

## ACM ND-2005

# Appendix ND - Compliance Procedures for Relocatable Public School Buildings

### ND.1 Purpose and Scope

This document describes the compliance procedures that shall be followed when the whole building performance approach is used for relocatable public school buildings. Relocatable public school buildings are constructed (manufactured) at a central location and could be shipped and installed in any California climate zone. Furthermore, once they arrive at the school site, they could be positioned so that the windows face in any direction. The portable nature of relocatable classrooms requires that a special procedure be followed for showing compliance when the whole building performance method is used. Compliance documentation for relocatable public school buildings will be reviewed by the Division of the State Architect.

### ND.2 The Plan Check Process

The Division of the State Architect (DSA) is the building department for relocatable public school buildings. Since relocatables are manufactured in batches, like cars or other manufactured products, the plan check and approval process occurs in two phases. The first phase is when the relocatable manufacturer completes design of a model or modifies a model. At this point, complete plans and specifications are submitted to the DSA; DSA reviews the plans for compliance with the energy standards and other California Building Code (CBC) requirements; and a "pre-check" (PC) design approval is granted. Once the PC design is approved, a school district or the manufacturer may file an "over-the-counter" application with DSA to construct one or more relocatables. The over-the-counter application is intended to be reviewed quickly, since the PC design has already been pre-checked. The over-the-counter application is the building permit application for construction and installation of a relocatable at a specific site, and includes the approved PC design drawings as well as site development plans for the proposed site where the relocatable will be installed. An over-the-counter application also is required for the construction of a stockpile of one or more relocatables based on the approved PC design drawings. Stockpiled relocatables are stored typically at the manufacturer's yard until the actual school site is determined where the relocatable will be installed. Another over-the-counter application is required to install a previously stockpiled relocatable at which time site development plans for the proposed site are checked.

The effective date for all buildings subject to the energy standards is the date of permit application. If a building permit application is submitted on or after the effective date, then the new energy standards apply. For relocatable classrooms, the date of the permit application is the date of the over-the-counter application, not the date of the application for PC design approval. The PC design is only valid until the code changes.

### ND.3 The Compliance Process

Like other nonresidential buildings, the standard design for relocatable public school buildings is defined by the prescriptive requirements. In the case of relocatables, there are two choices of prescriptive criteria:

- Table 143-C in the Standards may be used for relocatable school buildings that can be installed in any climate zone in the state. In this case, the compliance is demonstrated in climates 14, 15, and 16 and this is accepted as evidence that the classroom will comply in all

climate zones. These relocatables will have a permanent label that allows it to be used anywhere in the state.

- Table 143-A in the Standards may be used for relocatable school buildings that are to be installed in only specific climate zones. In this case, compliance is demonstrated in each climate zone for which the relocatable has been designed to comply. These relocatables will have a permanent label that identifies in which climate zones it may be installed. It is not lawful to install the relocatable in other climate zones.

The building envelope of the standard design has the same geometry as the proposed design, including window area and position of windows on the exterior walls, and meets the prescriptive requirements specified in §143. Lighting power for the standard design meets the prescriptive requirements specified in §146. The HVAC system for the standard design meets the prescriptive requirements specified in §144. The system typically installed in relocatables is a single-zone packaged heat pump or furnace. Most relocatable school buildings do not have water heating systems, so this component is neutral in the analysis. Other modeling assumptions such as equipment loads, are the same for both the proposed design and the standard design and are specified in the Nonresidential ACM Manual.

Manufacturers shall certify compliance with the standards and all compliance documentation shall be provided. If the manufacturer chooses to comply using Table 143-A for compliance in only specific climate zones, then the manufacturers shall indicate the climates zones for which the classroom will be allowed to be located.

Since relocatable public school buildings could be positioned in any orientation, it is necessary to perform compliance calculations for multiple orientations. Each model with the same proposed design energy features shall be rotated through 12 different orientations either in climate zones 14, 15 and 16 for relocatables showing statewide compliance or in the specific climate zones that the manufacturer proposes for the relocatable to be allowed to be installed, i.e., the building with the same proposed design energy features is rotated in 30 degree increments and shall comply in each case. Approved compliance programs shall automate the rotation of the building and reporting of the compliance results to insure it is done correctly and uniformly and to avoid unnecessary documentation.

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#### **ND.4 Documentation**

The program shall present the results of the compliance calculations in a format similar to Table ND-1. For each of the cases (12 orientations times number of climates), the Time Dependent Valuation (TDV) energy for the *Standard Design* and the *Proposed Design* are shown (the energy features of the *Proposed Design* shall be the same for all orientations). The final column shows the compliance margin, which is the difference between the TDV energy for the *Proposed Design* and the *Standard Design*. Approved compliance programs shall scan the data presented in the Table ND-1 format and prominently highlight the case that has the smallest compliance margin. Complete compliance documentation shall be submitted for the building and energy features that achieve compliance in all of the climate zones and orientations as represented by the case with the smallest margin. DSA may require that compliance documentation for other cases also be submitted; showing that the *Proposed Design* building and energy features are identical to the case submitted, in each orientation and climate zone. Table ND-1 shows rows for climate zones 14, 15, and 16, which are the ones used when the criteria of Table 143-C is used to show compliance throughout the state. If the criteria of Table 143-A is used, then rows shall be added to the table for each climate zone for which the manufacturer wants the relocatable to be allowed to be installed.

**Table ND-1 – Summary of Compliance Calculations Needed for Relocatable Classrooms**

Climate Zone	Azimuth	TDV Energy		
		Proposed Design	Standard Design	Compliance Margin
14	0			
	30			
	60			
	90			
	120			
	150			
	180			
	210			
	240			
	270			
	300			
	330			
	15	0		
30				
60				
90				
120				
150				
180				
210				
240				
270				
300				
330				
16		0		
	30			
	60			
	90			
	120			
	150			
	180			
	210			
	240			
	270			
	300			
	330			

**ND.5 Optional Features**

Relocatable classrooms may come with a variety of optional features, like cars. A school district can buy the “basic model” or it can pay for options. Many of the optional features do not affect energy efficiency and are not significant from the perspective of energy code compliance. Examples include floor finishes (various grades of carpet or tiles), casework, and ceiling and wall finishes. Other optional features do affect energy performance such as window construction.

insulation, lighting systems, lighting controls, HVAC ductwork, HVAC equipment, and HVAC controls.

