

## **Glossary of Standard Energy Auditing Terms**

### **Absolute Pressure**

Gauge pressure plus atmospheric pressure.

### **Absolute Temperature**

Temperature measured from absolute zero.

### **Absolute Zero Temperature**

Temperature at which all molecular motion ceases(-460 F. and -273 C.)

### **Absorbent**

Substance with the ability to take up or absorb another substance.

### **Absorption Refrigerator**

Refrigerator which creates low temperature by using the cooling effect formed when a refrigerant is absorbed by chemical substance.

### **ACCA**

A leading HVAC/R Association - <http://www.acca.org/>

### **Accumulator**

Storage tank which receives liquid refrigerant from evaporator and prevents it from flowing into suction line before vaporizing.

### **ACH, Air Changes Per Hour**

The number of times that air in a house is completely replaced with outdoor air in one hour.

### **Actuator**

That portion of a regulating valve which converts mechanical fluid, thermal energy or electrical energy into mechanical motion to open or close the valve seats.

### **Add On Heat Pump**

Installing a heat pump in conjunction with an existing fossil fuel furnace.

### **Adiabatic Compression**

Compressing refrigerant gas without removing or adding heat.

### **Adsorbent**

Substance with the property to hold molecules of fluids without causing a chemical or physical damage.

### **Aeration**

Act of combining substance with air.

### **AFUE**

Annual Fuel Utilization Efficiency -ratio of annual output of useful energy or heat to the annual energy input to the furnace

### **Agitator**

Device used to cause motion in confined fluid.

### **AHU (Air Handler Unit)**

The inside part of the A/C system that contains the blower, cooling (evaporator) coil, and heater.

### **Air Change**

The amount of air required to completely replace the air in a room or building; not to be confused with recirculated air

**Air Cleaner**

Device used for removal of airborne impurities.

**Air Coil**

Coil on some types of heat pumps used either as an evaporator or condenser.

**Air Conditioner**

Device used to control temperature, humidity, cleanliness and movement of air in a confined space.

**Air Conditioning**

Control of the temperature, humidity, air movement and cleaning of air in a confined space.

**Air Cooler**

Mechanism designed to lower temperature of air passing through it.

**Air Diffuser**

Air distribution outlet or grille designed to direct airflow into desired patterns.

**Air Diffusion**

Distribution of the air in a space, called the treated space, by means of devices, called air terminal devices, in a manner so as to meet certain specified conditions, such as air change rate, pressure, cleanliness, temperature, humidity, air velocity and noise level.

**Air Distribution**

The transportation of a specified air flow to or from the treated space or spaces, generally by means of ductwork.

**Air Gap**

The space between magnetic poles or between rotating and stationary assemblies in a motor or generator.

**Air Handler**

Fan-blower, filter and housing parts of a system.

**Air Infiltration**

Leakage of air into rooms through cracks, windows doors and other openings.

**Air Source Equipment**

Heat pumps or air conditioners that uses the outdoor air to transfer heat to and from the refrigerant in the unit.

**Air Terminal Device**

A device located in an opening provided at the boundaries of the treated space to ensure a predetermined motion of air in this space.

**Air-Cooled Condenser**

Heat of compression, plus the heat of absorption, is transferred from refrigerant within coil to surrounding air, either by convection or fan or blower.

**Airflow**

The distribution or movement of air

**Ak value (of an air terminal device)**

Quotient obtained by dividing a measured air flow rate by a measured air velocity according to a specific process and a specific instrument.

**ARI (Air-Conditioning and Refrigeration Institute)**

Air-Conditioning and Refrigeration Institute is a nonprofit, voluntary organization comprised of heating, air conditioning and refrigeration manufacturers. ARI publishes standards for testing and rating heat pumps and air conditioners to provide you with a standardized measure of comparison. So, ARI ensures a level of performance within the industry.

**ASHRAE**

A leading HVAC/R Association - American Society of Heating, Refrigerating and Air Conditioning Engineers - <http://www.ashrae.org/>

**ASTM**

American Society for Testing and Materials.

**Backdrafting**

Reverse flow of combustion gases down the chimney of a vented combustion appliance, which is often caused by depressurization of the room where the appliance is located.

**Balance Point**

The lowest outdoor temperature at which the refrigeration cycle of a heat pump will supply the heating requirements without the aid of a supplementary heat source.

**Balancing**

Process of adjusting the flow of air in duct systems, or water flow in hot-water heating systems.

**BAS (Building Automation System)**

A building automation system (BAS) is an example of a distributed control system. The control system is a computerized, intelligent network of electronic devices, designed to monitor and control the mechanical and lighting systems in a building.

**Blower (Fan)**

An air handling device for moving air in a distribution system.

