

# KEY TERMS\*

GREENCHOICE Applied Building Science  
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\*KEY TERMS come from the referenced Guidelines and Standards (Energy Star, EPA Indoor airPLUS and EPA Water Sense) in the Checklist, as well as industry driven research programs such as Building America.

## **AFUE Annual Fuel Utilization Efficiency (AFUE)**

Measures the amount of fuel converted to space heat in proportion to the amount of fuel entering the furnace. This is commonly expressed as a percentage. A furnace with an AFUE of 90 could be said to be 90% efficient. AFUE includes any input energy required by the pilot light but does not include any electrical energy for fans or pumps.

## **Air Barrier**

Any material that restricts air flow. In wall assemblies, the exterior air barrier is often a combination of sheathing and either building paper, house wrap or board insulation. The interior air barrier is typically gypsum board.

## **Batt Insulation**

Insulation that is typically manufactured out of fiberglass into 'blankets' sized for typical framing bays and manually fitted into place. They require extra diligence to ensure no gaps, voids, compression or misalignment where framing bays are not typical framing dimensions or include wiring and piping.

## **Blower Door Test**

Diagnostic tool designed to measure the airtightness of buildings and to help locate air leakage sites. The airtightness of a building is useful knowledge when trying to increase energy conservation or decrease indoor air pollution, or control building pressures.

## **Blown-in Insulation**

Insulation typically made from fiberglass or cellulose that is blown into construction assemblies dry or wet that inherently fills the entire framed assembly without any gaps, voids, compression or misalignment. Typically found in attics.

## **Building Envelope**

The outer shell, or the elements of a building, such as walls, floors, and ceilings, that enclose conditioned space.

## **Compression**

Insulation installation condition where the full thickness is reduced, resulting in increased density and reduced air pockets that drive thermal resistance. This undermines the effective R-value of the insulation.

## **Construction Documents**

The drawings (plans) and written specifications that describe construction requirements for a building.

## **Convective Air Flow**

As used with thermal bypass, this refers to air-flow that occurs in gaps between insulation and the air barrier due to temperature differences in and across the gap resulting in a stack effect or driving forces from more to less heat.

**Direct Vent**

A sealed ventilation system for combustion appliances that draws combustion air from outside the structure and vents combustion exhaust outside the structure. These systems may be combined with power vent exhausts. See *Power Vent and Sealed Combustion*.

**Duct Blaster Test**

Diagnostic tool designed to measure the airtightness of ductwork and to help locate air leakage sites. Duct leakage can increase heating and cooling costs over 30% and contribute to comfort, health and safety problems.

**EF (Energy Factor)**

A standardized measurement of the annual energy efficiency of water heating systems. It is the annual hot water energy delivered to a standard hot water load divided by the total annual purchased hot water energy input in consistent units. The resultant EF value is a percentage. EF is determined by a standardized U.S. Department of Energy (DOE) procedure.

**Energy (use)**

The quantity of onsite electricity, gas or other fuel required by the building equipment to satisfy the building heating, cooling, hot water, or other loads or any other service requirements (lighting, refrigeration, cooking, etc.)

**Energy Audit**

A site inventory and descriptive record of features impacting the energy use in a building. This includes, but is not limited to: all building component descriptions (locations, areas, orientations, construction attributes and energy transfer characteristics); all energy using equipment and appliance descriptions (use, make, model, capacity, efficiency and fuel type) and all energy features.

**ENERGY STAR<sup>®</sup> Home**

A home, certified by the U.S. Environmental Protection Agency (EPA), that is at least 30% more energy efficient than the minimum national standard for home energy efficiency as specified by the 1992 MEC, or as defined for specific states or regions. ENERGY STAR is a registered trademark of the EPA.

**EPA Indoor airPLUS Specifications**

Construction specifications which include the careful selection of and installation of moisture control systems; heating, ventilating, and air-conditioning systems; combustion-venting systems; radon resistant construction; and low-emitting building materials.

**EPA Water Sense Specifications**

WaterSense, a partnership program sponsored by EPA, seeks to protect the future of our nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices. WaterSense will help consumers identify water-efficient products and programs.

**Fully Aligned**

Condition where air barriers and thermal barrier (insulation) are contiguous (touching) and continuous across the entire building envelope.

**HERS (Home Energy Rating System)**

A standardized system for rating the energy-efficiency of residential buildings.

**HERS Score**

A value, typically between 0 and 100, indicating the relative energy efficiency of a given home as compared with the HERS Energy-Efficient Reference Home as specified by the HERS Council Guidelines. The lesser the score, the more efficient the home. A home with zero energy use for the rated energy uses (heating, cooling and hot water only) scores 0 and the HERS Reference Home scores 100. A home must beat the baseline score of 100 by 15% (minimum rating of 85) to qualify for the Energy Star rating.

**Housewrap**

Any of several spun-fiber polyolefin rolled sheet goods for wrapping the exterior of the building envelope.