When a manufacturer offers a relocatable classroom model with a variety of options, it is necessary to identify those options that affect energy performance and to show that the model complies with any combination of the optional features. Most of the time, optional energy features are upgrades that clearly improve performance. If the basic model complies with the Standards, then adding any or all of the optional features would improve performance. The following are examples of optional features that are clear upgrades in terms of energy performance:

- HVAC equipment that has both a higher SEER and higher EER than the equipment in the basic model.
- Lighting systems that result in less power than the basic model.
- Lighting controls, such as occupancy sensors, that are recognized by the standards and for which power adjustment factors in Table 146-~~AB~~ are published in Section §146 of the Standards.
- Windows that have both a lower SHGC and lower U-factor (limited to relocatables that do not take credit for daylighting).
- Wall, roof or floor construction options that result in a lower U-factor than the basic model.

For energy code compliance purposes, it is necessary to show that every variation of the relocatable classroom that is offered to customers will comply with the Standards. There are two approaches for achieving this, as defined below:

**1) Basic Model Plus Energy Upgrades Approach** The simplest approach is to show that the basic model complies with the Standards and that all of the options that are offered to customers are clear energy upgrades that would only improve performance. As long as each and every measure in the basic model is met or exceeded by the energy upgrades, the relocatable classroom will comply with the standards.

While clear upgrades are obvious in most cases, the following are some examples of options that are not energy upgrades, for which additional analysis would be needed to show compliance that every combination of options comply.

- HVAC equipment that has a higher SEER, but a lower EER.
- Windows that lower SHGC but increase U-factor, or vice versa.
- Insulation options that reduce the U-factor for say walls, but increase it for the roof.
- Any other combination of measures that results in the performance of anyone measure being reduced in comparison to a complying basic model.

**2) Modeling of Every Combination Approach.** A more complex whole building performance approach is required when a model is available with options which in combination may or may not comply. In this case every combination of options shall be modeled, and the specific combinations that comply shall be determined and only those combinations shall be allowed. This approach, while possible, requires considerably more effort on the part of the relocatable manufacturer and its energy consultant. It also places a greater burden on DSA when they issue the over-the-counter building permit for the PC design that only allows specific combinations of energy options.. DSA would have to examine the specific optional features that are proposed with the over-the-counter application and make sure that the proposed combination of measures achieves compliance.

The manufacturer or its energy consultant would need to prepare a table or chart that shows all of the acceptable combinations that achieve compliance. This chart could be quite complex, depending on the number of optional features that are offered.

Table ND-2 is intended to illustrate the complexity that could be involved in modeling of every combination of energy features. It shows a list of typical optional features that would affect energy performance. In this example, there are two possible for each of the eight options, e.g the feature is either there or not (in an actual case there could be a different number of options and a different number of states for any option). In the example any one of the features could be combined with any of the others. The number of possible combinations in this example is two (the number of states) to the eighth power (the number of measures that have two states). The number of possible options is then  $2^8$  or 256. This is the number of combinations that would need to be modeled in order to determine which combinations of optional features achieves compliance.

*Table ND-2 – Examples of Optional Features for Relocatable Classrooms*

Options Offered	States
1 <u>Efficient lighting option</u>	<u>Yes/N</u> <u>o</u>
2 <u>High efficiency heat pump</u>	<u>Yes/N</u> <u>o</u>
3 <u>Improved wall insulation</u>	<u>Yes/N</u> <u>o</u>
4 <u>Improved roof insulation</u>	<u>Yes/N</u> <u>o</u>
5 <u>Occupancy sensor for lighting</u>	<u>Yes/N</u> <u>o</u>
6 <u>Low -e windows</u>	<u>Yes/N</u> <u>o</u>
7 <u>Skylights</u>	<u>Yes/N</u> <u>o</u>
8 <u>Daylighting Controls</u>	<u>Yes/N</u> <u>o</u>

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**Appendix D:**  
**Glossary**



## Appendix D: Definitions

Terms, phrases, words, and their derivatives in Part 6 of the California State Building Code shall be defined as specified in Section 101 of that Code. Terms, phrases, words, and their derivatives not found in Section 101 shall be defined as specified in Title 24, Part 2, Chapter 2-4 of the California Code of Regulations. Terms, phrases, words, and their derivatives not found in either Title 24, Part 6 or Chapter 2-4 shall be defined as specified in Part II, Chapter 4 of the Uniform Building Code. Where terms, phrases, words, and their derivatives are not defined in any of the references above, they shall be defined as specified in Webster's Third New International Dictionary of the English Language, Unabridged (1987 ed.), unless the context requires otherwise.

**ACCA** is the Air-Conditioning Contractors of America.

**ACCESSIBLE** is having access thereto, but which first may require removal or opening of access panels, doors, or similar obstructions.

**ADDITION** is any change to a building that increases conditioned floor area and conditioned volume.

**AIR-TO-AIR HEAT EXCHANGER** is a device which will reduce the heat losses or gains which occur when a building is mechanically ventilated, by transferring heat between the conditioned air being exhausted and the unconditioned air being supplied.

**ALTERATION** is any change to a building's water heating system, space conditioning system, lighting system, or envelope that is not an addition. **ALTERNATIVE CALCULATION METHODS (ACMs)** are the Commission's Public Domain Computer Programs, one of the Commission's Simplified Calculation Methods, or any other calculation method approved by the Commission.

**ALTERNATIVE CALCULATION METHOD (ACM)** is a calculation method used to determine compliance with the building energy efficiency standards other than the reference method which (for the nonresidential building standards) uses the reference computer program, DOE 2.1E, as the computational engine. The current requirements limit ACMs to computer programs since there are specific requirements in this manual for required inputs, automated restrictive outputs, and automatic default assumptions.

**ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE)** is a measure of the percentage of heat from the combustion of gas or oil which is transferred to the space being heated during a year, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 112.

**ANNUNCIATED** is a visual signaling device that indicates the on, off, or other status of a load.

**ANSI** is the American National Standards Institute.

**APPLIANCE EFFICIENCY REGULATIONS** are the regulations in Title 20, Sections 1601 et. seq. of the California Code of Regulations.

**APPROVED BY THE COMMISSION** means approval under Section 25402.1 of the Public Resources Code.

**APPROVED CALCULATION METHOD** (See **ALTERNATIVE CALCULATION METHODS**).

**ARI** is the Air-conditioning and Refrigeration Institute.

**ASHRAE** is the American Society of Heating, Refrigerating, and Air-conditioning Engineers.

**ASME** is the American Society of Mechanical Engineers.

**ASTM** is the American Society for Testing and Materials.

**ATRIUM** is an opening through two or more floor levels other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning, or other equipment which is enclosed space and not defined as a mall.

