

HVAC Terminology

Abatement: Reduction or removal of a contaminant.

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/>

Acceptable indoor air quality: Indoor air that does not contain harmful concentrations of contaminants; air with which at least 80% of building occupants do not express dissatisfaction.

ACGIH: American Conference of Governmental Industrial Hygienists.

ACH: Air Changes Per Hour. The number of times that air in a house is completely replaced with outdoor air in one hour.

Action Level: A term used to identify the level of indoor radon at which remedial action is recommended.

Action Packet: In reference to the indoor air quality Tools for Schools Kit. The packet contains three components - an introductory memo, IAQ Backgrounder, and IAQ Checklist - to assist school personnel to implement an effective yet simple indoor air quality program in their school.

Activated Carbon: Specially processed carbon used as a filter drier ; commonly used to clean air.

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. The result is a dual fuel system.

Aeration: Act of combining substance with air.

Aerosol: A suspension of liquid or solid particles in air.

AFLU (Annual Fuel Utilization Efficiency): A rating that reflects the efficiency of a gas furnace in converting fuel to energy. A rating of 90 means that approximately 90% of the fuel is utilized to provide warmth to your home, while the remaining 10% escapes as exhaust.

AFUE (Annual Fuel Utilization Efficiency): This number represents how efficiently a furnace converts fuel to energy. The ratio of annual output of useful energy or heat to the annual energy input to the furnace. The higher the AFUE, the more efficient the furnace -- higher efficiency translates to more savings on fuel bills. This will range from 80% to 95%. Percentage of fuel used for heating. A measure of heating efficiency, in consistent units, determined by applying the federal test method for furnaces. This value is intended to represent the ratio of heat transferred to the conditioned space by the fuel energy supplied over one year.

AHU (Air Handler Unit): The inside part of the A/C system that contains the blower, cooling (evaporator) coil, and heater. The part of an HVAC system responsible for moving air, which may also clean, heat, or cool the air. This refers to equipment used to provide conditioned air to a space. The air handler unit generally includes a blower or fan, heating and/or cooling coils, and related equipment such as controls, condensate drain pans, and air filters. Does not include ductwork, registers or grilles, or boilers and chillers.

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. A device that actively removes impurities from the air, including forced air filtration systems and electronic air cleaners. Air cleaners may be added to HVAC systems or stand-alone room units.

Air Cleaning: An indoor air quality control strategy to remove various airborne particulates and/or gases from the air. The three types of air cleaning most commonly used are particulate filtration, electrostatic precipitation, and gas sorption.

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: An air distribution outlet or grille designed to direct airflow into desired patterns. Supply air terminal device, designed to direct airflow into desired patterns, usually placed in the ceiling, generally of circular, square or rectangular shape, and composed of divergent deflecting members.

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 Exchange Rate: The rate of air flow moving through a space, usually expressed in terms of room volume units per unit of time such as room air changes per hour.

Air Exchange Rate: The rate at which outside air replaces indoor air in a space. Expressed in one of two ways: the number of changes of outside air per unit of time in air changes per hour (ACH); or the rate at which a volume of outside air enters per unit of time - cubic feet per minute (cfm).

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

Air Handler: an-blower, filter and housing parts of a system. Fan-blower, filter, heat transfer coil, and housing parts of a system. Also known as the blower section and part of the split system, this unit is commonly in your home or attic and blows the air through your house. This has to be matched with the condenser properly to assure maximum efficiency. This will contain your heating and evaporator coil.

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

Air Quality Standard: A government-mandated regulation that specifies the maximum contaminant concentration beyond which health risks are considered to be unacceptable.

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 Terminal Device, Slot: A device with one or several slots with an aspect ratio of 10: 1 or more for each slot (the aspect ratio is the ratio of the length to the width of the closed rectangular opening). A slot may or may not have an adjustable member to vary the direction of the air jet(s) or air flow rate.

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.

Algaecide: Normally in tablet form, placed in evaporator drain pan. Used to help slow the growth of bacteria.

Allergens and Pathogens: Biological material, including bacteria, viruses, fungi, mold spores, pollens, skin flakes and insect parts are ubiquitous in indoor environments. These particulates range from less than one to several microns in size. When airborne, they are usually attached to dust particulates of various sizes so that all sizes of airborne particulates may include them.

Alternating Current (AC): Flow of electricity that constantly changes direction between positive and negative sides. Almost all power produced by electric utilities in the United States moves in current that shifts direction at a rate of 60 times per second.

Ambient: The surrounding atmosphere; encompassing on all sides; the environment surrounding a body but undisturbed or unaffected by it.

Ambient Air: The air surrounding a building; outside air.

Ambient Air Temperature: Surrounding temperature, such as the outdoor air temperature around a building.

Ampere (A or Amp): The primary unit of measurement of electrical current. One ampere of current is produced in a circuit by 1 volt acting through a resistance of 1 ohm.

Amplification: An increase in the numbers or concentration of a microbe or its products through reproduction and growth of the microbe.

Annual Effects: The total effects in energy use (measured in megawatthours) and peak load (measured in kilowatts) caused by all participants in the DSM programs that are in effect during a given year. It includes new and existing participants in existing programs (those implemented in prior years that are in place during the given year) and all participants in new programs (those implemented during the given year). The effects of new participants in existing programs and all participants in new programs should be based on their start-up dates (i.e., if participants enter a program in July, only the effects from July to December should be reported). If start-up dates are unknown and cannot be reasonably estimated, the effects can be annualized (i.e., assume the participants were initiated into the program on January 1 of the given year). The annual effects should consider the useful life of efficiency measures, by accounting for building demolition, equipment degradation and attrition.

Antimicrobial: Agent that kills microbial growth.

Appliance Efficiency Standards: California Code of Regulations, Title 20, Chapter 2, Subchapter 4: Energy Conservation, Article 4: Appliance Efficiency Standards. Appliance Efficiency Standards regulate the minimum performance requirements for appliances sold in California and apply to refrigerators, freezers, room air conditioners, central air conditioners, gas space heaters, water heaters, plumbing fittings, fluorescent lamp ballasts and luminaires, and ignition devices for gas cooking appliances and gas pool heaters. New National Appliance Standards are in place for some of these appliances and will become effective for others at a future date.

APR: Air Purifying Respirator

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.

Asbestos: A class of silicate minerals composed of long, thin fibers.

ASHRAE: A leading HVAC/R Association - American Society of Heating, Refrigerating and Air Conditioning Engineers - <http://www.ashrae.org/> The trade association that provides information and sets standards for the industry.

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. A condition where the normal movement of combustion products from a combustion appliance up a flue is reversed so that the combustion products can enter the building.

Background Concentration: The level of a contaminant present before the introduction of a new source.

Balance Point: The lowest outdoor temperature at which the refrigeration cycle of a heat pump will supply the heating requirements. Usually a temperature between 30°F to 45°F -- at which a heat pump's output exactly equals the heating needs of the house. Below the balance point, supplementary electric resistance heat is needed to maintain indoor comfort.

Balancing: The process of adjusting the flow of air in duct systems, or water flow in hot-water heating systems. Proper balancing is performed using accurate instrumentation to deliver the right amount of heating or cooling to each area or room of the home.

Bioaerosol: An airborne microbial contaminant, such as a virus, bacteria, fungus, algae, or protozoa, or particulate material associated with one of these microorganisms.

Biocide: Substance or chemicals that kills organisms such as molds.

Biological Contaminants: Agents derived from, or that are, living organisms (e.g., viruses, bacteria, fungi, and mammal and bird antigens) that can be inhaled and can cause many types of health effects including allergic reactions, respiratory disorders, hypersensitivity diseases, and infectious diseases. Also referred to as "microbiologicals" or "microbials."

Blower door: A large powerful variable-speed fan mounted in a doorway that blows air into (pressurizes) or sucks air out of (depressurizes) a house. It's used to test for air leakage in a house. The size and complexity of the fan varies, but all blower doors have adjustable frames around the fan so that they can fit snugly into most doorways.

Blower (Fan): An air handling device for moving air in a distribution system.

Boiler: A device for generating steam for power, processing, or heating purposes or for producing hot water for heating purposes or hot water supply. Heat from an external combustion source is transmitted to a fluid contained within the tubes in a boiler shell, a closed vessel in which water is converted to pressurized steam. This fluid is delivered to an end-use at a desired pressure, temperature, and quality.

Boot: A piece of duct used to connect ducts with registers.

Breathing Zone: The area of a room in which occupants breathe as they stand, sit, and lie down.

BRI (Building-Related Illness): Diagnosable illness whose symptoms can be identified and whose cause can be directly attributed to airborne building pollutants (e.g., Legionnaire's disease, hypersensitivity pneumonitis). Also: A discrete, identifiable disease or illness that can be traced to a specific pollutant or source within a building. (Contrast with "Sick building syndrome").

BTU (British Thermal Unit): The amount of heat that will raise or lower one pound of water 1 degree F. at 39.2 degrees F. One BTU is the equivalent of the heat given off by a single wooden kitchen match. The British Thermal Unit is a standard of measure for cooling and heating capacities. This is how the capacity of air conditioning is measured. A standard measure of heat energy in the U.S., commonly used to measure the energy content of various fuels and steam. It takes one Btu to raise the temperature of one pound of water by one degree Fahrenheit at sea level. For example, it takes about 2,000 Btus to make a pot of coffee. One Btu is equivalent to 252 calories, 778 foot-pounds, 1055 joules, and 0.293 watt-hours. Note: In the abbreviation, only the B is capitalized. For your home, it represents the measure of heat given off when fuel is burned for heating or the measure of heat extracted from your home for cooling.

BTUH (British Thermal Unit Per Hour): Establishes a time reference to btu input or output rates. A BTUH is how many BTUs are used per hour.

Buffer zone: An area within the home between the conditioned zones and the outside. Thus it normally is not conditioned (for instance, attics, attached garages, crawlspaces, basements, and enclosed porches).