**HSPF (Heating Season Performance Factor)**

A measurement of the seasonal efficiency of an electric heat pump using a standard heating load and outdoor climate profile over a standard heating season. It represents the total seasonal heating output in Btu divided by the total seasonal electric power input in watt-hours (Wh). Thus, the resultant value for HSPF has units of Btu/Wh.

**Infrared Thermal Imaging**

Heat sensing camera which helps reveal thermal bypass conditions by exposing hot and cold surface temperatures revealing unintended thermal flow, air flow, and moisture flow. Darker colors indicate cool temperatures, while lighter colors indicate warmer temperatures.

**Insulation Contact, Air-Tight (ICAT) Lighting Fixture**

Rating for recessed lights that can have direct contact with insulation and constructed with air-tight assemblies to reduce thermal losses.

**Jump Duct**

A flexible, short, U-shaped duct (typically 10-inch diameter) that connects a room to a common space as a pressure balancing mechanism. Jump ducts serve the same function as transfer grilles.

**Load**

The quantity of heat that must be added to or removed from the building (or the hot water tank) to satisfy specific levels of service, such as maintaining space temperature or hot water temperature at a specified thermostat setting (see also the definitions of energy and thermostat).

**Low-E**

Refers to a coating for high-performance windows, the "E" stands for emissivity or re-radiated heat flow. The thin metallic oxide coating increases the U-value of the window by reducing heat flow from a warm(er) air space to a cold(er) glazing surface. Low-E coatings allow short-wavelength solar radiation through windows, but reflect back longer wavelengths of heat.

**Manual D**

The methods and procedures that should be used to design residential duct systems. Residential duct systems have a direct and significant effect on equipment size, equipment efficiency, equipment malfunctions, envelope infiltration, operating cost, utility demand loads, vent performance, exhaust system performance, indoor air quality, ambient noise, occupant comfort and owner satisfaction. Therefore, the duct system must be carefully designed and properly installed or the potential benefits that are associated with building an efficient structure and using high efficiency equipment will not materialize.

**Manual J**

Method for calculating heat loss from the building through walls and ceilings, leaky ductwork, and infiltration through windows, doors, and other penetrations as well as heat gain into the building from sunlight, people, lights and appliances, doors, walls, and windows, and infiltration through wall penetrations. Design conditions for the area are also used as inputs into load calculations.

**Manual S**

Procedure to select and size heating and cooling equipment to meet Manual J loads based on local climate and ambient conditions at the building site. Manual S covers sizing strategies for all types of cooling and heating equipment, as well as how to use comprehensive manufacturer's performance data on sensible, latent, or heating capacity for various operating conditions.

**Mechanical Ventilation**

The active process of supplying or removing air to or from an indoor space by powered equipment such as motor-driven fans and blowers, but not by devices such as wind-driven turbine ventilators and mechanically operated windows.

**Microirrigation System**

Method where water is applied at or below the soil surface at low pressure and low volume.

**Misalignment**

Condition where air barrier and thermal barrier (Insulation) are not contiguous (touching) and not continuous across the entire building envelope.

**Performance Test**

An on-site measurement of the energy performance of a building energy feature or an energy using device conducted in accordance with pre-defined testing and measurement protocols and analysis and computation methods. Such protocols and methods may be defined by national consensus standards like those of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and the American Society for Test and Measurement (ASTM).

**Perm**

A unit of measure of water vapor permeance. One perm equals one grain of water vapor per hour flowing through one square foot of material at a differential vapor pressure equal to one inch of mercury. The greater the number, the more water vapor that will pass through a given material.

**Power Vent**

A sealed exhaust ventilation system for combustion appliances that uses a fan to move combustion exhaust out of the structure. See *Direct Vent and Sealed Combustion*.

**Pressure Boundary**

The point in a building at which inside air and outside air are separated. If a building were a balloon, the rubber skin would form the pressure boundary. Where inside and outside air freely mingle there is no pressure boundary.

**Pressurization Test**

A procedure in which a fan is used to place a house, duct system, or other container, under positive or negative air pressure in order to calculate air leakage.

**RESNET (Residential Energy Services Network)**

The national association of energy rating providers.

**Rated Flow Rate**

The flow rate of the showerhead when tested in accordance with ASME A112.18.1/CSA B125.1.

**Rated Home**

A specific residence that is evaluated by an energy rating.

**Rigid Insulation**

Insulation typically made from polystyrene or polyurethane manufactured into 4' x 8' boards of various thicknesses. As an exterior sheathing material, rigid board insulation provides a complete thermal break assembly and can effectively shift the dew point outside of the exterior wall construction assembly.

**R-value**

A measure of the thermal resistance of a material. Higher R-values indicate better resistance to heat flow through material. The effective R-value of an insulation material will be reduced by gaps, voids, compression or misalignment.