**ATTIC** is an enclosed unconditioned space directly below the roof and above the ceiling.

**AUTOMATIC** is capable of operating without human intervention.

**AUTOMATIC TIME SWITCH CONTROL DEVICES** are devices capable of automatically turning loads off and on based on time schedules.

**BELOW GRADE WALL** is the portion of a wall, enclosing conditioned space, that is below the grade line.

**BUILDING** is any structure or space for which a permit is sought.

**BUILDING ENVELOPE** is the ensemble of exterior and demising partitions of a building that enclose conditioned space.

**CAPTIVE KEY OVERRIDE** is a type of lighting control in which the key that activates the override cannot be released when the lights are in the on position.

**CEILING** is the interior upper surface of a space separating it from the attic, which has a slope less than 60 degrees from horizontal.

**CERTIFYING ORGANIZATION** is an independent organization recognized by the Commission to certify manufactured devices for performance values in accordance with procedures adopted by the Commission.

**CLIMATE CONTROL SYSTEM** (See SPACE CONDITIONING SYSTEM).

**CLIMATE ZONES** are the 16 geographic areas of California for which the Commission has established typical weather data, prescriptive packages and energy budgets. Climate zone boundary descriptions are in the document "California Climate Zone Descriptions" (July 1995), incorporated herein by reference. Figure 1-A is an approximate map of the 16 climate zones.

**CMC** means the 1998 California Mechanical Code prior to the effective date designated by the California Building Standards Commission for the 2000 California Mechanical Code. On and after the effective date designated by the California Building Standards Commission for the 2000 California Mechanical Code, CMC shall mean the 2000 California Mechanical Code.

**COEFFICIENT OF PERFORMANCE (COP), COOLING**, is the ratio of the rate of net heat removal to the rate of total energy input, calculated under designated operating conditions and expressed in consistent units, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 112.

**COEFFICIENT OF PERFORMANCE (COP), HEATING**, is the ratio of the rate of net heat output to the rate of total energy input, calculated under designated operating conditions and expressed in consistent units, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 112.

**COMMISSION** is the California State Energy Resources Conservation and Development Commission.

**COMPLETE BUILDING** is an entire building with one occupancy making up 90 percent of the conditioned floor area (see also ENTIRE BUILDING).

**CONDITIONED FLOOR AREA (CFA)** is the floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.

**CONDITIONED SPACE** is space in a building that is either directly conditioned or indirectly conditioned.

**CONDITIONED VOLUME** is the total volume (in cubic feet) of the conditioned space within a building.

**CONSTRUCTION LAYERS** are layers of material that make up a construction assembly.

~~**COOL ROOF** is a roofing material with high solar reflectance and high emittance that reduces heat gain through the roof.~~

**COOLING EQUIPMENT** is equipment used to provide mechanical cooling for a room or rooms in a building.

**COURTYARD** is an open space through one or more floor levels surrounded by walls within a building.

**COVERED PRODUCT** is an appliance regulated by the efficiency standards established under the National Appliance Energy Conservation Act, 42 U.S.C. Section 6291 et seq.

**CRAWL SPACE** is a space immediately under the first floor of a building adjacent to grade.

**CTI** is the Cooling Tower Institute.

**C-VALUE** (also known as **C-FACTOR**) is the time rate of heat flow through unit area of a body induced by a unit temperature difference between the body surfaces, in  $\text{Btu/hr ft}^2 \text{ } ^\circ\text{F}$ . It is not the same as **K** value or **K** factor.

**DAYLIT AREA** is the space on the floor that is the larger of (a) plus (b), or (c);

- (a) — For areas daylit by vertical glazing, the daylit area has a length of 15 feet, or the distance on the floor, perpendicular to the glazing, to the nearest 60-inch or higher opaque partition, whichever is less; and a width of the window plus either 2 feet on each side, the distance to an opaque partition, or one-half the distance to the closest skylight or vertical glazing, whichever is least.
- (b) — For areas daylit by horizontal glazing, the daylit area is the footprint of the skylight plus, in each of the lateral and longitudinal dimensions of the skylight, the lesser of the floor-to-ceiling height, the distance to the nearest 60-inch or higher opaque partition, or one-half the horizontal distance to the edge of the closest skylight or vertical glazing.
- (c) — The daylit area calculated using a method approved by the Commission.

~~**DECORATIVE GAS APPLIANCE** is a gas appliance that is designed or installed for visual effect only, cannot burn solid wood, and simulates a fire in a fireplace.~~

~~**DEGREE DAY, HEATING** is a unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal annual heating load of a building. For any one day, when the mean temperature is less than  $65^\circ\text{F}$ , there exist as many degree days as there are Fahrenheit degrees difference in temperature between the mean temperature for the day and  $65^\circ\text{F}$ . The number of degree days for specific geographical locations are those listed in the Residential Manual. For those localities not listed in the Residential Manual the number of degree days is as determined by the applicable enforcing agency.~~

**DEMISING PARTITIONS** are barriers that separate conditioned space from enclosed unconditioned space.

**DEMISING WALL** is a wall that is a demising partition.

**DENSITY** is the mass per unit volume of a construction material as documented in an ASHRAE handbook, a comparably reliable reference or manufacturer's literature.

~~**DESIGN CONDITIONS** are the parameters and conditions used to determine the performance requirements of space conditioning systems. Design conditions for determining design heating and cooling loads are specified in Section 144(b) for nonresidential, high rise residential, and hotel/motel buildings and in Section 150(h) for low rise residential buildings.~~

**DESIGN HEAT GAIN RATE** is the total calculated heat gain through the building envelope under design conditions.

**DESIGN HEAT LOSS RATE** is the total calculated heat loss through the building envelope under design conditions.

~~**DIRECTLY CONDITIONED SPACE** is an enclosed space that is provided with wood heating, is provided with mechanical heating that has a capacity exceeding  $10 \text{ Btu/hr ft}^2$ , or is provided with mechanical cooling that has a capacity exceeding  $5 \text{ Btu/hr ft}^2$ , unless the space conditioning system is designed and thermostatically controlled to maintain a process environment temperature less than  $55^\circ\text{F}$  or to maintain a process environment temperature greater than  $90^\circ\text{F}$  for~~

the whole space that the system serves, or unless the space conditioning system is designed and controlled to be incapable of operating at temperatures above 55°F or incapable of operating at temperatures below 90°F at design conditions.

**DISPLAY LIGHTING** is lighting confined to the area of a display that provides a higher level of illuminance than the level of surrounding ambient illuminance.

**DISPLAY PERIMETER** is the length of an exterior wall in a B, F-1, or M occupancy that immediately abuts a public sidewalk, measured at the sidewalk level for each story that abuts a public sidewalk.