Building Energy Efficiency Standards: California Code of Regulations, Title 24, Part 2, Chapter 2-53; regulating the energy efficiency of buildings constructed in California. Building Envelope the outer walls, windows, doors, roof, and floors of a building; the building shell.

Building Envelope: Elements of the building, including all external building materials, windows, and walls, that enclose the internal space.

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.

Calorie: One energy calorie is equivalent to 4.2 joules. Thus, it takes 500,000 calories of energy to boil a pot of coffee. One food calorie equals 1,000 energy calories.

Capacitor: A device used to start a motor or compressor (or to keep it running after start up.)

Capacity: (or System Capacity) The output or producing ability of a piece of cooling or heating equipment. Cooling and heating capacity are normally referred to in BTUs. The capacity of an air conditioner is measured by the amount of cooling it can do when running continuously. The total capacity is the sum of the latent capacity (ability to remove moisture from the air) and sensible capacity (ability to reduce the dry-bulb temperature). Each of these capacities is rated in Btus per hour (Btu/h). The capacity depends on the outside and inside conditions. As it gets hotter outside (or cooler inside) the capacity drops. The capacity at a standard set of conditions is often referred to as "tons of cooling."

Carbon Dioxide: (CO₂) A colorless, odorless, non-poisonous gas that is a normal part of the air. Carbon dioxide, also called CO₂, is exhaled by humans and animals and is absorbed by green growing things and by the sea. A gas which can at high levels (above 1.5 % or 15,000 parts per million), have physiological effects. Main indoor source is human respiration; measurements used as indicators of ventilation conditions.

Carbon Monoxide: (CO) An colorless, odorless gas that is the product of incomplete fuel combustion or carbon burns without sufficient air nearby. It is a chemical asphyxiant; in the bloodstream it effectively prevents the transport of oxygen to the body's tissues. CO exposure can affect the lungs, heart, and nervous system, and can cause death. Sources include cooling and heating appliances, tobacco smoke, and entrained exhaust from parking garages and truck idling areas. A gas, made up of carbon and oxygen molecules, produced by incomplete burning of carbon or carbonaceous materials, including carbon-based fuels. including coal, natural gas, gasoline, oil and wood. It is a major air pollutant on the basis of weight. Carbon monoxide is also produced from incomplete combustion of many natural and synthetic products. For instance, cigarette smoke contains carbon monoxide. When carbon monoxide gets into the body, the carbon monoxide combines with chemicals in the blood and prevents the blood from bringing oxygen to cells, tissues and organs. The body's parts need oxygen for energy, so high-level exposures to carbon monoxide can cause serious health effects, with death possible from massive exposures. Symptoms of exposure to carbon monoxide can include vision problems, reduced alertness, and general reduction in mental and physical functions. Carbon monoxide exposures are especially harmful to people with heart, lung and circulatory system diseases.

Carboxyhemoglobin Saturation: Carbon monoxide poisoning.

Carcinogen: An agent suspected or known to cause cancer.

Ceiling Plenum: The space between the suspended and structural ceiling used as part of the air distribution system that accomodates the mechanical and electrical equipment. This space usually accommodates electrical, communications, and mechanical connections as well. The space is kept under negative pressure.

Celsius: A temperature scale based on the freezing (0 degrees) and boiling (100 degrees) points of water. Abbreviated as C in second and subsequent references in text. Formerly known as Centigrade. To convert Celsius to Fahrenheit, multiply the number by 9, divide by 5, and add 32. For example: 10 degrees Celsius x 9 = 90; 90 / 5 = 18; 18 + 32 = 50 degrees Fahrenheit.

Central Air Handling Unit (Central AHU): This is the same as an Air Handling Unit, but serves more than one area.

Central Forced-Air Heating System: A piece of equipment that produces heat in a centralized area, then distributes it throughout the home through a duct system.

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.

Charge: Amount of refrigerant placed in a refrigerating unit.

Chemical Sensitization: Evidence suggests that some people may develop health problems characterized by effects such as dizziness, eye and throat irritation, chest tightness, and nasal congestion that appear whenever they are exposed to certain chemicals. People may react to even trace amounts of chemicals to which they have become "sensitized."

Chiller: A device that produces chilled water to provide air conditioning for large buildings or cooling for process applications. A device that cools water, usually to between 40 and 50 degrees Fahrenheit for eventual use in cooling air.

Circuit: One complete run of a set of electric conductors from a power source to various electrical

devices (appliances, lights, etc.) and back to the same power source.

Clean Air Act: The original Clean Air Act was passed in 1963, but the national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law. The 1990 amendments are often referred to as the 1990 Clean Air Act.

Clean Air Act Amendments of 1990: These amendments represent a major overhaul of the earlier Clean Air Act of 1970. Changes include revised provisions for attainment and maintenance of National Ambient Air Quality Standards, mobile sources, hazardous air pollutants, and other assorted air quality issues. In addition, it establishes guidelines for reductions in air pollution. The Act also specifically limits sulfur dioxide and nitrogen oxide emissions of power plants.

Cogeneration: Simultaneous production of two or more forms of useable energy from a single fuel source, e.g., heat energy and electrical or mechanical power, in the same facility. Because a typical cogeneration facility uses thermal energy which is generally vented in a traditional power plant, the process can be 50 to 70 percent more efficient. Fuels used in cogeneration facilities may take the form of natural gas, biomass, oil or coal. Most cogeneration systems are designed to simultaneously produce electric power (to be used on site or sold back to an investor-owned utility or both) and thermal heat for industrial processes or the heating and cooling of buildings. Cogeneration projects can be any size, from 10 kilowatts to 1,000 megawatts or more.

Coil: A cooling or heating element, often including fins, through which treated gas or liquid is passed, exchanging thermal energy with air surrounding it for heating or cooling.

Colony Forming Unit: (CFU) A laboratory measure of fungal concentration, indicating the quantity of viable organisms collected for a given unit sample.

Comfort Conditioning: The process of treating air to simultaneously control its temperature, humidity, cleanliness, and distribution to meet the comfort requirements of the occupants of the conditioned space.

Comfort Zone: The range of temperatures, humidities and air velocities at which the greatest percentage of people feel comfortable. The range of temperatures over which the majority of persons feel comfortable (neither too hot nor too cold).

Commercial: The commercial sector is generally defined as nonmanufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, and health, social, and educational institutions. The utility may classify commercial service as all consumers whose demand or annual use exceeds some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Commissioning: The testing of HVAC systems prior to building occupancy to check whether the systems meet the operational needs of the building within the capabilities of the system design. Start-up of a building that includes testing and adjusting HVAC, electrical, plumbing, and other systems to assure proper functioning and adherence to design criteria. Commissioning also includes the instruction of building representatives in the use of the building systems.

Compressor: The heart of an air conditioning or heat pump system. The large (usually black) part in the condenser (outdoor unit) that pumps refrigerant. The 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. The compressor maintains adequate pressure to cause refrigerant to flow in sufficient quantities to meet the cooling requirements of the system.

Condenser: This is the unit that will sit outside and is part of a split system, it contains the compressor which is the heart of your air conditioner or Heat Pump, it pumps the refrigerant through your system. Some people call the condenser the compressor, but the compressor is a component of the condenser along with the fan motor and condenser coil. Coil or outdoor coil

dissipates heat from the refrigerant, changing the refrigerant from vapor to liquid.

Condenser Approach Temperature: The temperature difference between the condenser's refrigerant temperature and the leaving condenser water temperature. An ideal indicator of fouling of condenser tubes, which can significantly degrade chiller efficiency.

Condenser Coil: [Also see Outdoor Coil] The outdoor portion of a heating or cooling system that either releases or collects heat from the outside air, depending on the time of year. The Condenser Coil is connected directly to the home's Air Handler and is also known as the Outdoor Coil.

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. The outdoor portion of a split system air conditioner contains the compressor and outdoor coil ignoring the reverse cycle operation, also the outdoor in a heat pump system.

Conditioned Air: The air that has been heated, cooled, humidified, or dehumidified to maintain an interior space within the "comfort zone"

Conditioned Floor Area: The floor area of enclosed conditioned spaces on all floors measured from the interior surfaces of exterior partitions for nonresidential buildings and from the exterior surfaces of exterior partitions for residential buildings.

Conditioned Space: Enclosed space that is either directly conditioned space or indirectly conditioned space.

Conditioned Space, Directly: An enclosed space that is provided with heating equipment that has a capacity exceeding 10 Btus/(hr-ft²), or with cooling equipment that has a capacity exceeding 10 Btus/(hr-ft²). An exception is if the heating and cooling equipment is designed and thermostatically controlled to maintain a process environment temperature less than 65 degrees Fahrenheit or greater than 85 degrees Fahrenheit for the whole space the equipment serves.

Conditioned Space, Indirectly: Enclosed space that: (1) has a greater area weighted heat transfer coefficient (u-value) between it and directly conditioned spaces than between it and the outdoors or unconditioned space; (2) has air transferred from directly conditioned space moving through it at a rate exceeding three air changes per hour.

Configuration: This describes the direction in which a furnace outputs heat. A furnace may have an upflow, downflow or crossflow (horizontal) configuration.

Constant Air Volume Systems: Air handling system that provides a constant air flow while varying the temperature to meet heating and cooling needs.

Contactors: In the condenser, the main switch that turns the condenser on.

Contaminant: An unwanted constituent that may or may not be associated with adverse health or comfort effects.

Convection: The movement of heat by air flow.

Cooling Capacity: The maximum rate at which cooling equipment removes heat from airflow at operating conditions.

Cooling Capacity, Latent: Available refrigerating capacity of an air conditioning unit for removing latent heat from the space to be conditioned.

Cooling Capacity, Sensible: Available refrigerating capacity of an air conditioning unit for removing sensible heat from the space to be conditioned.

Cooling Capacity, Total: Available refrigerating capacity of an air conditioner for removing

sensible heat and latent heat from the space to be conditioned.

Cooling Degree Day: A unit of measure that indicates how heavy the air conditioning needs are under certain weather conditions.

Cooling Load: The rate at which heat must be extracted from a space in order to maintain the desired temperature within the space.

