



# 200 DEFINITIONS

## Terms

The following definitions of terms used in this manual are repeated from the 90.1 Code for convenience. The index at the back of the manual provides a reference to pages where many of the terms are discussed. Definitions, resources, terms, and calculation methods are presented in the context where they are used in this manual or in some cases in the Reference section at the end of each technical chapter. Words in italics are defined in this chapter.

**Accessible** (as applied to equipment): admitting close approach; not guarded by locked doors, elevations, or other effective means. (See also *readily accessible*.)

**Annual fuel utilization efficiency (AFUE):** the ratio of annual output energy to annual input energy that includes any non-heating-season pilot input loss.

**Area of the space (A):** the horizontal lighted area of a given space measured from the inside of the perimeter *walls* or partitions, at the height of the working surface.

**Automatic:** self-acting, operating by its own mechanism when actuated by some impersonal influence, such as a change in current strength, pressure, temperature, or mechanical configuration. (See also *manual*.)

**Automatic flue damper device:** an electrically operated device, in the flue outlet or in the inlet of or upstream of the draft hood of an individual *automatically* operated gas-fired appliance, which is designed to *automatically* open the flue outlet during appliance operation and to *automatically* close off the flue outlet when the appliance is in a standby condition.

**Automatic vent damper device:** a device intended for installation in the venting *system*, in the outlet of or downstream of the appliance draft hood, of an individual *automatically* operated gas-fired appliance, which is designed to *automatically* open the venting *system* when the appliance is in operation and to *automatically* close off the venting *system* when the appliance is in a standby or shutdown condition.

- (a) **Electrically operated:** an *automatic vent damper device* that employs electrical energy to control the device.
- (b) **Thermally actuated:** an *automatic vent damper device* dependent for operation exclusively upon the direct conversion of the thermal energy of the vent gases into mechanical energy.

**Boiler capacity:** the rated heat output of the boiler in Btu/h, at the design inlet and outlet conditions and rated fuel or energy input.



**Building envelope:** the elements of a building that enclose *conditioned spaces* through which thermal energy may be transferred to or from the exterior or to or from *unconditioned spaces*.

**Check metering:** measurement instrumentation for the supplementary monitoring of energy consumption (electric, gas, oil, etc.) to isolate the various categories of energy use to permit conservation and control, in addition to the revenue metering furnished by the utility.

**Coefficient of performance (COP)–Cooling:** the ratio of the rate of heat removal to the rate of energy input, in consistent units, for a complete cooling *system* or factory-assembled equipment, as tested under a nationally recognized standard or designated operating conditions.

**Coefficient of performance (COP), heat pump–Heating:** the ratio of the rate of heat delivered to the rate of energy input, in consistent units, for a complete heat pump *system* under designated operating conditions.

**Commercial building:** includes but is not limited to occupancies for assembly, business, education, institutions, merchants, and storage.

**Conditioned floor area:** the area of the *conditioned space* measured at floor level from the interior surfaces of the *walls*.

**Conditioned space:** a *cooled space*, *heated space*, or *indirectly conditioned space*.

**Cooled space:** an enclosed space within a building that is cooled by a cooling *system* whose sensible capacity

- (a) exceeds 5 Btu/(h ft<sup>2</sup>) or
- (b) is capable of maintaining a space dry-bulb temperature of 90°F or less at design cooling conditions.

**Daylight sensing control (DS):** a device that *automatically* regulates the power input to electric lighting near the *fenestration* to maintain the desired workplace illumination, thus taking advantage of direct or indirect sunlight.

**Daylighted space:** the space bounded by vertical planes rising from the boundaries of the daylighted area on the floor to the floor or *roof* above.

**Daylighted zone:**

- (a) **Under skylights:** the area under each *skylight* whose horizontal dimension in each direction is equal to the *skylight* dimension in that direction plus either the floor-to-ceiling height or the dimension to an opaque partition, or one-half the distance to an adjacent *skylight* or vertical glazing, whichever is least.
- (b) **At vertical glazing:** the area adjacent to vertical glazing that receives daylighting from the glazing. For purposes of this definition and unless more detailed daylighting analysis is provided, the daylighting *zone* depth is assumed to extend into the space a distance of 15 ft or to the nearest opaque partition, whichever is less. The daylighting *zone* width is assumed to be the width of the window plus either 2 ft on each side, the distance to an opaque partition, or one-half the distance to an adjacent *skylight* or vertical glazing, whichever is least.

**Dead band (dead zone):** the range of values within which an input variable can be varied without initiating any noticeable change in the output variable.