**DISPLAY, PUBLIC AREA** are areas for the display of artwork, theme displays, and architectural surfaces in dining and other areas of public access, excluding restrooms and separate banquet rooms.

**DISPLAY, SALES FEATURE** is an item or items that requires special highlighting to visually attract attention and that is visually set apart from the surrounding area.

**DISPLAY, SALES FEATURE FLOOR** is a feature display in a retail store, wholesale store, or showroom that requires display lighting.

**DISPLAY, SALES FEATURE WALL** are the wall display areas, in a retail or wholesale space, that are in the vertical plane of permanent walls or partitions, and that are open shelving feature displays or faces of internally illuminated transparent feature display cases within the Gross Sales Wall Area.

**DUAL-GLAZED GREENHOUSE WINDOWS** are a type of dual-glazed fenestration product which adds conditioned volume but not conditioned floor area to a building.

~~**DUCT SEALING** is a procedure for installing a space conditioning distribution system that minimizes leakage of conditioned air. Minimum specifications for installation procedures, materials, diagnostic testing and field verification are contained in the Residential and Nonresidential ACM Approval Manuals.~~

**EAST-FACING** is oriented to within 45 degrees of true east, including 45°00'00" south of east (SE), but excluding 45°00'00" north of east (NE).

**ECONOMIZER, AIR** is a ducting arrangement and automatic control system that allows a cooling supply fan system to supply outside air to reduce or eliminate the need for mechanical cooling.

**ECONOMIZER, WATER** is a system by which the supply air of a cooling system is cooled directly or indirectly by evaporation of water, or other appropriate fluid, in order to reduce or eliminate the need for mechanical cooling.

**EFFECTIVE APERTURE (EA)** is (1) for windows, the visible light transmittance (VLT) times the window wall ratio; and (2) for skylights, the well index times the VLT times the skylight area times 0.85 divided by the gross exterior roof area.

**EFFICACY** is the ratio of light from a lamp to the electrical power consumed (including ballast losses), expressed in lumens per watt.

**ENCLOSED SPACE** is space that is substantially surrounded by solid surfaces.

**ENERGY BUDGET** is the maximum amount of source energy that a proposed building, or portion of a building, can be designed to consume, calculated with the approved procedures specified in Title 24, Part 6.

**ENERGY EFFICIENCY RATIO (EER)** is the ratio of net cooling capacity (in Btu/hr) to total rate of electrical energy (in watts), of a cooling system under designated operating conditions, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 112.

**ENERGY FACTOR (EF)** is the ratio of energy output to energy consumption of a water heater, expressed in equivalent units, under designated operating conditions over a 24-hour use cycle, as determined using the applicable test method in the Appliance Efficiency Regulations.

**ENERGY OBTAINED FROM DEPLETABLE SOURCES** is electricity purchased from a public utility, or any energy obtained from coal, oil, natural gas, or liquefied petroleum gases.

**ENERGY OBTAINED FROM NONDEPLETABLE SOURCES** is energy that is not energy obtained from depletable sources.

**ENFORCING AGENCY** is the city, county, or state agency responsible for issuing a building permit.

**ENTIRE BUILDING** is the ensemble of all enclosed space in a building, including the space for which a permit is sought, plus all existing conditioned and unconditioned space within the structure.

**ENVELOPE** means BUILDING ENVELOPE.

**EXFILTRATION** is uncontrolled outward air leakage from inside a building, including leakage through cracks and interstices, around windows and doors, and through any other exterior partition or duct penetration.

**EXTERIOR DOOR** is a door through an exterior partition that is opaque or has a glazed area that is less than or equal to one-half of the door area. Doors with a glazed area of more than one-half of the door area are treated as a fenestration product.

**EXTERIOR FLOOR/SOFFIT** is a horizontal exterior partition, or a horizontal demising partition, under conditioned space. For low-rise residential occupancies, exterior floors also include those on grade.

**EXTERIOR PARTITION** is an opaque, translucent, or transparent solid barrier that separates conditioned space from ambient air or space that is not enclosed. For low-rise residential occupancies, exterior partitions also include barriers that separate conditioned space from unconditioned space, or the ground.

**EXTERIOR ROOF/CEILING** is an exterior partition, or a demising partition, that has a slope less than 60 degrees from horizontal, that has conditioned space below, and that is not an exterior door or skylight.

**EXTERIOR ROOF/CEILING AREA** is the area of the exterior surface of exterior roof/ceilings.

**EXTERIOR WALL** is any wall or element of a wall, or any member or group of members, which defines the exterior boundaries or courts of a building and which has a slope of 60 degrees or greater with the horizontal plane. An exterior wall or partition is not an exterior floor/soffit, exterior door, exterior roof/ceiling, window, or skylight, or demising wall.

**EXTERIOR WALL AREA** is the area of the opaque exterior surface of exterior walls.

**FENESTRATION PRODUCT** is any transparent or translucent material plus any sash, frame, mullions, and dividers, in the envelope of a building, including, but not limited to: windows, sliding glass doors, french doors, skylights, curtain walls, garden windows, and other doors with a glazed area of more than one-half of the door area.

**FENESTRATION SYSTEM** means a collection of fenestration products included in the design of a building. (See "fenestration product")

**FIELD-FABRICATED FENESTRATION PRODUCT OR EXTERIOR DOOR** is a fenestration product or exterior door whose frame is made at the construction site of standard dimensional lumber or other materials that were not previously cut, or otherwise formed with the specific intention of being used to fabricate a fenestration product or exterior door. Field fabricated does not include site assembled frame components that were manufactured elsewhere with the intention of being assembled on-site (such as knocked down products, sunspace kits and curtainwalls).

**FIREPLACE** is a hearth and firechamber or similar prepared place in which a solid fuel fire may be burned, as defined in UBC Section 3102.2 and as further clarified in UBC Section 3102.7; these include but are not limited to factory-built fireplaces, masonry fireplaces, and masonry heaters.

**FLOOR/SOFFIT TYPE** is a floor/soffit assembly having a specific heat capacity, framing type, and U-value U-factor.

**FRAMED PARTITION or ASSEMBLY** is a partition or assembly constructed using separate structural members spaced not more than 32 inches on center.

**FRAMING PERCENTAGE** is the fraction of the surface of a partition that is framed expressed in percentage.

**GAS HEATING SYSTEM** is a natural gas or liquefied petroleum gas heating system.

**GAS LOG** is a self-contained, free-standing, open flame, gas-burning appliance consisting of a metal frame or base supporting simulated logs, and designed for installation only in a vented fireplace.