**BTU (British Thermal Unit)**

Quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

**CAE (Combined Annual Efficiency)**

A measure of the amount of heat produced for every dollar of fuel consumed for both home heating and water heating.

**Capacity**

The ability of a heating or cooling system to heat or cool a given amount of space. For heating, this is usually expressed in BTUs. For cooling, it is usually given in tons.

**Carbon Monoxide**

A colorless, odorless, highly poisonous gas produced when carbon burns without sufficient air nearby.

**Carboxyhemoglobin Saturation**

Carbon monoxide poisoning.

**CDD**

"Cooling degree days", or "CDD", are a measure of how much (in degrees), and for how long (in days), outside air temperature was higher than a specific base temperature. They are used for calculations relating to the energy consumption required to cool buildings.

**CFC (Chlorofluorocarbon)**

A class of refrigerants. Generally refers to the Chlorofluorocarbon family of refrigerants. Sometimes called Freon

**CFM (Cubic Feet per Minute)**

A standard measurement of airflow that indicates how many cubic feet of air pass by a stationary point in one minute. The higher the number, the more air is being forced through the system. A typical system produces 400 CFM per ton of air conditioning.

**CHP**

Combine Heat and Power

**Charge**

Amount of refrigerant placed in a refrigerating unit.

**Comfort Zone**

The range of temperatures, humidities and air velocities at which the greatest percentage of people feel comfortable.

**Compressor**

Pump of a refrigerating mechanism which draws a low pressure on cooling side of refrigerant cycle and squeezes or compresses the gas into the high pressure or condensing side of the cycle.

**Condenser Coil**

Part of the outdoor portion of a split-system air conditioner or heat pump. By converting refrigerant that is in a gas form back to a liquid, the coil sends heat carried by the refrigerant to the outside.

**Condensing Unit**

Part of a refrigerating mechanism which pumps vaporized refrigerant from the evaporator, compresses it, liquefies it in the condenser and returns it to the refrigerant control

**Conduction**

The transfer of heat through a solid material.

**Convection**

The movement of heat by air flow.

**COP (Coefficient Of Performance)**

COP compares the heating capacity of a heat pump to the amount of electricity required to operate the heat pump in the heating mode.

**DAMPER**

A device that is located in ductwork to adjust air flow.

**DB**

Dry Bulb Temperature

**db (Decibel)**

A decibel describes the relative loudness of a sound

**Demand Charge - Electric**

The charge that recovers certain costs which vary with the demand for, or the rate at which, general service customers consume electricity. Electric demand is expressed in kilowatts (kW) or in kilovoltamperes (kVA).

**Defrost Cycle**

The process of removing ice or frost buildup from the outdoor coil during the heating season.

**Dehumidification**

The reduction of water vapor in air by cooling the air below the dew point; removal of water vapor from air by chemical means, refrigeration, etc.

**Design Conditions**

Cooling loads vary with inside and outside conditions. A set of conditions specific to the local climate are necessary to calculate the expected cooling load for a home. Inside conditions of 75 degrees Fahrenheit and 50% relative humidity are usually recommended as a guideline. Outside conditions are selected for the 2.5% design point.

**Direct Gas-Fired Heater**

The burner fires directly in the air stream being heated, rather than through a heat exchanger. 100% of available BTUs are delivered to the heated space because no flue or heat exchanger is required. This results in no wasted energy.

**DOE (Department of Energy)**

The Department of Energy is a federal agency in charge of setting industry efficiency standards and monitoring the consumption of energy sources.

**Downflow**

A type of furnace that takes cool air from the top and blows warm air to the bottom.

**Drier**

Sometimes called filter/drier, it removes moisture and keeps the refrigerant clean.

**Duct**

A pipe or closed conduit made of sheet metal, fiberglass board, or other suitable material used for conducting air to and from an air handling unit.

**DUCTWORK**

The delivery system through which warm air from the furnace is brought to where it's needed.

**EER (Energy Efficiency Ratio)**

A ratio calculated by dividing the cooling capacity in Btu's per hour (Btuh) by the power input in watts at any given set of rating conditions, expressed in Btuh per watt (Btuh/watt). EER & SEER can not be compared equally. Air source equipment is rated by SEER and geothermal equipment is rated by EER. EER changes with the inside and outside conditions, falling as the temperature difference between inside and outside gets larger.

**Efficiency**

A rating on comfort equipment is similar to the miles per gallon rating on your car.

**ENERGY RECOVERY VENTILATOR (ERV)**

This device preheats incoming outside air during the winter and pre-cools incoming air during the summer to reduce the impact of heating and or cooling the indoor air.