Cooling Load Temperature Difference: (CLTD) A value used in cooling load calculations for the effective temperature difference (ΔT) across a wall or ceiling, which accounts for the effect of radiant heat as well as the temperature difference.

Cooling System: A system of air-to-air, liquid-to-air, liquid-to-liquid, etc., heat exchangers, ducts and/or pipes, etc., for removing heat from a system containing heat sources, such as power plants, automobile engines, and homes. Also, an Energy Efficiency program promotion aimed at improving the efficiency of the cooling delivery system, including replacement, in the residential, commercial, or industrial sectors.

Cooling tower: A heat transfer device, which cools warm water using outside air.

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. COPs vary with the outside temperature: as the temperature falls, the COP falls also, since the heat pump is less efficient at lower temperatures. ARI standards compare equipment at two temperatures, 47 F and 17 F, to give you an idea of the COP in both mild and colder temperatures. Geothermal equipment is compared at 32 F enter water temperature. COP & HSPF cannot be compared equally. Air Source Equipment is rated by HSPF or COP and Geothermal equipment is rated by COP.

Current: (Electric) A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured, e.g., in amperes.

Damper: A device that is located in ductwork to adjust air flow. This movable plate opens and closes to control airflow. Dampers are used effectively in zoning to regulate airflow to certain rooms. There are basically two types of dampers: Manual and motorized. A manual damper generally consists of a sheet metal (or similar material) flap, shaped to fit the inside of a round or rectangular duct. By rotating a handle located outside of the duct a technician can adjust (see Balancing) air flow to match the needs of a particular area or room. A motorized damper is generally used in a zoned system (see Zoning) to automatically deliver conditioned air to specific rooms or zones. In particular, the following types, can be distinguished:
Multiple leaf dampers, comprising of a number of blades (or shutters) of opposed or parallel leaf type. Single leaf dampers (the flap being mounted at one end), commonly called splitter dampers. Hit-and-miss dampers, having two or more slotted slide mechanism. Butterfly dampers, with two flaps in "V" arrangement.

Dampers: Controls that vary airflow through an air outlet, inlet, or duct. A damper position may be immovable, manually adjustable or part of an automated control system.

db: (Decibel) A decibel describes the relative loudness of a sound. Some common sounds are fairly close to a typical air conditioner or heat pump's sound level: human voice, 7.0 decibels; blender, 8.8 decibels.

DDC: (Direct Digital Control) Direct Digital Control

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.

Delta: (or Delta T) A difference in temperature. Often used in the context of the difference between the design indoor temperature and the outdoor temperature.

Demand Billing: The electric capacity requirement for which a large user pays. It may be based on the customer's peak demand during the contract year, on a previous maximum or on an agreed minimum. Measured in kilowatts.

Demand Charge: The sum to be paid by a large electricity consumer for its peak usage level.

Demand: (Utility) The rate at which electricity or natural gas is delivered to or by a system,, part of a system, or piece of equipment, e.g., to end users, at a given instant or averaged over any designated period of time. Electricity demand is typically expressed in kilowatts.

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.

Dewpoint: Is the temperature at which air becomes saturated with water and begins to condense - forming a dew. Therefore at 100 % RH the ambient or process temperature equals the dewpoint temperature. The more negative the dewpoint temperature is from the ambient temperature the less the risk of condensation and the drier the gas or air stream.

Diffusers and Grilles: Components of the ventilation system that distribute and return air to promote air circulation in the occupied space. Generally speaking, supply air enters a space through a diffuser or vent and return air leaves a space through a grille.

Dilution: A mitigation strategy that lowers the concentration of airborne contaminants by increasing the fraction of outdoor air in the supply airstream.

Direct Current: (DC) Electricity that flows continuously in the same direction.

Direct Expansion: (Refrigeration) Any system that, in operation between an environment where heat is absorbed (heat source), and an environment into which unwanted heat is directed (heat sink) at two different temperatures, is able to absorb heat from the heat source at the lower temperature and reject heat to the heat sink at the higher temperature. The cooling effect is obtained directly from a fluid called a refrigerant that absorbs heat at a low temperature and pressure, and transfers heat at a higher temperature and higher pressure.

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.

Double Glazing: Windows having two sheets of glass with an airspace between.

Downflow: A type of furnace that takes cool air from the top and blows warm air to the bottom - common where your furnace must be located in a second-floor closet or utility area.

Downflow Furnace: A furnace that pulls in cool return air from the top and blows/expels warm air at the bottom - common where your furnace must be located in a second-floor closet or utility area.

Drain Trap: A dip in the drain pipe of sinks, toilets, floor drains, etc., which is designed to stay filled with water, thereby preventing sewer gases from escaping into the room.

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

Dry Bulb Temperature: (DB) The temperature measured by a standard thermometer. A measure of the sensible temperature of air.

Dual Fuel System: A dual heating system, for example a heat pump and a fossil fuel furnace.

Dual-Duct System: A central plant heating, ventilation and air conditioning (HVAC) system that produces conditioned air at two temperatures and humidity levels. The air is then supplied through two independent duct systems to the points of usage where mixing occurs.

Dual-Paned: (Double-glazed) Two panes of glass or other transparent material, separated by a space.

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. A passageway made of sheet metal or other suitable material used for conveying air or other gas at relatively low pressures.

Duct tape: This (initially) sticky tape is unfortunately the most common material used to seal duct connections. Care must be taken when it's applied. For effective sealing, the surface it is applied to must be clean--free of dust, dirt, oil, or other substances. Duct tape has a tendency to lose adhesion with age, especially when used on ducts in unconditioned spaces.

Ductwork: 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. Hollow pipes or channels that carry/transfer air from the Air Handler to the air vents throughout your home. The delivery system through which warm air from the furnace is brought to where it's needed. Ductwork is made of sheet metal, fiberglass, or flexible plastic, and can be round or rectangular in shape. Ductwork is one of the most important components of a home heating and cooling system.

Dust: Dust is comprised of particles in the air that settle on surfaces. Large particles settle quickly and can be trapped by the body's defense mechanisms. Small particles are more likely to be airborne and are capable of passing through the body's defenses and entering the lungs.

Economizer, Air: A ducting arrangement and automatic control system that allows a heating, ventilation and air conditioning (HVAC) system to supply up to 100 percent outside air to satisfy cooling demands, even if additional mechanical cooling is required.

Economizer, Water: A system which uses either direct evaporative cooling, or a secondary evaporatively cooled water loop and cooling coil to satisfy cooling loads, even if additional mechanical cooling is required.

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.

Effective area: (of an air terminal device) The smallest net area of an air terminal device used by the air stream in passing through the air terminal device.

Efficiency: A rating on comfort equipment is similar to the miles per gallon rating on your car. The higher the rating number, the more efficient the system and the lower your fuel consumption will be. You can save a lot of money with a high efficiency unit. Depending on your local climate, lifestyle and electricity rates, savings will vary. For furnaces, it is the rate at which a furnace maximizes fuel use. This rate is numerically described as a ratio called AFUE (see AFUE). As of January, 1991, no furnaces can be manufactured with efficiencies lower than 78% afue. High efficiency furnaces will be rated 85 to 95% afue.

Electric Radiant Heating: A heating system in which electric resistance is used to produce heat

which radiates to nearby surfaces. There is no fan component to a radiant heating system.

Electric Rate Schedule: A statement of the electric rate and the terms and conditions governing its application, including attendant contract terms and conditions that have been accepted by a regulatory body with appropriate oversight authority.

Electric Resistance Heater: A device that produces heat through electric resistance. For example, an electric current is run through a wire coil with a relatively high electric resistance, thereby converting the electric energy into heat which can be transferred to the space by fans.

Electrostatic air cleaner: A device that uses an electrical charge to trap particles traveling in the air stream.

Emergency Heat: (Supplementary Electric Heat) The back up electric heat built into a heat pump system. The same as an auxiliary heater, except it is used exclusively as the heat source when the heat pump needs repair.

Emission Standard: A voluntary guideline or government regulation that specifies the maximum rate at which a contaminant can be released from a source.

Encapsulate: A mitigation technique that reduces or eliminates emissions from a source by sealing with an impenetrable barrier.

Endotoxin: A biological agent that is part of the outer membrane of some bacteria. Endotoxins are highly toxic, capable of causing fever, malaise, respiratory distress, even death.

Energy: Broadly defined, is the capability of doing work. More specifically, it is the capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Forms of energy include: thermal, mechanical, electrical and chemical. Energy may be transformed from one form into another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatt-hours, while heat energy may be measured in British thermal units or other traditional non-metric specialized units in addition to metric units. In the electric power industry, energy is more narrowly defined as electricity supplied over time, expressed in kilowatts.

Energy Efficiency: Refers to programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption (reported in megawatthours), often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

Energy Management System: A control system (often computerized) designed to regulate the energy consumption of a building by controlling the operation of energy consuming systems, such as the heating, ventilation and air conditioning (HVAC), lighting and water heating systems.

Enforcement: The legal methods used to make polluters obey the CLEAN AIR ACT. Enforcement methods include citations of polluters for violations of the law (citations are much like traffic tickets), fines and even jail terms. EPA and the state and local governments are responsible for enforcement of the Clean Air Act, but if they don't enforce the law, members of the public can sue EPA or the states to get action. Citizens can also sue violating sources, apart from any action EPA or state or local governments have taken. Before the 1990 Clean Air Act, all enforcement actions had to be handled through the courts. The 1990 Clean Air Act gave EPA authority so that, in some cases, EPA can fine violators without going to court first. The purpose of this new authority is to

speed up violating sources' compliance with the law and reduce court time and cost.

Envelope: The geometrical surface of the points of an air jet, corresponding to a determined value of the measured air velocity. This velocity is generally called «terminal velocity». Also, the air barrier that separates the conditioned space from the outside and from unconditioned spaces like attics and garages.

Environmental Agents: Conditions other than indoor air contaminants that cause stress, comfort, and/or health problems (e.g., humidity extremes, drafts, lack of air circulation, noise, and over-crowding).

