



Southface is building sustainably for life. Delivering practical green building solutions with tangible results.

Terms Glossary

A-B

AC Motor

A motor that converts alternating current electricity into mechanical power by using an electromagnetic induction phenomenon.

Annual Fuel Utilization Efficiency (AFUE)

The Annual Fuel Utilization Efficiency is a performance term for furnaces in the heating season - it represents heating output (kBtu's) divided by fuel input (kBtu's) and is a seasonal term so it accounts for cycling and standby losses. Older atmospheric furnaces may have been 60-70% AFUE, standard furnaces today are 80% AFUE and condensing furnaces are > 90% AFUE.

Air Barrier

The components of an assembly which are solid or sealed materials to prevent air leakage. When installed in conjunction with insulation, this makes up the building thermal envelope.

Air-to-Air Unit

Typical air conditioning and heat pump equipment that extract or reject heat (depending on the season) from the house air and then reject or extract that heat to the outdoor air.

Backdrafting

Occurs when combustion equipment's flue gases do not properly vent outwards; negative pressure at the appliance or clogged and/or improper flue connections can lead to pulling combustion products (such as carbon monoxide) back into the space.

B-D

British Thermal Unit (BTU)

A small quantity of energy in the Imperial units. By definition, a BTU is the amount of energy it takes to raise the temperature of one pound of water 1 degree Fahrenheit (which is about the energy of a wooden kitchen match). If a 16 oz. water bottle at 68F had 2 Btu's added, it would be 70F. For conversion, $3.413 \text{ Btu} = 1 \text{ W-hr}$

Conditioned Space

The portion of a building that is inside the building thermal envelope. This space is typically directly conditioned and finished but may also be indirectly conditioned and not necessarily finished space.

Convective Heat Transfer

Convective heat flow occurs through a fluid which may be a liquid or gas. In a home, air leakage is an example of unwanted convective heat transfer.

DC Motor

A direct current motor transforms electrical energy into mechanical energy by creating a magnetic field that is powered by direct current.

Dehumidification

The removal of water vapor from the air.

Demand-Based Recirculation System

A recirculating hot water system uses a pump to run hot water through a loop of piping so that fixtures get hot water quickly. This can be energy intensive so a demand-based system only operates when a button is pushed or an occupancy sensor is triggered.

Drainage Plane

A liquid water shedding surface with an intentional gap to facilitate drainage. An example is a brick veneer cladding with a 1" gap and felt paper or housewrap as the water shedding surface.

D-E

Duct Leakage

The amount of air measured in cubic feet per minute (CFM) that a duct system loses during operation - includes conditioned air leaking out as well as unconditioned air pulled into the duct system.

Electroluminescence

An optical and electrical phenomenon in which a material emits light in response to the passage of an electric field with a solid.

Energy Factor

The EF of a water heater is a function of two terms, the ability of the unit to efficiently create hot water from a fuel when firing as well as the standby losses when the unit is not firing (heat loss through tank, pilot light, etc.)

Energy Recovery Ventilators

ERV's have two air streams that move in opposite directions (one pulls stale air out of the house, the other pulls fresh air into the house). The airstreams do not mix but a heat exchange media in an ERV transfers both heat and moisture from one stream to the other which tempers the fresh air before it is introduced into the house.

Energy Simulation

An energy model which simulates the flow of heat and energy used by a building during a year's time.

ENERGY STAR

A program of the US Environmental Protection Agency (EPA) that recognizes the most efficient products, appliances and buildings (www.energystar.gov).

F-H

First Hour Rating

When called for by the occupants of a home with a tank water heater, cold water replaces the hot water that is drawn out. The burner or element fires and creates more hot water than the actual volume of the tank during the first hour of operation.

Ground Source Equipment

Sometimes referred to as "geothermal", ground source heat pumps extract and reject heat (depending on the season) to the earth (usually through buried piping filled with water) as opposed to the ambient air.

Ground-Coupled Unit

See ground source equipment.

Heat Pump

A heat pump is identical to an air conditioner in the summer time. Heat from the house air is extracted and rejected to the outdoors (via a compressor-driven refrigerant loop). Unlike an AC, a heat pump features a reversing valve which allows the unit to run the opposite direction in the winter time (extracting heat from the cold outdoors and rejecting it inside to provide space heating).

Heat Pump Water Heater

An electric fired tank water heater that does not rely on current passing through an electrical element to heat water but instead utilizes a heat pump to extract heat from around the unit to then put into the water.