**EPA (Environmental Protection Agency)**

Environmental Protection Agency - <http://www.epa.gov/>

**Evaporator Coil**

Part of a split-system air conditioner or heat pump located indoors. The evaporator coil cools and dehumidifies the air by converting liquid refrigerant into a gas, which absorbs the heat from the air. The warmed refrigerant is then carried through a tube to the outdoor unit (condenser coil).

**Exfiltration**

Uncontrolled air leakage out of a building.

**Exhaust**

The air flow leaving the treated space.

**Filter**

A device for removing dust particles from air or unwanted elements from liquids.

**Filter**

A device for removing dust particles from air or unwanted elements from liquids.

**Flow hood**

A diagnostic tool used to measure air flow through ducts, supply registers, and return grilles.

**FORCED AIR**

This describes a type of heating system that uses a blower motor to move air through the furnace and into the ductwork.

**Forced Air**

This describes a type of heating system that uses a blower motor to move air through the furnace and into the ductwork.

**Furnace**

That part of an environmental system which converts gas, oil, electricity or other fuel into heat for distribution within a structure.

**Geothermal Equipment**

Heat pumps that uses the ground to transfer heat to and from the refrigerant in the unit. The unit circulates water through a heat exchanger in the to a closed loop buried in the ground or by pumping water from a well through the unit.

**HCFC (Hydrochlorofluorocarbon)**

A class of refrigerants. Generally refers to Halogenated Chlorofluorocarbon family of refrigerants.

**HDD**

"Heating degree days", or "HDD", are a measure of how much (in degrees), and for how long (in days), outside air temperature was lower than a specific "base temperature" (or "balance point"). They are used for calculations relating to the energy consumption required to heat buildings.

**HEAT EXCHANGER**

Device that enables furnaces to transfer heat from combustion safely into breathable air. The primary heat exchanger transfers heat from combustion gases to the air blowing through the ductwork.

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**Heat Gain**

The amount of heat gained, measured in BTU's, from a space to be conditioned, at the local summer outdoor design temperature and a specified indoor design condition.

**Heat Loss**

The amount of heat lost, measured in BTU's from a space to be conditioned, at the local winter outdoor design temperature and a specified indoor design condition.

**Heat Pump**

Compression cycle system used to supply heat to a temperature controlled space. Same system can also remove heat from the same space.

**HEAT RECOVERY VENTILATOR (HRV)**

This device bring fresh, outside air into a home while simultaneously exhausting stale indoor air outside. In the process of doing this, an HRV removes heat from the exhaust air and transfers it to the incoming air, pre-heating it.

**HFC (Hydrofluorocarbon)**

A class of refrigerants. Generally refers to Hydrofluorocarbon family of refrigerants

**Humidifier**

A device that adds moisture to warm air being circulated or directed into a space.

**Humidistat**

A device designed to regulate humidity input by reacting to changes in the moisture content of the air.

**Humidity**

The amount of moisture in the air. Air conditioners remove moisture for added comfort.

**HVAC**

Heating, Ventilating and Air Conditioning

**HVAC/R**

Heating, Ventilating, Air Conditioning, & Refrigeration

**IAQ**

Indoor Air Quality

**Induction**

Process by which the primary air sets into motion an air volume, called secondary air, in the room.

**Induction ratio (i)**

Ratio of the total air flow rate to the primary air flow rate.

**Infiltration**

Air flow inward into a space through walls, leaks around doors and windows or through the building materials used in the structure.

**ISO 9000**

A family of international standards for quality management and assurance by the ISO (International Standards Organization).

**kBTU (Kilo British Thermal Unit)**

1000 BTUs Quantity of heat required to raise the temperature of one thousand pounds of water one degree Fahrenheit.

**kW**

kilowatt, equals 1,000 watts.

**kWh**

kilowatt hour is the amount of kilowatts of electricity used in one hour of operation of any equipment.

**Latent Cooling Load**

The net amount of moisture added to the inside air by plants, people, cooking, infiltration, and any other moisture source. The amount of moisture in the air can be calculated from a combination of dry-bulb and wet-bulb temperature measurements.

**Latent Heat**

Heat, that when added or removed, causes a change in state - but no change in temperature.

**Load Estimate**

A series of studies performed to determine the heating or cooling requirements of your home. An energy load analysis uses information such as the square footage of your home, window and door areas, insulation quality and local climate to determine the heating and cooling capacity needed by your furnace, heat pump or air conditioner.

**Lon or LonWorks**

LonWorks is a networking platform specifically created to address the needs of control applications. The platform is built on a protocol created by Echelon Corporation for networking devices over media such as twisted pair, power lines, fiber optics, and RF.

**Manometer**

An instrument that measures air pressure differences between locations. Tubes are usually attached to a manometer and run to the spaces where pressures are measured.