Environmental Tobacco Smoke: (ETS) The combination of sidestream and mainstream smoke that is emitted from a burning cigarette; also called second-hand smoke.

Environmental Tobacco Smoke: (ETS) Mixture of smoke from the burning end of a cigarette, pipe, or cigar and smoke exhaled by the smoker.

EPA: (Environmental Protection Agency) Environmental Protection Agency - <http://www.epa.gov/>
A federal agency created in 1970 to permit coordinated governmental action for protection of the environment by systematic abatement and control of pollution through integration of research, monitoring, standards setting and enforcement activities. EPA administers federal environmental policies, enforces environmental laws and regulations, performs research, and provides information on environmental subjects. The agency also acts as chief advisor to the President on U.S. environmental policy and issues.

Epidemiological: Dealing with the scientific study of the incidence, control, and spread of disease in a population.

Ergonomics: The science that investigates the impact of people's physical environment on their health and comfort (e.g., chair design, monitor location, desk configuration or height, etc.)

ERV: (Energy Recovery Ventilator) 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. This means that smaller capacity heating and cooling systems can be used in homes, which results in lower installation costs, lower peak demand for energy, and lower operating costs.

Evaporative Cooler: A type of cooling equipment that turns air into moist, cool air by saturating the air with water vapor. It does not cool air by use of a refrigeration unit. This type of equipment is commonly used in warm, dry climates.

Evaporative Cooling: Cooling by exchange of latent heat from water sprays, jets of water, or wetted material.

Evaporator Approach Temperature: The temperature difference between the evaporator's refrigerant temperature and the leaving chilled water temperature.

Evaporator Coil: [Also see Indoor Coil] The evaporator coil is located inside your house in a split system in the airhandler, or above the gas furnace. This will produce cooling in the air conditioning mode and heating in a Heat Pump mode. This coil section in the evaporator is where refrigerant evaporates and absorbs heat from air passed over the coil. This is also very important in removing humidity from your home.

Exfiltration: Uncontrolled air leakage out of a building. Exfiltration Air flow outward through a wall, building envelope, etc.

Exhaust: Air removed deliberately from a space, by a fan or other means, usually to remove contaminants from a location near their source. The air flow leaving the treated space. Exhaust may be accomplished by one or more of the following methods:

- a. Extraction: exhaust in such a manner that the air is discharged into the atmosphere.
- b. Relief: exhaust in such a manner that the air is allowed to escape from the treated space if the pressure in that space rises above a specified level.
- c. Recirculation: exhaust in which the air is returned to the air treatment system.
- d. Transfer: exhaust in which air passes from the treated space to another treated space.

Exhaust Air Flow Rate: Volume of air leaving an exhaust air terminal device within a time unit.

Exhaust Air Terminal Device: Air terminal device through which air leaves the treated space.

Exhaust Ventilation: Mechanical removal of air from a portion of a building (e.g., piece of equipment, room, or general area).

Fahrenheit: (F) A temperature scale in which the boiling point of water is 212 degrees and its freezing point is 32 degrees. To convert Fahrenheit to Celsius, subtract 32, multiply by 5, and divide the product by 9. For example: $100 \text{ degrees Fahrenheit} - 32 = 68$; $68 \times 5 = 340$; $340 / 9 = 37.77 \text{ degrees Celsius}$.

Fan Coil: An indoor component of a heat pump system used in place of a furnace, to provide additional heating on cold days when the heat pump does not provide adequate heating. A component of a heating, ventilation and air conditioning (HVAC) system containing a fan and heating or cooling coil, used to distribute heated or cooled air.

FAQ: (Frequently Asked Questions) Used to mean a list of frequently asked questions.

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

Fire Valves: (or Fire Dampers) Components which are installed in an air distribution system between two fire separating compartments and are designed to prevent propagation of fire and/or smoke. Generally are kept open by mechanical restraint, whose effect is canceled under specific conditions. The valve is then closed automatically.

Flex duct: Usually installed in a single, continuous piece between the register and plenum box, a flexible duct usually has an inner lining and an insulated coating on the outside.

Flow Hood: A diagnostic tool used to measure air flow through ducts, supply registers, and return grilles. Device that easily measures airflow quantity, typically up to 2,500 cfm.

Follow-Up Testing: The testing designed to confirm the results of the initial testing using identical testing devices and similar test conditions.

Forced Air: This describes a type of heating system that uses a blower motor to move air through the furnace and into the ductwork. Heating and or cooling system that connects to the conditioned space with duct-work that uses air as the moving fluid. The heating or cooling can come from any number of sources.

Forced Air Unit: (FAU) A central furnace equipped with a fan or blower that provides the primary means for circulation of air.

Formaldehyde: Formaldehyde is a colorless water-soluble gas. Due to its wide use, it is frequently considered separately from other volatile organic compounds (VOCs)

Fungi: A large group of organisms including molds, mildews, yeasts, mushrooms, rusts, and smuts. Any of a group of parasitic lower plants that lack chlorophyll. Most fungi produce spores, which are broadcast through the air so that virtually all environmental surfaces will have some fungal material. Most health effects are associated with allergic responses to antigenic material or toxic effects from mycotoxins. Fungi also generate certain volatile organic compounds.

Fungicide: Substance or chemical that kills fungi.

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

Furnace, Horizontal: A furnace that lies on its side, pulling in return air from one side and expelling warm air from the other.

Gas Sorption: Devices used to reduce levels of airborne gaseous compounds by passing the air through materials that extract the gases.

Geothermal Energy: Natural heat from within the earth, captured for production of electric power, space heating or industrial steam.

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.

Geothermal Gradient: The change in the earth's temperature with depth. As one goes deeper, the earth becomes hotter.

Global Climate Change: Gradual changing of global climates due to buildup of carbon dioxide and other greenhouse gases in the earth's atmosphere. Carbon dioxide produced by burning fossil fuels has reached levels greater than what can be absorbed by green plants and the seas.

Greenhouse Effect: The presence of trace atmospheric gases make the earth warmer than would direct sunlight alone. These gases (carbon dioxide [CO₂], methane [CH₄], nitrous oxide [N₂O], tropospheric ozone [O₃], water vapor [H₂O], and chlorofluorocarbons) allow visible light and ultraviolet light (shortwave radiation) to pass through the atmosphere and heat the earth's surface. This heat is re-radiated from the earth in form of infrared energy (longwave radiation). The greenhouse gases absorb part of that energy before it escapes into space. Thus the greenhouse effect allows solar radiation to penetrate but absorbs the infrared radiation returning to space. This process of trapping the longwave radiation specifically is known as the greenhouse effect. Scientists estimate that without the greenhouse effect, the earth's surface would be roughly 54 degrees Fahrenheit colder than it is today -- too cold to support life as we know it. See GLOBAL CLIMATE CHANGE.

Greenhouse Effect: (Relating to Buildings) The characteristic tendency of some transparent materials (such as glass) to transmit radiation with relatively short wavelengths (such as sunlight) and block radiation of longer wavelengths (such as heat). This tendency leads to a heat build-up within the space enclosed by such a material.

Grille: An air terminal device with multiple passages for the air. Grilles Coverings for the ducts where they open to the conditioned space. (Same as Registers)

Half-Life: The amount of time it takes for half of the existing amount of a radioactive element to decay to non-radioactive products.

HCFC: (Hydrochlorofluorocarbon) A class of refrigerants. Generally refers to Halogenated Chlorofluorocarbon family of refrigerants.

Heat Balance: The outdoor temperature at which a building's internal heat gain (from people, lights and machines) is equal to the heat loss through windows, roof and walls.

Heat Capacity: The amount of heat necessary to raise the temperature of a given mass one degree. Heat capacity may be calculated by multiplying the mass by the specific heat.

Heat Engine: An engine that converts heat to mechanical energy.

Heat Exchanger: This is a 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. It's vital that none of the combustion gas itself gets into the airstream. The primary heat exchanger handles the hottest gases. This device transfers heat from outgoing stale air to incoming cold air. In warm climates, this process can be reversed. In high efficiency furnaces, secondary heat exchangers recover heat that used to be vented up the chimney with the exhaust gases. By recovering this heat, the furnace becomes more efficient. Part of the heat recovered here causes the water and acid to condense out of the exhaust gas. Because this liquid is corrosive, secondary heat exchangers must be designed to prevent deterioration. Usually this means they are made of stainless steel or some derivative of it.

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. An increase in the amount of heat contained in a space, resulting from direct solar radiation, heat flow through walls, windows, and other building surfaces, and the heat given off by people, lights, equipment, and other sources.

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. A decrease in the amount of heat contained in a space, resulting from heat flow through walls, windows, roof and other building surfaces and from exfiltration of warm air.

Heat Pump: A heating and air conditioning unit that heats or cools by moving heat. A Heat Pump is a reverse cycle air conditioner. The Heat Pump uses a compression cycle system to supply heat or remove heat remove a temperature controlled space. An air-conditioning unit which is capable of heating by refrigeration, transferring heat from one (often cooler) medium to another (often warmer) medium, and which may or may not include a capability for cooling. This reverse-cycle air conditioner usually provides cooling in summer and heating in winter. When you run your air conditioner, your outdoor unit will be blowing hot air, (in other words, removing the heat from your home and sending it outside). When you run your heat pump, you reverse the flow of refrigerant and remove the heat from the atmosphere outside and blow it inside. When the temperature dips below 40 degrees outside, the Heat Pump labors in producing heat so they install a back up or auxiliary electric heat strip to supplement the Heat Pump. Electric Heat strips are very expensive to operate. In southern climates where it rarely dips below 40 degrees the heat pump is very efficient. A 3 to 1 savings in heating compared to electric heat strips.

Heat Pump Cooling Mode: In the cooling cycle of a Heat Pump , you are removing hot air from inside the house and sending it outside. You can feel the hot air outside, over the condenser fan motor.