**Sealed Combustion**

Sealed combustion means that a combustion appliance, such as a furnace, water heater, or fireplace, acquires all air for combustion through a dedicated sealed passage from the outside; combustion occurs in a sealed combustion chamber, and all combustion products are vented to the outside through a separate dedicated sealed vent. See *Direct Vent and Power Vent*.

**SEER (Seasonal Energy Efficiency Ratio)**

A measurement similar to HSPF except that it measures the seasonal cooling efficiency of an electric air conditioner or heat pump using a standard cooling load and outdoor climate profile over a standard cooling season. It represents the total seasonal cooling output in Btu divided by the total seasonal electric input in watt-hours (Wh). The SEER value are units of Btu/Wh.

**Semi-Permeable**

The term vapor semi-permeable describes a material with a water vapor permeance between 1 and 10 perms. Water vapor can pass through a semi-permeable material but at a slow rate.

**Solar Heat Gain Coefficient (SHGC)**

SHGC measures how well a window blocks heat caused by sunlight. The lower the SHGC rating the less solar heat the window transmits. This rating is expressed as a fraction between 0 and 1. The number is the ratio of a window's solar heat admittance compared to the total solar heat available on the exterior window surface at normal solar incidence (i.e., perpendicular to the glazing surface).

**Spray Foam Insulation**

Insulation available in both open- and closed-cell configurations that is typically made from polyurethane. It is sprayed into construction assemblies as a liquid that expands to fill the surrounding cavity. Once dry, spray foam functions as both an air barrier and thermal barrier and effectively fill holes and cracks for both a well-insulated and air-tight wall assembly. Closed-cell spray foams are more dense and also function as a vapor barrier.

**Supply Ducts**

The ducts in a forced air heating or cooling system that supply heated or cooled air from the air conditioner to conditioned spaces.

**Thermal Barrier**

Term used to describe when flow of heat is restricted or slowed. This is accomplished through insulation.

**Thermal Bridging**

Accelerated thermal flow that occurs when materials that are poor insulators displace insulation (such as framing material).

**Thermal Bypass Checklist**

Comprehensive list of building details for ENERGY STAR Qualified Homes addressing construction details where air barriers and insulation are commonly missing.

**Thermal Bypass**

The movement of heat around or through insulation. This typically occurs when gaps exist between the air barrier and insulation or where air barriers are missing.

**Thermal Boundary**

The border between conditioned and unconditioned space where insulation should be placed.

**Thermostat**

A control device that measures the temperature of the air in a home or the water in a hot water tank and activates heating or cooling equipment to cause the air or water temperature to remain at a pre-specified value, normally called the set point temperature.

**Ton(s) of Refrigeration**

Units used to characterize the cooling capacity of air conditioning equipment. One ton equals 12,000 Btu/h.

**U-Value**

Measures the rate at which heat flows or conducts through a building assembly (wall, floor, ceiling, etc.). The smaller the u-value the more energy efficient an assembly and the slower the heat transfer. Window performance labels include U-values (calling them U-factors) to help in comparing across window products.

**Vapor Diffusion**

Vapor diffusion describes the molecular process in which vapor moves moisture from areas of higher vapor pressure to areas of lower vapor pressure, and from areas of greater temperature to areas of lesser temperature.

**Vapor Diffusion Retarder**

The function of a vapor diffusion retarder is to control the entry of water vapor into building assemblies through the mechanism of vapor diffusion. The effectiveness of a vapor diffusion retarder is based on its perm rating. See *Perm* and *Vapor Diffusion*.

**Ventilation**

The controlled movement of air into and out of a house.

**WaterSense Labeled Bathroom Sink Faucet**

These faucets have a flow rate that does not exceed 1.5 gallons per minute (gpm) (5.7 lpm) at a pressure of 60 psi (414 kPa) at the inlet when water is flowing, and is not less than 0.8 gpm (3.0 lpm) at a pressure of 20 psi (1.38 kPa) at the inlet when water is flowing. The WaterSense high-efficiency bathroom sink faucet specification can be found at [http://www.epa.gov/watersense/specs/faucet\\_final.htm](http://www.epa.gov/watersense/specs/faucet_final.htm) and a list of labeled faucets and faucet accessories can be found at [http://www.epa.gov/watersense/pp/lists/find\\_faucet.htm](http://www.epa.gov/watersense/pp/lists/find_faucet.htm).

**WaterSense Labeled Tank-Type High-Efficiency Toilet**

These toilets have a flush volume that does not exceed 1.28 gallons (4.8 liters), have a solid waste removal of 350 grams or greater, and conform to the adjustability and other supplementary requirements included in the WaterSense high-efficiency tank-type toilet specification. This specification can be found at <http://www.epa.gov/watersense/specs/het.htm> and a list of labeled toilet models can be found at [http://www.epa.gov/watersense/pp/find\\_het.htm](http://www.epa.gov/watersense/pp/find_het.htm).