**Pascals (Pa)**

A small unit of air pressure.

**Plenum**

Air flow passage made of duct board, metal, drywall, or wood. Joins supply and return ducts with HVAC equipment.

**Radiation**

The transfer of heat directly from one surface to another (without heating the intermediate air acting as a transfer mechanism).

**Reciprocating Compressor**

A type of compressor used in air conditioners that compresses refrigerant by using a type of "piston" action.

**Refrigerant**

Substance used in refrigerating mechanism. It absorbs heat in evaporator by change of state from a liquid to a gas, and releases its heat in a condenser as the substance returns from the gaseous state back to a liquid state.

**Register**

Combination grille and damper assembly covering an air opening or end of an air duct.

**Return Air**

Air drawn into a heating unit after having been circulated from the heater's output supply to a room.

**RH**

Relative Humidity

**RSES**

A leading HVAC/R Association - Refrigeration Service Engineers Society - <http://www.rses.org/>

**ppm**

Parts per million

**Saturation Temperature**



Also referred to as the boiling point or the condensing temperature. This is the temperature at which a refrigerant will change state from a liquid to a vapor or visa versa.

**SEER (Seasonal Energy Efficiency Ratio)**

The total cooling of a central unitary air conditioner or unitary heat pump in Btu's during its normal annual usage period for cooling divided by the total electric energy input in watt-hours during the same period.

**Sensible Cooling Load**

The heat gain of the home due to conduction, solar radiation, infiltration, appliances, people, and pets. Burning a light bulb, for example, adds only sensible load to the house. This sensible load raises the dry-bulb temperature.

**Sensible Heat**

Heat, that when added or removed, causes a change in temperature but not in state.

**Setpoint**

The temperature to which a thermostat is set to result in a desired heated space temperature.

**Sizing**

Refers to the procedure a heating contractor goes through to determine how large a furnace (measured in btuh) is needed to heat a house efficiently.

**Sound Attenuators**

Components which are inserted into the air distribution system and designed to reduce airborne noise which is propagated along the ducts.

**Split System**

Refrigeration or air conditioning installation, which places condensing unit outside or away from evaporator. These unit are connected together by a supply and return refrigerant lines.

**Spread (LS)**

Maximum distance between two vertical planes tangent to a specified envelope and perpendicular to a plane through the core center. The spread are generally referred to the envelope corresponding to 0.25 m/s for zero supply temperature differential (i.e., under isothermal conditions).

**Subcooled Liquid**

Liquid refrigerant which is cooled below its saturation temperature.

**Superheated Vapor**

Refrigerant vapor which is heated above its saturation temperature. If a refrigerant is superheated, there is no liquid present.

**Supply**

The ductwork that carries air from the air handler to the rooms in the house.

**Switchover Valve**

A device in a heat pump that reverses the flow of refrigerant as the system is switched from cooling to heating. Also called a reversing valve or four-way valve.

**THERM**

Another measurement of heat. One therm equals 100,000 BTUH.

**Thermostat**

A temperature sensitive switch for controlling the operation of a heater or furnace.

**Throw (Lt)**

The maximum distance between the center of the core and a plane which is tangent to a specified envelope and perpendicular to the intended direction of flow. The throw is generally referred to as the envelope corresponding to 0.25 m/s for zero supply temperature differential (i.e., under isothermal conditions).

**Time Delay**

Usually refers to a device that will not allow the condenser to restart for an average of 5 minutes.

**Ton**

A unit of measure for cooling capacity. One ton = 12,000 BTUs per hour.

**Total air flow rate (QL)**

Sum of the primary and secondary air flow rates which are moved in the treated space.

**Upflow**

A type of furnace that draws cool air from the bottom and blows the warmed air out the top into the duct work. This type of furnace is usually installed in a basement or an out-of-the-way closet.

**VAV**

Variable Air Volume.

**Ventilator**

Captures heating or cooling energy from stale indoor air and transfers it to fresh incoming air.

**VFD**

Variable Frequency Drive, Electronic speed control for motors.

**W**

Watt, a unit of electricity.

**WB**

Wet Bulb

**WC (Water Column)**

Common measure of air pressure used in HVAC systems.

**Wet-bulb Temperature**

When a wet wick is placed over a standard thermometer and air is blown across the surface, the water evaporates and cools the thermometer below the dry-bulb temperature. This cooler temperature (called the wet-bulb temperature) depends on how much moisture is in the air.

**Zone**

1) Conditioned space in a house under the control of a thermostat. 2) A space within a house with a distinct pressure compared to other pressure zones.

**Zoning**

A system in which living areas or groups of rooms are divided into separate spaces and each space's heating/air conditioning is controlled independently.