Heat Pump Heating Mode: In the heating mode of a Heat Pump the refrigerant cycle is reversed and you are now removing the heat from the outside and sending it inside the house. You can feel the cool air outside, over the condenser fan motor. When temperatures go below 40 degrees Heat Pumps labor in producing heat and must use back up electric heat strips. Heat strips cost 3 times as much to operate as a Heat Pump when producing heat.

Heat Rate: A number that tells how efficient a fuel-burning power plant is. The heat rate equals the Btu content of the fuel input divided by the kilowatt-hours of power output.

Heat Source: A body of air or liquid from which heat is collected. In an air source heat pump, the air outside the house is used as the heat source during the heating cycle.

Heat Transfer: Flow of heat energy induced by a temperature difference. Heat flow through a building envelope typically flows from a heated, or hot area to a cooled, or cold area.

Heating Degree Day: A unit that measure the space heating needs during a given period of time.

Heating Load: The rate at which heat must be added to a space in order to maintain the desired temperature within the space.

Heating System: Energy Efficiency program promotion aimed at improving the efficiency of the heating delivery system, including replacement, in the residential, commercial, or industrial sectors.

Hertz: A unit of electromagnetic wave frequency that is equal to one cycle per second. -- It is named after Henrich R. Hertz.

HFC: (Hydrofluorocarbon) A class of refrigerants. Generally refers to Hydrofluorocarbon family of refrigerants

High-Efficiency Particulate Air (HEPA) Filter: A specialized filter capable of removing 99.97% of particulates 0.3 μ in diameter. High efficiency particulate arrestance (filters).

Home Energy Assistance Program: (HEAP) A centrally operated direct payment program that assists eligible households in offsetting the cost of heating and cooling their homes. Payments are generally made in the form of dual party warrants (checks) made payable to the applicant and their designated utility company. For example, the program is administered in California by the California Department of Economic Opportunity using federal and state funds.

Horsepower: (HP) A unit for measuring the rate of doing work. One horsepower equals about three-fourths of a kilowatt (745.7 watts).

House Dust Mite: A common microscopic household arachnid, which feeds on shed skin scales, and so tends to concentrate around mattresses and furniture. Antigens present in the mite's excreta are implicated in cases of allergic asthma and allergic rhinitis.

HRV: (Heat Recovery Ventilator) 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 transfer it to the incoming air, pre-heating it. This allows for the reclamation of much of the energy that otherwise would simply be vented outside. The end result: home comfort systems operate more efficiently.

HSPF: (Heating Seasonal Performance Factor) Indicates how efficiently a Heat Pump is working. A higher number means the unit works more efficiently. Heating Seasonal Performance Factor is similar to SEER, but it measures the efficiency of the heating portion of your heat pump. Like SEER, industry minimums have been raised recently, and the minimum is now 6.80 HSPF. Most new units have ratings from 7.0 to 9.4. A representation of the total heating output of a central air-conditioning heat pump in Btus during its normal usage period for heating, divided by the total electrical energy input in watt-hours during the same period, as determined using the specified test procedures. Efficiency is derived according to federal test methods by using the total Btus during its normal usage period for heating divided by the total electrical energy input in watt-hours during the same period. The total heating output of a heat pump during its normal annual usage period for heating divided by the total electric power input in watt-hours during the same period. COP & HSPF can not be compared equally. Air Source equipment is rated by HSPF or COP and Geothermal equipment is rated by COP. ARI standards compares air source equipment at two temperatures, 47 F and 17 F. Geothermal equipment is compared at 32 F enter water temperature.

Humidifier: A device that adds moisture to warm air being circulated or directed into a space. This adds necessary moisture to protect your furnishings and reduce static electricity.

Humidistat: A device designed to regulate humidity input by reacting to changes in the moisture content of the air. Much like a thermostat but turns the system on & off by sensing the humidity level.

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

HVAC: (Heating, Ventilating and Air Conditioning) Heating, Ventilating and Air Conditioning

HVAC/R: (Heating, Ventilating, Air Conditioning, & Refrigeration) Heating, Ventilating, Air Conditioning, & Refrigeration

Hydronic Heating: A system that heats a space using hot water which may be circulated through a convection or fan coil system or through a radiant baseboard or floor system.

IAQ Backgrounder: A component of the IAQ Tools for Schools Action Packet that provides a general introduction to IAQ issues in educational facilities.

IAQ Coordinator: An individual (usually with facility management) who provides leadership and coordination of all IAQ activities.

IAQ: (Indoor Air Quality) Indoor Air Quality - characteristics of the indoor climate of a building, including the gaseous composition, temperature, relative humidity, and airborne contaminant levels.

IAQ Management Plan: A set of flexible and specific steps for preventing and resolving IAQ problems in any kind of commercial facility.

Indicator Compounds: Chemical compounds, such as carbon dioxide, whose presence at certain concentrations may be used to estimate certain building conditions (e.g., airflow, presence of sources).

Indoor Air Pollutant: Particles and dust, fibers, mists, bioaerosols, and gases or vapors.

Indoor Coils: [Also see Evaporator Coil] Refrigerant containing portion of a fan coil unit similar to a car radiator, typically made of several rows of copper tubing with aluminum fins. A home's comfort system consists of two components: the outdoor unit (air conditioner or heat pump) and the indoor unit (coil or blower coil). Combinations of various units will result in vastly different efficiency ratings. Unreasonably high efficiency ratings can be created by using unrealistic indoor and outdoor equipment combinations. The term "most popular coil" indicates the actual tested combinations; other ratings may be simulated and unrealistic. Be sure that the efficiency ratings you are comparing are for "most popular coil." You'll know the ratings are attainable and close to reality.

Indoor Unit: This is usually located inside the house and contains the indoor coil, fan, motor, and filtering device, sometimes called the air handler.

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.

Industrial: The industrial sector is generally defined as manufacturing, construction, mining, agriculture, fishing, and forestry establishments (Standard Industrial Classification [SIC] codes 01-39). The utility may classify industrial service using the SIC codes, or based on demand or annual usage exceeding some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Infiltration: Air movement into an enclosed space through cracks and openings. Unintentional movement of outdoor air into a house. Air flow inward into a space through walls, leaks around doors and windows or through the building materials used in the structure. It results from the forces of wind, temperature difference, and HVAC operation.

ISO 9000: A family of international standards for quality management and assurance by the ISO (International Standards Organization).

IWC: (Inches of water column) Commonly used in the USA

Joule: A unit of work or energy. It takes ~ 1,000 joules to equal a British thermal unit. It typically takes ~ 1 million joules to make a pot of coffee.

KBTU: (kBtu) One-thousand (1,000) Btus.

Kilovolt: (kv) One-thousand volts (1,000). Distribution lines in residential areas usually are 12 kv (12,000 volts).

kW: (kilowatt or kW) A kilowatt equals one thousand (1,000) watts. A unit of measure of the amount of electric power production needed to operate given equipment. On a hot summer afternoon a typical home, with central air conditioning and other equipment in use, might have a demand of four kW. An electric power capacity of one kW is sufficient to power ten 100-watt light bulbs.

kWh: (kilowatt hour or kWh) A kilowatt hour (kWh) is the amount of kilowatts of electricity used in one hour of operation of any equipment. The most commonly-used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour. In 1989, a typical California household consumes 534 kWh in an average month. A typical electric consumer in Pennsylvania currently uses 500 kWh per month of electricity.)

Latent Cooling Load: (or Latent Load) The cooling load caused by moisture in the air. 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. A change in the heat content that occurs without a corresponding change in temperature, usually accompanied by a change of state (as from liquid to vapor during evaporation).

Life Extension: A term used to describe capital expenses which reduce operating and maintenance costs associated with continued operation of electric utility boilers and other equipment. Such boilers usually have a 40 year operating life under normal circumstances.

Life-Cycle Cost: Amount of money necessary to own, operate and maintain a building, system, plant, piece of equipment, etc., over its useful life.

Load: The amount of electric power supplied to meet one or more end user's needs. The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy consuming equipment of the consumers.

Load Building: Refers to programs that are aimed at increasing the usage of existing electric equipment or the addition of electric equipment. Examples include industrial technologies such as induction heating and melting, direct arc furnaces and infrared drying; cooking for commercial establishments; and heat pumps for residences. Load building should include programs that promote electric fuel substitution. Load building effects should be reported as a negative number, shown with a minus sign.

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. When referring to heating, this is often known as a Heat Loss Analysis, since a home's heating requirements are determined by the amount of heat lost through the roof, entry ways and walls.

Local Exhaust Ventilation: An industrial ventilation system that captures and removes contaminants emitted from nearby sources before dilution into ambient workplace air can occur.

Make-Up Air: See "Outdoor Air Supply."

Man-Made Mineral Fibers: (MMMMF) Fiber insulation products including glass wool, fiberglass, rock wool, slag wools, as well as refractory ceramic fibers, which are used for fireproofing.

Manual D: Manual D is the ACCA method for designing duct systems. Contractors often find it a laborious process and most duct systems are just installed, not designed. The amount of time necessary to design a duct system is certainly warranted in tract construction where the design is used repeatedly and for custom homes where the total cost of the home warrants a proper design. In short, designing a duct system is essential for proper equipment performance and customer comfort.

Manual J: Manual J is a widely accepted method of calculating the sensible and latent cooling (and heating) loads under design conditions. It was jointly developed by the Air Conditioning Contractors of America (ACCA) and the Air-Conditioning and Refrigeration Institute (ARI).

Manual S: Manual S is the ACCA method of selecting air conditioning equipment to meet the design loads. It ensures that both the sensible capacity and the latent capacity of the selected equipment will be adequate to meet the cooling load.

Mastic: An adhesive paste used in the fabrication and sealing of thermal insulation on piping fittings, equipment, and duct work. It spreads easily and dries permanently. Its applications include new ducts and old, sheet metal seams, and ductboard. Not all mastics are created equal. Some are toxic, some are water-based, and some take longer to cure, making them more suitable for new construction than retrofit.

Matched System: A heating and cooling system comprised of products that have been certified to perform at promised comfort and efficiency levels when used together, and used according to design and engineering specifications.