**Degree-day, cooling:** a unit, based upon temperature difference and time, used in estimating cooling energy consumption. For any one day, when the mean temperature is more than a reference temperature, typically 65°F, there are as many degree-days as degrees Fahrenheit temperature difference between the mean temperature for the day and the reference temperature. Annual cooling degree-days (CDD) are the sum of the degree-days over a calendar year.

**Degree-day, heating:** a unit, based upon temperature difference and time, used in estimating heating energy consumption. For any one day, when the mean temperature is less than a reference temperature, typically 65°F, there are as many degree-days as degrees Fahrenheit temperature difference between the mean temperature for the day and the reference temperature. Annual heating degree-days (HDD) are the sum of the degree-days over a calendar year.

**Dwelling unit:** a single housekeeping unit composed of one or more rooms providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

**Economizer, air:** a ducting arrangement and *automatic control system* that allow a cooling supply fan *system* to supply *outdoor (outside) air* to reduce or eliminate the need for mechanical refrigeration during mild or cold weather.

**Economizer, water:** a *system* by which the supply air of a cooling *system* is cooled directly or indirectly or both by evaporation of water or by other appropriate fluid (in order to reduce or eliminate the need for mechanical refrigeration).

**Efficiency, HVAC system:** the ratio of the useful energy output (at the point of use) to the energy input, in consistent units, for a designated time period, expressed in percent.

**Emergency system (backup system):** a *system* that exists for the purpose of operating in the event of failure of a primary *system*.

**Emergency use:** electrical and lighting *systems* required to supply power *automatically* for illumination and equipment in the event of a failure of the normal power supply.

**Energy efficiency ratio (EER):** the ratio of net equipment cooling capacity in Btu/h to total rate of electric input in watts under designated operating conditions. When consistent units are used, this ratio becomes equal to COP. (See also *coefficient of performance*.)

**Fan system energy demand:** the sum of the demand of all fans that are required to operate at design conditions to supply air from the heating or cooling source to the *conditioned space(s)* and return it back to the source or exhaust it to the outdoors.

**Fenestration:** any light-transmitting section in a building *wall* or *roof*. The *fenestration* includes glazing material (which may be glass or plastic), framing (mullions, muntins, and dividers), external shading devices, internal shading devices, and integral (between glass) shading devices.

**Fenestration area:** the total area of *fenestration* measured using the rough opening and including the glass or plastic, sash, and frame.

**Flue damper:** a device, in the flue outlet or in the inlet of or upstream of the draft hood of an individual *automatically* operated gas-fired appliance, which is designed



to *automatically* open the flue outlet during appliance operation and to *automatically* close off the flue outlet when the appliance is in a standby condition.

**Gross floor area:** the sum of the floor areas of the *conditioned spaces* within the building, including basements, mezzanine and intermediate-floor tiers, and penthouses of headroom height 7.5 ft or greater. It is measured from the exterior faces of exterior *walls* or from the centerline of *walls* separating buildings (excluding covered walkways, open *roofed-over* areas, porches and similar spaces, pipe trenches, exterior terraces or steps, chimneys, *roof overhangs*, and similar features).

**Gross lighted area (GLA):** the sum of the total lighted areas of a building measured from the inside of the perimeter *walls* for each floor of the building.

**Heat capacity (HC):** the amount of heat necessary to raise the temperature of a given mass 1°F. Numerically, the mass expressed per unit of *wall* surface multiplied by the specific heat, Btu/(ft<sup>2</sup> °F).

**Heat trap:** device or piping arrangement that effectively restricts the natural tendency of hot water to rise in vertical pipes during standby periods. Examples are the U-shaped arrangement of elbows or a 360-degree loop of tubing.

**Heated space:** an enclosed space within a building that is heated by a heating *system* whose output capacity

- (a) exceeds 10 Btu/(h ft<sup>2</sup>) or
- (b) is capable of maintaining a space dry-bulb temperature of 50°F or more at design heating conditions.

**Heating seasonal performance factor (HSPF):** the total heating output of a heat pump during its normal annual usage period for heating, in Btu, divided by the total electric energy input during the same period, in watt-hours.

**High-rise residential building:** hotels, motels, apartments, condominiums, dormitories, and other residential-type facilities that provide complete housekeeping or transient living quarters and are over three stories in height above grade.

**Humidistat:** an *automatic* control device responsive to changes in humidity.

**HVAC system:** the equipment, distribution network, and terminals that provide either collectively or individually the processes of heating, ventilating, or air conditioning to a building.