**GENERAL LIGHTING** is lighting designed to provide a substantially uniform level of illumination throughout an area, exclusive of any provision for special visual tasks or decorative effect. When designed for lower than task illuminance used in conjunction with other specific task lighting systems, it is also called "ambient" lighting.

**GLAZING** (See FENESTRATION PRODUCT).

**GOVERNMENTAL AGENCY** is any public agency or subdivision thereof, including, but not limited to, any agency of the state, a county, a city, a district, an association of governments, or a joint power agency.

**GROSS EXTERIOR ROOF AREA** is the sum of the skylight area and the exterior roof/ceiling area.

**GROSS EXTERIOR WALL AREA** is the sum of the window area, door area, and exterior wall area.

**GROSS SALES FLOOR AREA** is the total area (in square feet) of retail store floor space that is (1) used for the display and sale of merchandise; or (2) associated with that function, including, but not limited to, sales transactions areas, fitting rooms, and circulation areas and entry areas within the space used for display and sale.

**GROSS SALES WALL AREA** is the area (in square feet) of the inside of exterior walls and permanent full height interior partitions within the gross sales floor area of a retail store that is used for the presentation of merchandise for sale, less the area of openings, doors, windows, baseboards, wainscots, mechanical or structural elements, and other obstructions preventing the use of the area for the presentation of merchandise.

**HABITABLE STORY** is a story that contains space in which humans may work or live in reasonable comfort, and that has at least 50 percent of its volume above grade.

**HEAT CAPACITY (HC)** of an assembly is the amount of heat necessary to raise the temperature of all the components of a unit area in the assembly one degree F. It is calculated as the sum of the average thickness times the density times the specific heat for each component, and is expressed in Btu per square foot per degree F.

**HEAT PUMP** is a device that is capable of heating by refrigeration, and that may include a capability for cooling.

**HEATING EQUIPMENT** is equipment used to provide mechanical heating for a room or rooms in a building.

**HEATING SEASONAL PERFORMANCE FACTOR (HSPF)** is the total heating output of a heat pump (in British thermal units) during its normal use period for heating divided by the total electrical energy input (in watt hours) during the same period, as determined using the applicable test method in the Appliance Efficiency Regulations.

**HI** is the Hydronics Institute.

**HIGH BAY** is a space with luminaires 25 feet or more above the floor.

**HIGH-RISE RESIDENTIAL BUILDING** is a building, other than a hotel/motel, of occupancy group R-1 with four or more habitable stories.

**HORIZONTAL GLAZING** (See SKYLIGHT).

**HOTEL/MOTEL** is a building or buildings incorporating six or more guest rooms or a lobby serving six or more guest rooms, where the guest rooms are intended or designed to be used, or which are used, rented, or hired out to be occupied, or which are occupied for sleeping purposes by guests, and all conditioned spaces within the same building envelope. Hotel/motel also includes all conditioned spaces which are (1) on the same property as the hotel/motel, (2) served by the same central HVAC system as the hotel/motel, and (3) integrally related to the functioning of the hotel/motel as such, including, but not limited to, exhibition facilities, meeting and conference facilities, food service facilities, lobbies, and laundries.

**HVAC SYSTEM** (see SPACE CONDITIONING SYSTEM).

**ILLUMINATED FACE** is a side of an exit sign that has the word "EXIT" on it.

**INDIRECTLY CONDITIONED SPACE** is enclosed space including, but not limited to, unconditioned volume in atria, that (1) is not directly conditioned space; and (2) either (a) has an area-weighted heat transfer coefficient to directly conditioned space exceeding that to the outdoors or to unconditioned space, or (b) is a space through which air from directly conditioned spaces is transferred at a rate exceeding 3 air changes per hour.

**INFILTRATION** is uncontrolled inward air leakage from outside a building, or unconditioned space, including leakage through cracks and interstices, around windows and doors, and through any other exterior or demising partition or pipe or duct penetration.

**INTEGRATED PART LOAD VALUE (IPLV)** is 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 as determined using the applicable test method in the Appliance Efficiency Regulations or Section 112.

**ISOLATION DEVICE** is a device that prevents the conditioning of a zone or group of zones in a building while other zones of the building are being conditioned.

**LOW BAY** is a space with luminaires less than 25 feet above the floor.

**LOW-RISE RESIDENTIAL BUILDING** is a building, other than a hotel/motel, that is of occupancy group R-1 and is three stories or less, or that is of occupancy group R-3.

**LPG** is Liquefied Petroleum Gas.

**LUMEN MAINTENANCE DEVICE** is a device capable of automatically adjusting the light output of a lighting system throughout a continuous range to provide a preset level of illumination.

**LUMINAIRE** is a complete lighting unit consisting of a lamp and the parts designed to distribute the light, to position and protect the lamp, and to connect the lamp to the power supply; commonly referred to as "lighting fixtures" or "instruments."

**MANUAL** is capable of being operated by personal intervention.

**MANUFACTURED DEVICE** is any heating, cooling, ventilation, lighting, water heating, refrigeration, cooking, plumbing fitting, insulation, door, fenestration product, or any other appliance, device, equipment, or system subject to Sections 110 through 119 of Title 24, Part 6.

**MANUFACTURED FENESTRATION PRODUCT** is a fenestration product typically assembled before delivery to a job site. "Knocked down" or partially assembled products sold as a fenestration product must be considered a manufactured fenestration product and meet the rating and labeling requirements for manufactured fenestration products.

**MECHANICAL COOLING** is lowering the temperature within a space using refrigerant compressors or absorbers, desiccant dehumidifiers, or other systems that require energy from depletable sources to directly condition the space. In nonresidential, high-rise residential, and hotel/motel buildings cooling of a space by direct or indirect evaporation of water alone is not considered mechanical cooling.

**MECHANICAL HEATING** is raising the temperature within a space using electric resistance heaters, fossil fuel burners, heat pumps, or other systems that require energy from depletable sources to directly condition the space.

**MODELING ASSUMPTIONS** are the conditions (such as weather conditions, thermostat settings and schedules, internal gain schedules, etc.) that are used for calculating a building's annual energy consumption and that are in the Alternative Calculation Methods Manuals.

**MOVABLE SHADING DEVICE** (See OPERABLE SHADING DEVICE).

**MULTI-SCENE DIMMING SYSTEM** is a lighting control device that has the capability of setting light levels throughout a continuous range, and that has pre-established settings within the range.

**NEWLY CONDITIONED SPACE** is any space being converted from unconditioned to directly conditioned or indirectly conditioned space. Newly conditioned space must comply with the requirements for an addition. See Section 149 for nonresidential occupancies and Section 152 for residential occupancies.