Material Safety Data Sheets: (MSDS) Product safety information sheets prepared by manufacturers and marketers of products containing toxic chemicals. These sheets can be obtained by requesting them from the manufacturer or marketer. Some stores, such as hardware stores, may have material safety data sheets on hand for products they sell.

Mechanical System: See HVAC.

Megawatt Hour: (MWh) One thousand kilowatt-hours, or an amount of electricity that would supply the monthly power needs of a typical home having an electric hot water system.

Megawatt: (MW) One thousand kilowatts (1,000 kW) or one million (1,000,000) watts. One megawatt is enough energy to power 1,000 average California homes.

MHPU: (Mobile Home Package Unit) The Mobile Home Package Unit is an air conditioner with electric or gas heat or can be a Heat Pump. This unit has the condenser and air handler all-in-one package. Commonly used in mobile homes and sits outside. (Self-contained unit)

Microbiologicals: See "Biological Contaminants."

Mildew: A superficial covering of organic surfaces with fungi under damp conditions.

Mitigation: A procedure or strategy aimed at reducing or eliminating an indoor air problem, either through source control, ventilation control, exposure reduction, or air cleaning.

Mixing Ratio: (Relative Humidity) Is often used in drying applications and is the ratio of the mass of water vapor to the mass of dry air with which it is associated. Vaisala products give this output as grams of water per kilogram of dry air (g/kg).

Mold: A fungal infestation that causes disintegration of a substance. Molds are a group of

organisms that belong to the kingdom Fungi. In this document, the terms fungi and mold are used interchangeably. There are over 20,000 species of mold.

Multiple Chemical Sensitivity: (MCS) A condition in which a person reports sensitivity or intolerance (as distinct from "allergic") to a number of chemicals and other irritants at very low concentrations.

mVOC: Microbial volatile organic compound, a chemical made by a mold which may have a moldy or musty odor.

Mycotoxin: A metabolic product generated by certain fungi; includes both useful substances, such as penicillin, and harmful substances, such as aflatoxin.

National Ambient Air Quality Standard: (NAAQS) The US outdoor air quality standard designed to protect public health. Pollutants covered by the NAAQS include ozone, sulfur dioxide, lead, nitrogen dioxide, respirable particulates, and carbon monoxide.

National Institute for Occupational Safety and Health: (NIOSH) The US government agency authorized to research and develop exposure criteria for toxic substances and recommend these standards to OSHA. NIOSH is also authorized to investigate unsafe working conditions.

Natural Ventilation: The supply of outdoor air through passive flow from windows, chimneys, doors, and other infiltration.

Negative Ion Generator: An air cleaning device that uses static charges to remove particulates from indoor air.

Negative Pressure: Condition that exists when less air is supplied to a space than is exhausted from the space, so the air pressure within that space is less than that in surrounding areas. Under this condition, if an opening exists, air will flow from surrounding areas into the negatively pressurized space.

NESHAP: National Emissions Standard for Hazardous Pollutants

New Construction: Energy efficiency program promotion to encourage the building of new homes, buildings, and plants to exceed standard government-mandated energy efficiency codes; it may include major renovations of existing facilities.

Nitrogen dioxide: (NO₂) A pollutant associated with combustion; a deep lung irritant. The two most prevalent oxides of nitrogen are nitrogen dioxide (NO₂) and nitric oxide (NO). Both are toxic gases with NO₂ being a highly reactive oxidant, and corrosive. NO gradually reacts with the oxygen in the air to form NO₂.

Nozzle: An air terminal device designed to generate a low energy loss and thus produce a maximum throw by minimum entertainment.

Occupational Safety and Health Administration: (OSHA) The regulatory arm of the US Department of Labor, which promulgates safety and health standards, facilitates training programs, and enforces regulations on work sites. OSHA has developed permissible exposure limits for over 600 contaminants present in the industrial workplace.

Ohm: A unit of measure of electrical resistance. One volt can produce a current of one ampere through a resistance of one ohm.

Organic Compounds: Chemicals that contain carbon. Volatile organic compounds vaporize at room temperature and pressure. They are found in many indoor sources, including many common household products and building materials.

Original Equipment Manufacturer: (OEM) Refers to the manufacturers of complete vehicles or

heavy duty engines, as contrasted with remanufacturers, converters, retrofitters, up-fitters, and repowering or rebuilding contractors who are overhauling engines, adapting or converting vehicles or engines obtained from the OEMs, or exchanging or rebuilding engines in existing vehicles.

Outdoor Air Supply: Air brought into a building from the outdoors (often through the ventilation system) that has not been previously circulated through the system. Also known as "Make-Up Air."

Outdoor Coil: [Also see Condenser Coil] Refrigerant containing portion of a fan coil unit similar to a car radiator, typically made of several rows of copper tubing with aluminum fins.

Outside Air: Air taken from outdoors and not previously circulated through the HVAC system.

Ozone: (O₃) A kind of oxygen that has three atoms per molecule instead of the usual two. The molecule contains three oxygen atoms (O₃). a highly reactive form of oxygen. Ozone exposure can result in mucous membrane irritation and potential pulmonary damage. Some copier machines and laser printers emit noticeable levels.

Ozone Generator: An air cleaning device that produces highly reactive ozone, which reacts with volatile organic compounds to form non hazardous products, remove particulates, and reduce the number of biocontaminants.

Ozone Hole: Thin place in the ozone layer located in the stratosphere high above the Earth. Stratospheric ozone thinning has been linked to destruction of stratospheric ozone by CFCs and related chemicals. The 1990 CLEAN AIR ACT has provisions to reduce and eliminate ozone-destroying chemicals' production and use. Ozone holes have been found above Antarctica and above Canada and northern parts of the United States, as well as above northern Europe.

Package Unit or Package System: A self-contained unit or system that has the Air Handler & Condenser in same unit. Normally placed outside the home and connected to a duct system by a penetration through the home's foundation. Except for geothermal which is a self-contained indoor unit that is placed in a closet, attached garage, basement, or mechanical room.

PAPR: Powered air purifying respirator.

Particulates: Small airborne particles found in indoor environments which include fibrous materials, solid-state semi-volatile organic compounds, and biological materials.

Pascals: (Pa) A small unit of air pressure. One pound per square inch equals 6,895 pascals.

Passive Smoking: The inhalation of environmental tobacco smoke; also called involuntary smoking.

Pathogen: Any microorganism or substance that causes disease.

PELs: Permissible Exposure Limits (standards set by the Occupational, Safety and Health Administration).

Permeable: Porous, allowing the passage of air.

Personal Protective Equipment: (PPE)

Pesticides: Pesticides are chemicals that are used to kill or control pests which include bacteria, fungi, weeds, and other organisms, in addition to insects and rodents. Most pesticides are inherently toxic. Most contain volatile organic compounds.

Picocurie: A unit of measurement used to describe radon concentration.

Plenum: Air compartment connected to a duct or ducts. Air flow passage made of duct board, metal, drywall, or wood. Joins supply and return ducts with HVAC equipment. The portions of the

air distribution system that makes use of the building structure, and the sheet metal that connects distribution ductwork to an air handling unit. Many buildings use the space above a dropped ceiling as a plenum.

Pollutant Pathways: Avenues for distribution of pollutants in a building. HVAC systems are the primary pathways in most buildings; however all building components interact to affect how air movement distributes pollutants.

Positive Pressure: Condition that exists when more air is supplied to a space than is exhausted, so the air pressure within that space is greater than that in surrounding areas. Under this condition, if an opening exists, air will flow from the positively pressurized space, outward to surrounding areas.

Power: The rate at which energy is transferred. Electricity for use as energy is also referred to as power. Electrical power is usually measured in watts. Also used for a measurement of capacity.

PPM: (Parts Per Million) A unit, which may be mass/mass, and hence represents a direct measure of fractional mass, or volume/volume, and represents in this case, a molar fraction at low pressures and high temperatures, commonly used to represent the degree of pollutant concentration where the concentrations are small.

Pressed Wood Products: A group of materials used in building and furniture construction that are made from wood veneers, particles, or fibers bonded together with an adhesive under heat and pressure.

Pressure balancing: The process of neutralizing pressure differences within a home.

Preventive Maintenance: (PM) A program of building maintenance implemented to reduce the possibility of problems, usually through periodic inspection, cleaning, adjustment, calibration, and replacement of functioning, parts of the HVAC system, as well as housekeeping practices to reduce the buildup of potential contaminants. Primarily done on a building's mechanical systems, this involves a regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems. Preventive maintenance helps to prevent parts, material, and systems failure by ensuring that parts, materials and systems are in good working order.

Price of Quality, The: There is more to buying a heat pump or air conditioner than ratings. The quality of construction and materials used as well as the reliability of the manufacturer and installing contractor can all affect your long-term satisfaction and comfort. Top quality, high efficiency equipment will cost more initially, but it will save you money on utility bills and service calls for years to come. Be sure to weigh all the factors before choosing your new system.

Primary Air Flow Rate: Volume of air entering a supply air terminal device within a time unit.

Process Heating: Energy Efficiency program promotion of increased electric energy efficiency applications in industrial process heating.

Programmable Controller: A device that controls the operation of electrical equipment (such as air conditioning units and lights) according to a preset time schedule.

Psychosocial Factors: Psychological, organizational, and personal stressors that could produce symptoms similar to those caused by poor indoor air quality.

R-Value: A measure, in Btu/(ft² F), of the resistance to transmission of heat by an insulating material. The higher the R-value of a material, the greater is its insulating properties and the slower the heat flow through it. The specific value needed to insulate a home depends on climate, type of heating system and other factors.

Radiant: System that uses hot surfaces to radiate or convect heat into the environment. Without the use of fans or blowers

Radiant Barrier: A device designed to reduce or stop the flow of radiant energy.

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

Radioactive Decay: The disintegration of the nuclei of the atoms of radioactive (charged) elements with the concomitant release of alpha, beta, or gamma rays.