**Indirectly conditioned space:** an enclosed space within the building that is not a heated or *cooled space*, whose area-weighted heat transfer coefficient to heated or *cooled spaces* exceeds that to the outdoors or to *unconditioned spaces*; or through which air from heated or *cooled spaces* is transferred at a rate exceeding three air changes per hour. (See also *heated space*, *cooled space*, and *unconditioned space*.)

**Infiltration:** the uncontrolled inward air leakage through cracks and crevices in any building element and around windows and doors of a building.

**Integrated part-load value (IPLV):** a single-number figure of merit based on part-load EER or COP expressing part-load efficiency for air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities for the equipment.



**Lumen maintenance control:** a device that senses the illumination level and causes an increase or decrease of illuminance to maintain a preset illumination level.

**Manual (nonautomatic):** action requiring personal intervention for its control. As applied to an electric controller, *nonautomatic* control does not necessarily imply a *manual* controller but only that personal intervention is necessary. (See *automatic*.)

**Marked rating:** the design load operating conditions of a device as shown by the manufacturer on the nameplate or otherwise marked on the device.

**Occupancy sensor:** a device that detects the presence or absence of people within an area and causes any combination of lighting, equipment, or appliances to be adjusted accordingly.

**Opaque areas:** all exposed areas of a *building envelope* that enclose *conditioned space* except *fenestration areas* and building service openings such as vents and grilles.

**Orientation:** the directional placement of a building on a building site with reference to the building's longest horizontal axis or, if there is no longest horizontal axis, then with reference to the designated main entrance.

**Outdoor (outside) air:** air taken from the exterior of the building that has not been previously circulated through the building. (See *ventilation air*.)

**Ozone depletion factor:** a relative measure of the potency of chemicals in depleting stratospheric ozone. The *ozone depletion factor* potential depends upon the chlorine and the bromine content and atmospheric lifetime of the chemical. The depletion factor potential is normalized such that the factor for CFC-11 is set equal to unity and the factors for the other chemicals indicate their potential relative to CFC-11.

**Packaged terminal air conditioner (PTAC):** a factory-selected *wall* sleeve and separate unencased combination of heating and cooling components, assemblies, or sections (intended for mounting through the *wall* to serve a single room or *zone*). It includes heating capability by hot water, steam, or electricity.

**Packaged terminal heat pump:** a PTAC capable of using the refrigeration *system* in a reverse cycle or heat pump mode to provide heat.

**Plenum:** an enclosure that is part of the air-handling *system* and is distinguished by having a very low air velocity. A *plenum* often is formed in part or in total by portions of the building.

**Private driveways, walkways, and parking lots:** exterior transit areas that are associated with a commercial or residential building and intended for use solely by the employees or tenants and not by the general public.

**Process energy:** energy consumed in support of a manufacturing, industrial, or commercial process other than the maintenance of comfort and amenities for the occupants of a building.

**Process load:** the calculated or measured time-integrated load on a building resulting from the consumption or release of *process energy*.

**Programmable:** capable of being preset to certain conditions and having self-initiation to change in response to those conditions.



**Projection factor (PF):** the exterior horizontal shading projection depth divided by the sum of the height of the *fenestration* and the distance from the top of the *fenestration* to the bottom of the external shading projection in units consistent with the projection depth.

**Prototype building:** a generic building design of the same size and occupancy type as the proposed design that complies with the prescriptive requirements of RS-1 and has prescribed assumptions used to generate the energy budget concerning shape, *orientation*, and HVAC and other *system* designs.

**Public driveways, walkways, and parking lots:** exterior transit areas that are intended for use by the general public.

**Public facility restroom:** a restroom used by the transient public.

**Readily accessible:** capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. (See also *accessible*.)

**Recooling:** lowering the temperature of air that has been previously heated by a heating *system*.

**Reference building:** a specific building design that has the same form, *orientation*, and basic *systems* as the prospective design that is to be evaluated for compliance and meets all the criteria of the prescriptive compliance method of RS-1.

**Reheating:** raising the temperature of air that has been previously cooled either by refrigeration or an economizer *system*.

**Reset:** adjustment of the controller setpoint to a higher or lower value *automatically* or *manually*.

**Roof:** those portions of the *building envelope*, including all opaque surfaces, *fenestration*, doors, and hatches, that are above *conditioned space* and are horizontal or tilted at less than 60 degrees from horizontal. (See also *walls*.)

**Room air conditioner:** an encased assembly designed as a unit to be mounted in a window or through a *wall* or as a console. It is designed primarily to provide free delivery of conditioned air to an enclosed space, room, or *zone*. It includes a prime source of refrigeration for cooling and dehumidification and means for circulating and cleaning air and may also include means for ventilating and heating.