**NONRESIDENTIAL BUILDING** is any building which is of occupancy group A, B, E, or H.

NOTE: Requirements for high-rise residential buildings and hotels/motels are included in the nonresidential sections of Title 24, Part 6.

**NONRESIDENTIAL MANUAL** is the manual developed by the Commission, under Section 25402.1(e) of the Public Resources Code, to aid designers, builders and contractors in meeting the energy efficiency requirements for nonresidential, high-rise residential, and hotel/motel buildings.

**NORTH-FACING** is oriented to within 45 degrees of true north, including 45°00'00" east of north (NE), but excluding 45°00'00" west of north (NW).

**OCCUPANCY SENSOR, LIGHTING** is a device that automatically turns lights off soon after an area is vacated.

**OCCUPANCY TYPE** is one of the following:

**AUDITORIUM:** The part of a public building where an audience sits in fixed seating, or a room, area, or building with fixed seats used for public meetings or gatherings not specifically for the viewing of dramatic performances.

**AUTO REPAIR:** The portion of a building used to repair automotive equipment and/or vehicles, exchange parts, and may include work using an open flame or welding equipment.

**BANK/FINANCIAL INSTITUTION:** An area in a public establishment for conducting financial transactions including the custody, loan, exchange, or issue of money, for the extension of credit, and for facilitating the transmission of funds.

**CLASSROOM, LECTURE, OR TRAINING:** A room or area where an audience or class receives instruction.

**COMMERCIAL AND INDUSTRIAL STORAGE:** A room, area, or building used for storing items.

**CONVENTION, CONFERENCE, MULTIPURPOSE AND MEETING CENTERS:** An assembly room, area, or building that is used for meetings, conventions and multiple purposes including, but not limited to, dramatic performances, and that has neither fixed seating nor fixed staging.

**CORRIDOR:** A passageway or route into which compartments or rooms open.

**DINING:** A room or rooms in a restaurant or hotel/motel (other than guest rooms) where meals that are served to the customers will be consumed.

**ELECTRICAL/MECHANICAL ROOM:** A room in which the building's electrical switchbox or control panels, and/or HVAC controls or equipment is located.

**EXERCISE CENTER/GYMNASIUM:** A room or building equipped for gymnastics, exercise equipment, or indoor athletic activities.

**EXHIBIT:** A room or area that is used for exhibitions that has neither fixed seating nor fixed staging.

**GENERAL COMMERCIAL AND INDUSTRIAL WORK:** A room, area, or building in which an art, craft, assembly or manufacturing operation is performed.

**HIGH BAY:** Luminaires 25 feet or more above the floor.

**LOW BAY:** Luminaires less than 25 feet above the floor.

**GROCERY STORE:** A room, area, or building that has as its primary purpose the sale of foodstuffs requiring additional preparation prior to consumption.

~~*HOTEL FUNCTION AREA:* A hotel room or area such as a hotel ballroom, meeting room, exhibit hall, or conference room, together with prefunction areas and other spaces ancillary to its function.~~

~~*HOTEL LOBBY:* The contiguous spaces in a hotel/motel between the main entrance and the front desk, including waiting and seating areas, and other spaces encompassing the activities normal to a hotel lobby function.~~

~~*KITCHEN/FOOD PREPARATION:* A room or area with cooking facilities and/or an area where food is prepared.~~

~~*LAUNDRY:* A place where laundering activities occur.~~

~~*LIBRARY:* A repository for literary materials, such as books, periodicals, newspapers, pamphlets and prints, kept for reading or reference.~~

~~*LOCKER/DRESSING ROOM:* A room or area for changing clothing, sometimes equipped with lockers.~~

~~*LOUNGE/RECREATION:* A room used for leisure activities which may be associated with a restaurant or bar.~~

~~*MAIN ENTRY LOBBY/RECEPTION/WAITING:* The lobby of a building that is directly located by the main entrance of the building and includes the reception area, sitting areas, and public areas.~~

~~*MALLS, ARCADES AND ATRIA:* A public passageway or concourse that provides access to rows of stores or shops.~~

~~*MEDICAL AND CLINICAL CARE:* A room, area, or building that does not provide overnight patient care and that is used to promote the condition of being sound in body or mind through medical, dental, or psychological examination and treatment, including, but not limited to, laboratories and treatment facilities.~~

~~*MUSEUM:* A space in which works of artistic, historical, or scientific value are cared for and exhibited.~~

~~*OFFICE:* A room, area, or building of UBC group B occupancy other than restaurants.~~

~~*PRECISION COMMERCIAL OR INDUSTRIAL WORK:* A room, area, or building in which an art, craft, assembly or manufacturing operation is performed involving visual tasks of small size or fine detail such as electronic assembly, fine woodworking, metal lathe operation, fine hand painting and finishing, egg processing operations, or tasks of similar visual difficulty.~~

~~*RECEPTION/WAITING AREA:* An area where customers or clients are greeted prior to conducting business.~~

~~*RELIGIOUS WORSHIP:* A room, area, or building for worship.~~

~~*RESTAURANT:* A room, area, or building that is a food establishment as defined in Section 27520 of the Health and Safety Code.~~

~~*RESTROOM:* A room or suite of rooms providing personal facilities such as toilets and washbasins.~~

~~*RETAIL AND SALES:* A room, area, or building in which the primary activity is the sale of merchandise.~~

~~*SCHOOL:* A building or group of buildings that is predominately classrooms and that is used by an organization that provides instruction to students.~~

~~*STAIRS, ACTIVE/INACTIVE:* A series of steps providing passage from one level of a building to another~~

~~*SUPPORT AREAS:* A room or area used as a passageway, utility room, storage space, or other type of space associated with or secondary to the function of an occupancy that is listed in these regulations.~~

~~**THEATER, MOTION PICTURE:** An assembly room, hall, or building with tiers of rising seats or steps for the showing of motion pictures.~~

~~**THEATER, PERFORMANCE:** An assembly room, hall, or building with tiers of rising seats or steps for the viewing of dramatic performances, lectures, musical events and similar live performances.~~

~~**VOCATIONAL ROOM:** A room used to provide training in a special skill to be pursued as a trade.~~

~~**WHOLESALE SHOWROOM:** A room where samples of merchandise are displayed.~~

~~**OPERABLE SHADING DEVICE** is a device at the interior or exterior of a building or integral with a fenestration product, which is capable of being operated, either manually or automatically, to adjust the amount of solar radiation admitted to the interior of the building.~~

~~**OPTIMAL OVERHANG** is an overhang that completely shades the glazing at solar noon on August 21 and substantially exposes the glass at solar noon on December 21.~~