Radon (Rn) and Radon Decay Products: Radon is a radioactive gas formed and emitted by the decay of radium and uranium in rock. The radon decay products (also called radon daughters or progeny) can be breathed into the lung where they continue to release radiation as they further decay.

Re-Entrainment: Situation that occurs when the air being exhausted from a building is immediately brought back into the system through the air intake and other openings in the building envelope.

Receiver: Tank on the liquid side of a system that holds excess refrigerant in the system that needs to be there for proper operation.

Reclaiming: Processing or returning used refrigerant to the manufacturer or processor for disposal or reuse.

Recool: The sensible cooling of air that has been previously heated by HVAC systems serving the same building.

Refrigerant: Substance used in refrigerating mechanism. A substance that produces a refrigerating effect while expanding or vaporizing. Air conditioning systems use Refrigerant in the Evaporator Coil to cool air as it passes by. Refrigerants absorb 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.

Refrigerant Charge: The amount of refrigerant contained within the air conditioning equipment and required for proper operation.

Refrigerant Lines: Two copper lines that connect the Condenser (Outdoor) Coil to the Evaporator (Indoor) Coil.

Registers: Combination grille and damper assembly covering an air opening or end of an air duct. Coverings for the ducts where they open to the conditioned space. (Same as Grilles)

Reheat: The heating of air that has been previously cooled either by mechanical refrigeration or economizer cooling systems.

Relative Humidity: (RH) Relative humidity is defined as the ratio of the water vapor pressure to the saturation vapor pressure (over water) at the temperature of the gas. $RH = P_w/P_{ws} * 100$

Relative Risk: The ratio of health impact incidence among exposed individuals to incidence among unexposed individuals.

RELS: Recommended Exposure Limits (recommendations made by the National Institute for Occupational Safety and Health (NIOSH)).

Remediate: Fix

Reservoir: The environmental substrate, or source, of a particular organism. Reservoirs for indoor biocontaminants include stagnant water, moist surfaces, and dust collection sites.

Residential: The residential sector is defined as private household establishments which consume energy primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking, and clothes drying. The classification of an individual consumer's account, where the use is both residential and commercial, is based on principal use.

Resistance: (Electrical) The ability of all conductors of electricity to resist the flow of current, turning some of it into heat. Resistance depends on the cross section of the conductor (the smaller the cross section, the greater the resistance), the material, the length of the flow path, and its temperature (the hotter the cross section, the greater its resistance).

Resistance: (Thermal) The reciprocal of thermal conductance. See R-VALUE.

Respirable Suspended Particulates: Particulates less than 10 µm in diameter that can enter the respiratory tract.

Retrofit: Broad term that applies to any change after the original purchase, such as adding equipment not a part of the original purchase. As applied to alternative fuel vehicles, it refers to conversion devices or kits for conventional fuel vehicles. (Same as 3aftermarket2.)

Return: The ductwork that carries air from the house to the air handler.

Return Air: Air drawn into a heating unit after having been circulated from the heater's output supply to a room. The air removed from an occupied space and returned to the air handler to be exhausted or recirculated.

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

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) An efficiency measurement that is similar to Miles Per Gallon for cars. The higher this number, the more energy efficient they system is. The amount of cooling your equipment delivers per every dollar spent on electricity. The higher the number the lower the operating cost (not more cooling.) SEER applies to air conditioners and heat pumps. In the past, a unit with a SEER of 8.00 was considered standard efficiency, and a unit with a 10.00 SEER was considered high efficiency. After January 1, 1992, the minimum SEER required by the DOE is 10.00 and 15.00+ SEER is considered high efficiency. EER & SEER can not be compared equally. Air source equipment is rated by SEER and geothermal equipment is rated by EER. New units have SEER ratings from 10 to 17 BTUs per watt. 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. The Seasonal Energy Efficiency Ratio is a standard method of rating air conditioners based on three tests. All three tests are run at 80 degrees Fahrenheit inside and 82 degrees Fahrenheit outside. The first test is run with humid indoor conditions, the second with dry indoor conditions, and the third with dry conditions cycling the air conditioner on for 6 minutes and off for 24 minutes. The published SEER may not represent the actual seasonal energy efficiency of an air conditioner in your climate. The total cooling output of a central air conditioning unit in Btus during its normal usage period for cooling divided by the total electrical energy input in watt-hours during the same period, as determined using specified federal test procedures. [Title 20, Section 2-1602(c)(11)].

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. Heat that results in a temperature change.

Sensitization: Repeated or single exposure to an allergen that results in the exposed individual becoming hypersensitive to the allergen.

Setback: A reduction of climate control energy demand in HVAC controls when a building is unoccupied.

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

Short-Circuiting: Situation that occurs when the supply air flows to return or exhaust grilles before entering the breathing zone (area of a room where people are). To avoid short-circuiting, the supply air must be delivered at a temperature and velocity that results in mixing throughout the space.

Sick building: A building in which the indoor air quality is considered to be unacceptable to a substantial majority of occupants.

Sick Building Syndrome: (SBS) A phenomenon in which building occupants experience a variety of health and/or comfort effects linked to time spent in a particular building, but where no specific illness or causative agent can be identified. Symptoms in sufferers often include headaches, eye irritation, and respiratory irritation. Term that refers to a set of symptoms that affect some number of building occupants during the time they spend in the building and diminish or go away altogether during periods when they leave the building. (Contrast with Building Related Illness.)

Single Package: A year 'round heating and air conditioning system that has all the components completely encased in one unit outside the home.

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. Too small a furnace won't deliver enough heating; too large a furnace increases energy costs and can have an adverse effect on comfort. Sizing depends on the square-footage of the home, the amount of ceiling and wall insulation, the window area, use of storm doors, storm windows, and more.

Smoke stick: A diagnostic tool used to observe air flow. Usually it consists of a chemical in a squeezable container. When squeezed it emits smoke which visibly follows air flow currents.

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

Sound Rating Number: (SRN) Sound is measured in bels (a bel equals 10 decibels). The SRN of a unit is based on ARI test, performed at ARI standard rating conditions. Average sound rating range from 7.0 to 8.0 decibels. The lower the SRN rating, the quieter the unit.

Sound Ratings: Although sound does not affect the efficiency of a unit, it will certainly affect your comfort. If your unit has a low sound level, you will hardly notice it is operating. But if it has a higher sound level, it may mean your good night's sleep is disturbed every time it runs!

Source Control: A preventive strategy for reducing airborne contaminant levels through removal of the material or activity generating the pollutants.

Sources: Sources of indoor air pollutants. Indoor air pollutants can originate within the building or be drawn in from outdoors. Common sources include people, fixtures and furnishings, photocopiers, plants, food, etc.

Specific Heat: In English units, the quantity of heat, in Btu, needed to raise the temperature of one pound of material one degree Fahrenheit.

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. Also applicable to heat pump installations. A combination heat pump or air conditioner with indoor components such as a furnace or blower coil. To maximize effectiveness, Split Systems should be matched.

Spore: Molds reproduce by means of spores. Spores are microscopic; they vary in shape and size (2-100 micrometers). Spores may travel in several ways--they may be passively moved (by a breeze or waterdrop), mechanically disturbed (by a person or animal passing by), or actively discharged by the mold (usually under moist conditions or high humidity).

Spread: (LS) (for a supply air terminal device) 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).

SRN: (Sound Rating Number) Sound is measured in bels (a bel equals 10 decibels). The SRN of a unit is based on ARI test, performed at ARI standard rating conditions. Average sound rating range from 7.0 to 8.0 decibels. The lower the SRN rating, the quieter the unit.

Stack effect: A condition resulting from the rise of heated air, which creates positive pressure near the top of the building and negative pressure toward the bottom. Stack effect pressures have been known to overpower mechanical ventilation systems, disrupting proper circulation and contributing to the infiltration and stagnation of pollutants.

Stack Effect: The overall upward movement of air inside a building that results from heated air rising and escaping through openings in the building super structure, thus causing an indoor pressure level lower than that in the soil gas beneath or surrounding the building foundation.

Standard Industrial Classification: (SIC) A set of codes developed by the Office of Management and Budget, which categorizes business into groups with similar economic activities.

Static Pressure: Condition that exists when an equal amount of air is supplied to and exhausted from a space. At static pressure, equilibrium has been reached.

Statistical Significance: The probability that and degree to which the results of an experimental study describe an actual relationship between two factors beyond that which might be expected by pure coincidence.

Straight Cool: This is an air conditioner that uses different forms of heating such as Natural Gas, LP Gas, Electric Resistance heat and oil.

Stratosphere: Part of the atmosphere, the gases that encircle the Earth. The stratosphere is a layer of the atmosphere 9-31 miles above the Earth. Ozone in the stratosphere filters out harmful sun rays, including a type of sunlight called ultraviolet B, which has been linked to health and environmental damage.

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.

Supplementary Heat: (Emergency Heat) The auxiliary or emergency heat provided at temperatures below a heat pump's balance point. It is usually electrical resistance heat.

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

Supply Air: The air flow entering the treated space.

Swamp Cooler: See Evaporative Cooler.

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.

System: A combination of equipment and/or controls, accessories, interconnecting means and terminal elements by which energy is transformed to perform a specific function, such as climate control, service water heating, or lighting.

Systems Control: The control of indoor air pollutants through the use of mechanical means such as ventilation control or air cleaning.

Temperature: Degree of hotness or coldness measured on one of several arbitrary scales based on some observable phenomenon (such as the expansion).

Temperature Differential: The difference between the entering and leaving temperature for a given fluid. For example, a 10-degree evaporator temperature differential for a chiller would describe an operating condition where the entering water temperature is 54 degrees and the leaving is 44 degrees.

Testing, Adjusting, And Balancing: (TAB) The diagnostic and corrective procedures for HVAC controls and operating components to ensure provision of specified airflow rates and environmental conditions.

Therm: Another measurement of heat. One therm equals One hundred thousand (100,000) British thermal units (1 therm = 100,000 Btu).