Hot Water Distribution

The pipes and plumbing that deliver hot water from the source appliance to the fixtures that use it.

H-M

“House as a System”

Recognizing the interaction of the parts and features of a home. An example would be how a powered attic ventilator (PAV) fan created a negative pressure in the home during summertime operation, causing the water heater to backdraft and poison the occupants with carbon monoxide.

Heating Season Performance Factor (HSPF)

The Heating Season Performance Factor is a performance term for heat pumps in the winter mode – it represents heating output (kBtu’s) divided by energy input (kWh). Analogous to SEER for cooling mode and higher is better.

HVAC

Heating, Ventilating and Air Conditioning equipment. Often ventilation is not included so the equipment only performs space heating and cooling.

Incandescent

Light emission resulting from heat.

Latent Cooling

The portion of the work done by an air conditioner to remove the moisture of the air (dehumidification).

Low-E Windows

Low-emissivity coated windows contain a very thin metallic coating that allows visible light to pass through but reduces heat transfer via UV or infrared radiation.

Manual J Calculation

A methodology for determining the amount of cooling or heating needed by a house under design conditions (almost hottest day, almost coldest night).

M-S

Manual S Calculation

A methodology for selecting proper air conditioning and heating equipment based upon the calculated loads and equipment specifications.

Positive Pressure Ventilation

Opposite of an exhaust fan which creates negative pressure. Positive pressure ventilation introduces outdoor air into a space from a known location (and the same amount of conditioned air will leak out of the space). Positive pressure is desirable in humid climates.

Radiant Barrier

Typically foil-faced, a radiant barrier is a low-emitting surface that is often applied to the rafters or underside of roof decking in a vented attic. The surface must not be in contact with other materials or else conduction would occur.

Return Air Pathway

The route by which air that is supplied to a space via the supply ducts makes its way back to the air handling unit (AHU) blower in order to recirculate house air.

R-Value

The resistance to conduction heat flow. The R-value is the inverse of U-factor and the higher the R-value, the more efficient the insulation coverage is.

Seasonal Energy Efficiency Ratio (SEER)

The Seasonal Energy Efficiency Ratio is a performance term for air conditioners - it represents cooling output (kBtu's) divided by energy input (kWh). Higher is better!

Sensible Cooling

The portion of the work done by an air conditioner to change the temperature of the air (sensible heat removal).

S-U

Solar Heat Gain Coefficient

See solar gain

Solar Gain

The radiant solar energy that is gained through a component such as a window. Solar Heat Gain Coefficient (SHGC) is a cooling season performance value for a window and lower is better. A single pane clear glass window might have an SHGC = 0.8, a double pane clear glass window SHGC = 0.5 and a double pane low-e window might be 0.27.

Thermal Envelope

The building thermal envelope is the boundary that separates conditioned space from unconditioned spaces - it consists of the air barrier in conjunction with the insulation. To work properly, the insulation and air barrier must be continuous and in contact with each other.

U-Factor

The "Conductance" or ability of a window to allow heat to conduct across the assembly. U-factor is a heating season performance value for a window and is highly affected by both the glass and the frame; lower is better. A single pane clear glass metal-frame window might have a U-factor of 1.3 while that same window with a wood frame might be $U = 1.0$, a double pane clear glass wood-frame window has a U-factor around 0.5 and a double pane low-e wood-frame window would have U-factor around 0.33. Extruded fiberglass and vinyl frames perform comparably to wood.

Unconditioned Space

The portion of a building that is outside the building thermal envelope. This space is not intentionally conditioned.

U-W

Uniform Energy Factor

The Department of Energy (DOE)'s newer term that classifies water heater efficiency based on usage. UEF ratings are determined by assigning water heaters into one of four different categories (bins) of hot water usage and then evaluating their performance based on that usage. A water heater is assigned a UEF within its bin based upon its first hour rating. A higher UEF means a water heater is more energy efficient and will cost less to operate compared to other water heaters in the same bin. A water heater's UEF can only be compared with water heaters within the same bin.

Variable Speed and Capacity AC

Heating and cooling equipment that can automatically adjust its speed and output based on the actual heating and cooling loads on the house at that particular hour.

WaterSense

Similar to ENERGY STAR, a label for more water efficient fixtures in various categories of usage.

Weatherization

The process of making energy efficient improvements to a home - typically consists of air sealing and insulating the home and sealing and improving the ductwork.