~~**ORNAMENTAL CHANDELIERS** are ceiling-mounted, close-to-ceiling, or suspended decorative luminaires that use glass, crystal, ornamental metals, or other decorative material and that typically are used in hotel/motels, restaurants, or churches as a significant element in the interior architecture.~~

~~**OUTDOOR AIR** (Outside air) is air taken from outdoors and not previously circulated in the building.~~

~~**OVERALL HEAT GAIN** is the value obtained in Section 143(b)2 for determining compliance with the component envelope approach.~~

~~**OVERALL HEAT LOSS** is the value obtained in Section 143(b)1 for determining compliance with the component envelope approach.~~

~~**PLENUM** is an air compartment or chamber, including uninhabited crawl space, areas above a ceiling or below a floor, including air spaces below raised floors of computer/data processing centers, or attic spaces, to which one or more ducts are connected and which forms part of either the supply air, return air or exhaust air system, other than the occupied space being conditioned.~~

~~**POOR QUALITY LIGHTING TASKS** are visual tasks that require illuminance category "E" or greater, because of the choice of a writing or printing method that produces characters that are of small size or lower contrast than good quality alternatives that are regularly used in offices.~~

~~**PRIVATE OFFICE** or **WORK AREA** is an office bounded by 30-inch or higher partitions and is no more than 200 square feet.~~

~~**PROCESS** is an activity or treatment that is not related to the space conditioning, lighting, service water heating, or ventilating of a building as it relates to human occupancy.~~

~~**PROCESS LOAD** is a load resulting from a process.~~

~~**PUBLIC AREAS** are spaces generally open to the public at large, customers, congregation members, or similar spaces, where occupants need to be prevented from controlling lights for safety, security, or business reasons.~~

~~**PUBLIC FACILITY RESTROOM** is a restroom designed for use by the public.~~

~~**RAISED FLOOR** is a floor (partition) over a crawl space, or an unconditioned space, or ambient air.~~

~~**RADIANT BARRIER** is any reflective material that has an emittance of 0.05 or less, tested in accordance with ASTM C-1371-98, and that is certified to the California Department of Consumer Affairs.~~

~~**READILY ACCESSIBLE** is capable of being reached quickly for operation, repair, or inspection, without requiring climbing or removing obstacles, or resorting to access equipment.~~

**RECOOL** is the cooling of air that has been previously heated by space conditioning equipment or systems serving the same building.

**RECOVERED ENERGY** is energy used in a building that (1) is mechanically recovered from space conditioning, service water heating, lighting, or process equipment after the energy has performed its original function; (2) provides space conditioning, service water heating, or lighting; and (3) would otherwise be wasted.

**REDUCED FLICKER OPERATION** is the operation of a light, in which the light has a visual flicker less than 30% for frequency and modulation.

**REFERENCE COMPUTER PROGRAM** is the DOE 2.1E program, version 86. Note that the *reference computer program* is only part of the *reference method* which is the official set of procedures and additional calculational algorithms, that uses the the official rules and assumptions along with the *reference computer program* to manipulate required inputs to:

- 1) describe the salient, energy-consuming features of a proposed building design; and to
- 2) create and describe relevant energy consuming aspects of a standard building design that meets the prescriptive building energy efficiency standards; and to
- 3) simulate both proposed and standard building designs and determine if the energy consumption of the proposed building is less than the standard building; and to
- 4) print a specific set of required compliance forms if and only if the calculated energy budget for the standard building design is greater than the proposed building design.

In the absence of other information to the contrary, the *reference method* is described in the most detail in the *reference method* input files in the Supplement to this manual.

**REHEAT** is the heating of air that has been previously cooled by cooling equipment or systems or an economizer.

**RELATIVE SOLAR HEAT GAIN** is the ratio of solar heat gain through a fenestration product (corrected for external shading) to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation, which is then reradiated, conducted, or convected into the space.

**REPAIR** is the reconstruction or renewal of any part of an existing building for the purpose of its maintenance. Note: Repairs to low-rise residential buildings are not within the scope of these standards.

**RESIDENTIAL BUILDING** (See HIGH-RISE RESIDENTIAL BUILDING and LOW-RISE RESIDENTIAL BUILDING).

**RESIDENTIAL MANUAL** is the manual developed by the Commission, under Section 25402.1(c) of the Public Resources Code, to aid designers, builders, and contractors in meeting energy efficiency standards for low-rise residential buildings.

**ROOF** is the exterior surface on the top of a building, which has a slope less than 60 degrees from horizontal.

**ROOF/CEILING TYPE** is a roof/ceiling assembly having a specific framing type and U-factor U-value.

**ROOM CAVITY RATIO (RCR)** is:

$$\text{--- (a) for rectangular rooms ---} \quad \frac{5 \times H \times (L + W)}{L \times W}$$

--- or ---

$$\text{--- (b) for irregular shaped rooms ---} \quad \frac{2.5 \times H \times P}{A}$$

Where:

- L = Length of room
- W = Width of room
- H = Vertical distance from the work plane to the center line of the lighting fixture
- P = Perimeter of room
- A = Area of room

**RUNOUT** is piping that is no more than 12 feet long and that is connected to a fixture or an individual terminal unit.

**SCONCE** is a wall mounted decorative light fixture.

**SEASONAL ENERGY EFFICIENCY RATIO (SEER)** means the total cooling output of a central air conditioner in British thermal units during its normal usage period for cooling divided by the total electrical energy input in watt-hours during the same period, as determined using the applicable test method in the Appliance Efficiency Regulations.

**SEMI-CONDITIONED SPACE** is an enclosed nonresidential space that is provided with wood heating, cooling by direct or indirect evaporation of water, mechanical heating that has a capacity of 10 Btu/(hr ft<sup>2</sup>) or less, mechanical cooling that has a capacity of 5 Btu/(hr ft<sup>2</sup>) or less, or is maintained for a process environment as set forth in the definition of **DIRECTLY CONDITIONED SPACE**.

**SERVICE WATER HEATING** is heating of water for sanitary purposes for human occupancy, other than for comfort heating.

**SHADING** is the protection from heat gains because of direct solar radiation by permanently attached exterior devices or building elements, interior shading devices, glazing material, or adherent materials. Permanently attached means (a) attached with fasteners that require additional tools to remove (as opposed to clips, hooks, latches, snaps, or ties); or (b) required by the UBC for emergency egress to be removable from the interior without the use of tools.

**SHADING COEFFICIENT (SC)** is the ratio of the solar heat gain through a fenestration product to the solar heat gain through an unshaded 1/8 inch thick clear double strength glass under the same set of conditions. For nonresidential, high-rise residential, and hotel/motel buildings, this shall exclude the effects of mullions, frames, sashes, and interior and exterior shading devices.