Thermal (Energy) Storage: A technology that lowers the amount of electricity needed for comfort conditioning during utility peak load periods. A buildings thermal energy storage system might, for example, use off-peak power to make ice or to chill water at night, later using the ice or chilled water in a power saving process for cooling during the day. See THERMAL MASS.

Thermal Mass: A material used to store heat, thereby slowing the temperature variation within a space. Typical thermal mass materials include concrete, brick, masonry, tile and mortar, water, and rock or other materials with high heat capacity.

Thermodynamics: The study of the transformation of energy into other manifested forms and of their practical applications. Commonly encountered forms of the statements of the three principal laws of thermodynamics are: (0) The heat capacity and entropy of every crystalline solid becomes zero at absolute zero (0 degrees Kelvin). (1) The Law of the Conservation of Energy -- energy may be transformed in an isolated system, but its total is constant. (2) Heat from a reservoir at a constant temperature cannot be changed completely into work by a cyclic process.

Thermostat: A temperature sensitive switch for controlling the operation of a heater or furnace. Typically found on a wall inside the home, that consists of a series of sensors and relays that monitor and control the functions of a heating and cooling system. A device that allows you to control the temperature inside your home by telling the heating or cooling system how much air to produce. An automatic control device designed to be responsive to temperature and typically used to maintain set temperatures by cycling the HVAC system.

Thermostat, Air-Sensing: Thermostat unit in which sensing element is located in refrigerated space.

Thermostat, Setback: (Programmable Thermostat) A state-of-the-art electronic thermostat with a built-in memory that can be programmed for different temperature settings at different times of the day. A device, containing a clock mechanism, which can automatically change the inside temperature maintained by the HVAC system according to a preset schedule. The heating or cooling requirements can be reduced when a building is unoccupied or when occupants are asleep.

Threshold: (IAQ) The contaminant dose or exposure level below which there is no expected significant effect.

Threshold Limit Value: (TLV) The American Conference of Governmental Industrial Hygienists recommended guideline for exposure limit represented in terms of exposure over a work day (8 hours) or a work week (40 hours).

Threshold Limit Values: (TLVs) Threshold Limit Values (guidelines recommended by the American Conference of Governmental Industrial Hygienists).

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).

Tight Building Syndrome: (TBS) A condition in which a building is very tightly insulated against infiltration, its ventilation is reduced for energy conservation, and airborne contaminants are sufficiently elevated to cause health effects in occupants; often used synonymously with sick building syndrome (SBS).

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

Ton or "Ton of Cooling": A cooling unit of measure. Each ton equals the cooling effect of 12,000 Btu/h. Heat pumps and air conditioners are generally sized in tons. Typical sizes for single family residences are between two and five tons. It is important to note that actual capacity is not constant and will change based on outdoor or indoor temperatures. The published capacity rating of air conditioners and heat pumps is based on performance at the ARI standard temperature levels of 95 F outside, 80 F inside, and 50% relative humidity. The number of tons a system has is the total BTU capacity of the system. The size of the area to be cooled will determine the correct size of the system in tons. While an air conditioner may be called a three ton unit, it may not produce 36,000 Btu/h in cooling. There is a wide variety of actual capacities that are called "three tons."

Total air flow rate: (QL) Sum of the primary and secondary air flow rates which are moved in the treated space.

Total Home Comfort System: The ultimate solution to providing you with consistent, customized home comfort, despite the ever-changing weather.

Total Volatile Organic Compounds: (TVOCs) A measure representing the sum of all VOCs present in the air to provide an approximate indication of pollutant levels. Indoor air typically contains hundreds of different VOCs in very low concentrations, some of which can have additive effects.

Total Volatile Organic Compounds: (TVOCs) Total volatile organic compounds. See "Volatile Organic Compounds (VOCs)"

Toxicant: A substance that can cause tissue damage or otherwise affect organs or systems within the body.

Tracer Gas: An inert compound that is a rare constituent of indoor air which is released into building air and monitored qualitatively and/or quantitatively to characterize airflow characteristics to determine air pathways, infiltration, and ventilation efficiency measurements.

Tracer Gases: Compounds, such as sulfur hexafluoride, which are used to identify suspected pollutant pathways and to quantify ventilation rates. Trace gases may be detected qualitatively by their odor or quantitatively by air monitoring equipment.

Transformer: A device, which through electromagnetic induction but without the use of moving parts, transforms alternating or intermittent electric energy in one circuit into energy of similar

type in another circuit, commonly with altered values of voltage and current.

Transmittance: The time rate of heat flow per unit area under steady conditions from the air (or other fluid) on the warm side of a barrier to the air (or fluid) on the cool side, per unit temperature difference between the two sides.

UA: A measure of the amount of heat that would be transferred through a given surface or enclosure (such as a building envelope) with a one degree temperature difference between the two sides. The UA is calculated by multiplying the U-Value, or overall heat transfer coefficient U, by the area A of the surface (or surfaces).

Unconditioned Space: A space that is neither directly nor indirectly conditioned space, which can be isolated from conditioned space by partitions and/or closeable doors.

Upflow: See "Upflow Furnace"

Upflow Furnace: A furnace that pulls cool return air in from the bottom and blows/expels warm 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.

Urea Formaldehyde Foam Insulation: (UFFI) A form of insulation no longer in use because of excessive formaldehyde emissions and documented associated health impacts.

Useful Thermal Output: The thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application, i.e., total thermal energy made available for processes and applications other than electrical generation.

Valves: Components inserted into air ducts or devices which permit modification of the air resistance of the system and consequently a complete shut-off of the air flow (control valves).

VAV System: (Variable Air Volume System) A mechanical HVAC system capable of serving multiple zones which controls the temperature maintained in a zone by controlling the amount of heated or cooled air supplied to the zone.

VAV: (Variable Air Volume) Variable Air Volume.

Ventilation: The process of supplying or removing air by natural or mechanical means to or from any space. Such air may or may not have been conditioned or treated.

Ventilation Air: Defined as the total air, which is a combination of the air brought inside from outdoors and the air that is being recirculated within the building.

Ventilation effectiveness: A measure of the fraction or percentage of outdoor air that reaches the occupied zone of a specified area; an evaluation of air delivery to occupants, regardless of the effectiveness of contaminant removal.

Ventilation efficiency: An evaluation of the pollutant removal capacity of a ventilation system.

Ventilation Rate: The rate at which indoor air enters and leaves a building. Expressed in one of two ways: the number of changes of outdoor air per unit of time (air changes per hour, or "ach") or the rate at which a volume of outdoor air enters per unit of time (cubic feet per minute, or "cfm").

Ventilation standard: A specification for the minimum rate of input of outdoor air into indoor spaces.

VFD: (Variable Frequency Drive) Electronic speed control for motors.

Volatile Organic Compounds: (VOCs) One of a class of chemical compounds; indoor sources

include tobacco smoke, building products, furnishings, cleaning materials, solvents, and office supplies. In sufficient quantities, VOCs can cause eye, nose, and throat irritations; dizziness; and headaches. Some VOCs are suspected carcinogens. Data for health effects resulting, from exposure to the characteristically low levels of VOCs in the indoor environment are scarce. Compounds that vaporize (become a gas) at room temperature. Common sources which may emit VOCs into indoor air include housekeeping and maintenance products, and building and furnishing materials. In sufficient quantities, VOCs can cause eye, nose, and throat irritations, headaches, dizziness, visual disorders, memory impairment; some are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans.

Volt: A unit of electromotive force. It is the amount of force required to drive a steady current of one ampere through a resistance of one ohm. Electrical systems of most homes and office have 120 volts.

W: (Watt) A watt is a unit of electricity. A unit of measure of electric power at a point in time, as capacity or demand. It is the rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor. One watt of power maintained over time is equal to one joule per second. Some Christmas tree lights use one watt. The watt is named after Scottish inventor James Watt and is capitalized when shortened to w and used with other abbreviations, as in kWh.

Water vapor: Water vapor can be treated as a gas. At a particular temperature air for example can only hold so much water vapor. The higher the temperature the more water vapor it can hold. When saturated the relative humidity would be 100 % RH, so relative humidity describes how close to saturation the air is. It is important to remember that in a process with a high relative humidity a small drop in temperature will cause the humidity to rise and the environment to saturate. Rapid temperature changes in an environmental chamber for example could also cause condensation.

Watt-Hour: (W-hr) One watt of power expended for one hour. An electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electric circuit steadily for 1 hour. One thousandth of a kilowatt-hour.

WB: Wet Bulb

WC: (Water Column) Common measure of air pressure used in HVAC systems.

Weather Stripping: Specially designed strips, seals and gaskets installed around doors and windows to limit air leakage.

Wet Bulb Temperature: The temperature at which water, by evaporating into air, can bring the air to saturation at the same temperature. Wet-bulb temperature is measured by a wet-bulb psychrometer. Traditionally this was the temperature indicated by a thermometer whose bulb is wrapped in a wet sheath. The wet bulb temperature and the dry bulb temperature (i.e air temperature) would then be used to calculate relative humidity or dewpoint. Alternatively charts or tables can be used.

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.

Whole House Fan: A system capable of cooling a house by exhausting a large volume of warm air when the outside air is cool.

Zonal Control: A method of designing and controlling the HVAC system of a residence so that living areas can be maintained at a different temperature than sleeping areas using independent setback thermostats. If specific requirements are met, zonal control may earn a credit towards compliance with whatever building energy efficiency standards are applicable.

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. Also see Buffer zone. or 1) In the context of an HVAC system: a space or group of spaces served by an HVAC system or portion of an HVAC system controlled by a single thermostat or other control device; 2) A space or group of spaces within a building with sufficiently similar comfort conditioning requirements so that comfort conditions can be maintained throughout by a single control device.

Zone Heat: A central heating system in a building, designed to allow different temperatures to be maintained in two or more parts of the building.

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. This can be accomplished by using either multiple independent systems, or a single system using electronic controls and motorized dampers (see Damper). For example, you might prefer to have the kitchen area of your home be slightly cool, while at the same time keeping the temperature in the bedrooms warmer.