**Seasonal energy efficiency ratio (SEER):** the total cooling output of an air conditioner during its normal annual usage period for cooling, in Btu, divided by the total electric energy input during the same period, in watt-hours.

**Service systems:** all energy-using or energy-distributing components in a building that are operated to support the occupant or process functions housed therein (including HVAC, *service water heating*, illumination, transportation, cooking or food preparation, laundering, or similar functions).

**Service water heating (SWH):** the supply of hot water for purposes other than comfort heating and process requirements.

**Shading coefficient (SC):** the ratio of solar heat gain through *fenestration*, with or without integral shading devices, to that occurring through unshaded 1/8-in.-thick clear double-strength glass.



**Shell building:** a building for which the envelope is designed, constructed, or both prior to knowing the occupancy type. (See also *speculative building*.)

**Single-line diagram:** a simplified schematic drawing that shows the connection between two or more items. Common multiple connections are shown as one line.

**Skylight:** glazing that is horizontal or tilted less than 60 degrees from horizontal.

**Solar energy source:** natural daylighting or thermal, chemical, or electrical energy derived from direct conversion of incident solar radiation at the building site.

**Speculative building:** a building for which the envelope is designed, constructed, or both prior to the design of the lighting, HVAC systems, or both. A *speculative building* differs from a *shell building* in that the intended occupancy is known for the *speculative building*. (See also *shell building*.)

**System:** a combination of equipment and/or controls, accessories, interconnecting means, and *terminal elements* by which energy is transformed so as to perform a specific function, such as HVAC, *service water heating*, or illumination.

**Tandem wiring:** pairs of luminaires operating with lamps in each luminaire powered from a single ballast contained in one of the luminaires.

**Task lighting:** lighting that provides illumination for specific functions and is directed to a specific surface or area.

**Task location:** an *area of the space* where significant visual functions are performed and where lighting is required above and beyond that required for general ambient use.

**Terminal element:** a device by which the transformed energy from a *system* is finally delivered: registers, diffusers, lighting fixtures, faucets, etc.

**Thermal conductance (C):** the constant time rate of heat flow through the unit area of a body induced by a unit temperature difference between the surfaces, Btu/(h ft<sup>2</sup> °F). It is the reciprocal of *thermal resistance*. (See *thermal resistance*.)

**Thermal mass:** materials with mass *heat capacity* and surface area capable of affecting building loads by storing and releasing heat as the interior and/or exterior temperature and radiant conditions fluctuate. (See also *heat capacity* and *wall heat capacity*.)



**Thermal mass wall insulation position:**

- (a) **Exterior insulation position:** a *wall* having all or nearly all of its mass exposed to the room air with the insulation on the exterior of that mass.
- (b) **Integral insulation position:** a *wall* having mass exposed to both room and *outdoor (outside) air* with substantially equal amounts of mass on the inside and outside of the insulation layer.
- (c) **Interior insulation position:** a *wall* not meeting either of the above definitions, particularly a *wall* having most of its mass external to an insulation layer.

**Thermal resistance (R):** the reciprocal of *thermal conductance*;  $1/C$  as well as  $1/h$ ,  $1/U$ ;  $(\text{h ft}^2 \text{ }^\circ\text{F})/\text{Btu}$ .

**Thermal transmittance (U):** the overall coefficient of heat transfer from air to air. It is the time rate of heat flow per unit area under steady conditions from the fluid on the warm side of the barrier to the fluid on the cold side, per unit temperature difference between the two fluids,  $\text{Btu}/(\text{h ft}^2 \text{ }^\circ\text{F})$ .

**Thermal transmittance, overall ( $U_0$ ):** the gross overall (area-weighted average) coefficient of heat transfer from air to air for a gross area of the *building envelope*,  $\text{Btu}/(\text{h ft}^2 \text{ }^\circ\text{F})$ . The  $U_0$  value applies to the combined effect of the time rate of heat flows through various parallel paths, such as windows, doors, and opaque construction areas, composing the gross area of one or more *building envelope* components, such as *walls*, floors, and *roof* or ceiling.

**Thermostat:** an *automatic* control device responsive to temperature.

**Unconditioned space:** space within a building that is not a *conditioned space*. (See *conditioned space*.)

**Unitary cooling equipment:** one or more factory-made assemblies that normally include an evaporator or cooling coil, a compressor, and a condenser combination (and may also include a heating function).

**Unitary heat pump:** one or more factory-made assemblies that normally include an indoor conditioning coil, compressor(s), and outdoor coil or refrigerant-to-water heat exchanger, including means to provide both heating and cooling functions.