~~**SITE-ASSEMBLED FENESTRATION** includes both field fabricated fenestration and site-built fenestration.~~

~~**SITE-BUILT FENESTRATION PRODUCTS** are fenestration products designed to be field-glazed or field assembled units comprised of specified framing and glazing components. Site-built fenestration is eligible for certification under NERC 100-SB, and may include both vertical glazing and horizontal glazing.~~

**SITE SOLAR ENERGY** is natural daylighting, or thermal, chemical, or electrical energy derived from direct conversion of incident solar radiation at the building site.

**SKYLIGHT** is glazing having a slope less than 60 degrees from the horizontal with conditioned space below, except for purposes of complying with Section 151(f), where a skylight is glazing having a slope not exceeding 4.76 degrees (1:12) from the horizontal.

**SKYLIGHT AREA** is the area of the surface of a skylight, plus the area of the frame, sash, and mullions.

**SKYLIGHT TYPE** is a type of skylight assembly having a specific solar heat gain coefficient, whether translucent or transparent, and U value U factor, whether glass mounted on a curb, glass not mounted on a curb or plastic (assumed to be mounted on a curb).

**SMACNA** is the Sheet Metal and Air-conditioning Contractors National Association.

**SOLAR HEAT GAIN COEFFICIENT (SHGC)** is the ratio of the solar heat gain entering the space through the fenestration area to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation, which is then reradiated, conducted, or convected into the space.

**SOURCE ENERGY** is the energy that is used at a site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission, and distribution losses, and that is used to perform a specific function, such as space conditioning, lighting or water heating. Table 1-B contains the conversion factors for converting site to source energy.

**SOUTH-FACING** is oriented to within 45 degrees of true south including 45°00'00" west of south (SW), but excluding 45°00'00" east of south (SE).

**SPA** is a vessel that contains heated water, in which humans can immerse themselves, is not a pool, and is not a bathtub.

**SPACE CONDITIONING SYSTEM** is a system that provides either collectively or individually heating, ventilating, or cooling within or associated with conditioned spaces in a building.

**SPECIFIC HEAT** is the quantity of heat that must be supplied to a unit mass of the material to increase its temperature by one degree as documented in an ASHRAE handbook, a comparably reliable reference or manufacturer's literature.

**SYSTEM** is a combination of equipment, controls, accessories, interconnecting means, or terminal elements, by which energy is transformed to perform a specific function, such as space conditioning, service water heating, or lighting.

**TASK-ORIENTED LIGHTING** is lighting that is designed specifically to illuminate a task location, and that is generally confined to the task location.

**THERMAL CONDUCTIVITY** is the quantity of heat that will flow through a unit area of the material per hour when the temperature difference through the material is one degree as documented in an ASHRAE handbook, a comparably reliable reference or manufacturer's literature.

**THERMAL MASS** is solid or liquid material used to store heat for later heating use or for reducing cooling requirements.

**THERMAL RESISTANCE (R)** is the resistance of a material or building component to the passage of heat in  $\text{hr}\cdot\text{ft}^2\cdot\text{°F}/\text{Btu}$ .

**THERMOSTATIC EXPANSION VALVE (TXV)** is a refrigerant metering valve, installed in an air conditioner or heat pump, which controls the flow of liquid refrigerant entering the evaporator in response to the superheat of the gas leaving it.

**THROW DISTANCE** is the distance between the luminaire and the center of the plane lit by the luminaire on a display.

**TUNING** is a lighting control device that allows authorized personnel only to select a single light level within a continuous range.

**UBC** is the 1994 edition of the state-adopted Uniform Building Code, Title 24.

**UL** is the Underwriters Laboratory.

**UMC** is the 1997 edition of the state-adopted Uniform Mechanical Code.

**UNCONDITIONED SPACE** is enclosed space within a building that is not directly conditioned, indirectly conditioned, or semi-conditioned space.

**UNIT INTERIOR MASS CAPACITY (UIMC)** is the amount of effective heat capacity per unit of thermal mass, taking into account the type of mass material, thickness, specific heat, density and surface area.

**U-VALUE U-FACTOR** is the overall coefficient of thermal transmittance of a construction assembly, in  $\text{Btu}/\text{h}\cdot\text{ft}^2\cdot\text{°F}$ , including air film resistance at both surfaces.

**VAPOR BARRIER** is a material that has a permeance of one perm or less and that provides resistance to the transmission of water vapor.

**VARIABLE AIR VOLUME (VAV) SYSTEM** is a space conditioning system that maintains comfort levels by varying the volume of conditioned air to the zones served.

**VERTICAL GLAZING** (See "window")

**VERY VALUABLE MERCHANDISE** is rare or precious objects, including, but not limited to, jewelry, coins, small art objects, crystal, china, ceramics, or silver, the selling of which involves customer inspection of very fine detail from outside of a locked case.

**VISIBLE LIGHT TRANSMITTANCE (VLT)** is the ratio (expressed as a decimal) of visible light that is transmitted through a glazing material to the light that strikes the material.

**WALL TYPE** is a wall assembly having a specific heat capacity, framing type, and U-value U factor.

**WELL INDEX** is the ratio of the amount of visible light leaving a skylight well to the amount of visible light entering the skylight well and is calculated as follows:

\_\_\_\_\_ (a) for rectangular wells:



\_\_\_\_\_ or

\_\_\_\_\_ (b) for irregular shaped wells:



\_\_\_\_\_ Where the length, width, perimeter, and area are measured at the bottom of the well, and R is the  
 \_\_\_\_\_ weighted average reflectance of the walls of the well.

**WEST-FACING** is oriented to within 45 degrees of true west, including 45°00'00" north of due west (NW), but excluding 45°00'00" south of west (SW).

**WINDOW** is glazing that is not a skylight.

**WINDOW AREA** is the area of the surface of a window, plus the area of the frame, sash, and mullions.

**WINDOW TYPE** is a window assembly having a specific solar heat gain coefficient, relative solar heat gain, and U-value U factor.

**WINDOW WALL RATIO** is the ratio of the window area to the gross exterior wall area.

~~**WOOD HEATER** is an enclosed wood burning appliance used for space heating and/or domestic water heating, and which meets the definition in Federal Register, Volume 52, Number 32, February 18, 1987.~~

~~**WOOD STOVE** (See WOOD HEATER).~~

~~**ZONE, LIGHTING** is a space or group of spaces within a building that has sufficiently similar requirements so that lighting can be automatically controlled in unison throughout the zone by an illumination controlling device or devices, and does not exceed one floor.~~