filter, Viscous.

Viscous Flow

See Flow, Viscous (Laminar).

Volume

The quantity of three-dimensional space that any solid, liquid, gas, plasma, or vacuum occupies. SI Unit: m^3 (cubic metre).

When applied to vessels it is the volume of a compartment ready for operation, including the volume of nozzles to the first connection (flange, coupling, weld, braze) and excluding the volume of permanent internal part.

See also:

Internal Gross Volume

Internal Net Volume

Volume Controller

A control for maintaining a predetermined volume of air flow through ductwork in relation to the thermal load on the system (source: BS 5643:1984).

Volumetric Efficiency

The ratio of the amount of vapour volume pumped by a compressor to the swept volume of the compressor.

Ww

Wall Flame Oil Burner

See Oil Burner, Rotary Vaporising (Wall Flame Type).

Wall Mounting Heater

See Heater, Wall Mounting.

Wall, Solar Azimuth

See Solar Azimuth, Wall.

Warm Air Heating Unit

See Heating Unit, Fan-assisted Warm Air.

Warmth

Comfortable heat (source: BS 5643:1984).

Warning

A hazard classification, part of system of safety warnings and symbols based on:

- BS EN ISO 7010: Graphical symbols. Safety colours and safety signs. Registered safety signs;
- BS EN 82079-1: Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements.

⚠ WARNING

This indicates a hazard with a medium level of risk, which if not avoided, will result in death or serious injury if instructions, including recommended precautions, are not followed. In addition, there is a high risk of damage to the component, product or process.

Instructions, which describe a WARNING, are prefixed by this symbol.

Warning Pipe

An overflow pipe fitted to cisterns, etc, to warn of a defective control (source: BS 5643:1984).

Washer, Air

See Air Washer.

Waste Energy

See Energy, Waste.

Waste Heat

See Heat, Waste.

Waste Heat Boiler

See Boiler, Waste Heat.

Water Chiller

See Chiller, Water

Water Cooled Condenser

See Condenser, Water Cooled.

Water Cooled Room Air Conditioner

See Room Air Conditioner, Water Cooled.

Water Cooled System

A type of refrigerant based air conditioning system that uses water as a condensing medium. Typically, the water-cooled condenser is located inside the air conditioner with the rest of the refrigeration components. Water is piped to the unit from a cooling tower or other suitable source.

Water Cooler

See Cooler, Water.

Water, Feed

The water, previously treated to remove air and impurities, that is supplied to a boiler for evaporation (source: BS 5643:1984).

Water, Hardness of

See Hardness of Water.

Water Hammer

Sharp, hammer-like blow or blows from a steep-fronted pressure wave in a long water pipeline, caused by the sudden stoppage of flow or by the sudden change of direction of slugs of water passing down a steam pipe (source: BS 5643:1984).

Water, Make-up

See Make-up Water.

Water, Natural

Untreated water from a natural source: river, stream etc (source: BS 5643:1984).

Water, Raw

Water untreated by the user (source: BS 5643:1984).

Water Recooler

See Cooling Tower.

Water Softening

A process in water treatment for the reduction of hardness (source: BS 5643:1984).

Water Transport Factor

The ratio of sensible heat change in the circulating water to the total power input to all pump motors in the circulating system (source: BS 5643:1984).

Water Treatment

The removal, reduction or control of hardness, impurities and other substances (minerals, pathogens etc) in natural water (source: BS 5643:1984).

Water Tube

A tube of small cross-section, being part of a boiler through which water and steam circulate (source: BS 5643:1984).

Water Tube Boiler

See Boiler, Water Tube.

Water Usage Effectiveness (WUE)

Is a site-based metric developed by The Green Grid that is an assessment of the water used on-site for a data centre's operation. This includes water used for humidification and water evaporated on-site for energy production or for cooling the data centre and its support systems.

Watt

The watt is a derived unit of power in the International System of Units (SI), named after the Scottish engineer James Watt (1736–1819). The unit is defined as joule per second and can be used to express the rate of energy conversion or transfer with respect to time.

Weak Solution

See Solution, Weak.

Weather Factor

A fractional number based on the number of degree days at a particular locality used in estimating the probable fuel consumption of a heating system (source: BS 5643:1984).

Welded Joint

A gas tight joint obtained by the joining of the metal parts in the plastic or molten state.

Refer to J & E Hall International Engineering Standard:

JEH-ES-13-001 Welding Standard for the Fabrication of Steel Pipelines.

Welding

The joining of materials (particularly metals) by applying heat to melt them together, sometimes with pressure and sometimes with an intermediate or filler metal having a high melting point.

Wet Bulb Temperature

See Temperature, Wet Bulb.

Wet Bulb Thermometer

See Thermometer, Wet Bulb.

Wet Compression Refrigeration System

See Refrigeration System, Wet Compression.

Wet Steam

See Steam, Wet.

Wetback Economic Boiler

See Boiler, Economic, Wetback.

Wild Heat

Uncontrolled heat that is absorbed by or generated within an enclosure (source: BS 5643:1984).

Wind Energy

See Energy, Wind.

Working Pressure

See Pressure, Working.

Working Zone

Zone, Working.

Xx

Yy

Zz

Zeotrope

A mixture of two or more refrigerants with different boiling points that, when in a totally liquid or vapour state, act as one component. However, when changing state the individual refrigerants evaporate or condense at different temperatures. Zeotropic mixtures have a temperature glide greater than 5.5 ºC and should be charged in the liquid state to assure proper mixture. Zeotropic refrigerants include: R-401A and R-408A

See also:

Azeotrope

Near Azeotrope

Zone

A space or group of spaces with sufficient thermal characteristics to enable internal conditions to be maintained by a single control system or a single element of a comprehensive control system (source: BS 5643:1984).

Zone, Comfort

See Comfort Zone.

Zone, Dead

The band within which a change of value of an input signal, for example, a control condition, to an element or system may take place without causing any perceptible change in output signal (source: BS 5643:1984).

Zone, Exterior

A zone within a building that is predominantly affected by external changes (such as temperature, solar gain or wind effect) acting through the walls and roof rather than by changes within the building (source: BS 5643:1984).

Zone, Interior

A zone with a building that is substantially unaffected by changes of conditions outside the building (source: BS 5643:1984).

Zone, Occupied

See Occupied Zone.

Zone, Perimeter

A zone within a building that is predominantly affected by external changes (such as temperature, solar gain or wind effect) acting through one or more walls of the building (source: BS 5643:1984).

Zone, Working

An occupied zone within which desired temperatures should be maintained (source: BS 5643:1984).

Zone Control

Independent control of a section of a system (source: BS 5643:1984).