**Variable-air-volume (VAV) HVAC system:** *HVAC systems* that control the dry-bulb temperature within a space by varying the volume of heated or cooled supply air to the space.

**Vent damper:** a device intended for installation in the venting *system*, in the outlet of or downstream of the appliance draft hood, of an individual *automatically* operated gas-fired appliance, which is designed to *automatically* open the venting *system* when the appliance is in operation and to *automatically* close off the venting *system* when the appliance is in a standby or shutdown condition.

**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.

**Ventilation air:** that portion of supply air that comes from the outside (outdoors), plus any recirculated air, to maintain the desired quality of air within a designated space. (See also *outdoor air*.)





**Visible light transmittance (VLT):** the fraction of solar radiation in the visible spectrum that passes through the *fenestration* (window, clerestory, or *skylight*).

**Walls:** those portions of the *building envelope* enclosing *conditioned space*, including all opaque surfaces, *fenestration*, and doors, which are vertical or tilted at an angle of 60° from the horizontal or greater. (See also *roof*.)

**Wall heat capacity:** the sum of the products of the mass of each individual material in the *wall* per unit area of *wall* surface times its individual specific heat, Btu/(ft<sup>2</sup> °F). (See *thermal mass*.)

**Window-wall ratio (WWR):** the ratio of the *wall fenestration area* to the gross exterior *wall* area.

**Zone:** a space or group of spaces within a building with any combination of heating, cooling, or lighting requirements sufficiently similar so that desired conditions can be maintained throughout by a single controlling device.



## Acronyms and Abbreviations

The following is a list of acronyms used in this manual. Additional Lighting acronyms used in Chapter 401 are provided in Table 401A.

**AABC:** Associated Air Balance Council

**ACP:** alternative component performance

**AF:** area factor

**AFUE:** annual fuel use efficiency

**AHAM:** Association of Home Appliance Manufacturers

**ANSI:** American National Standards Institute

**ASHRAE:** American Society of Heating, Refrigeration, and Air-conditioning Engineers

**ARI:** Air Conditioning and Refrigeration Institute

**ASTM:** American Society for Testing and Materials

**BTU:** British thermal unit

**CABO:** Council of American Building Officials

**CDD:** cooling degree days

**CFC:** chlorofluorocarbon

**CFM:** cubic feet per minute

**CFR:** Code of Federal Regulations

**CHWP:** chilled water pump

**CHWR:** chilled water return

**CHWS:** chilled water supply

**CMU:** concrete masonry units

**CTI:** Cooling Tower Institute

**CO:** carbon monoxide

**CO<sub>2</sub>:** carbon dioxide

**COP:** coefficient of performance

**CWP:** condenser water pump

**CWR:** condenser water return

**CWS:** condenser water supply

**DECOS:** design energy cost

**DLCF:** daylight control credit factor

**DOE:** United States Department of Energy



**DS:** daylight sensing control  
**DX:** direct expansion  
**ECB:** energy cost budget  
**EER:** energy efficiency ratio  
**EPA92:** Energy Policy Act of 1992  
**EQUIP:** equipment power density  
**FC:** footcandles  
**FPM:** feet per minute  
**FT<sup>2</sup>:** square feet  
**GLA:** gross lighted area  
**HC:** heat capacity  
**HDD:** heating degree days  
**HID:** high-intensity discharge  
**HP:** horsepower  
**HSPF:** heating seasonal performance factor  
**HVAC:** heating, ventilation, and air conditioning  
**IESNA:** Illuminating Engineering Society of North American  
**ILD:** internal load density  
**IN. W.G.:** inches of water gauge  
**IPLV:** integrated part-load value  
**kW:** kilowatt  
**LPD:** lighting power density  
**MEC:** Model Energy Code  
**NAECA:** National Appliance Energy Conservation Act  
**NEBB:** National Environmental Balancing Bureau  
**NEMA:** National Electric Manufacturer's Association  
**NFRC:** National Fenestration Rating Council  
**NWDA:** National Wood Window and Door Association  
**O&M:** operation and maintenance  
**OS:** occupancy sensor  
**PTAC:** packaged terminal air conditioner  
**PVC:** poly vinyl chloride  
**R:** thermal resistance  
**SC:** shading coefficient



**SC<sub>x</sub>**: shading coefficient, excluding effect of external shading projections

**SEER**: seasonal energy efficiency ratio

**SWH**: service water heating

**TD**: temperature difference

**U**: thermal transmittance

**UL**: Underwriters Laboratories

**UPD**: unit power density

**VAV**: visible-air-volume

**VLT**: visible light transmittance

**WWR**: window-wall ratio