REVISION RECORD FOR THE STATE OF CALIFORNIA

SUPPLEMENT

September 21, 2006

2005 Title 24, Part 6, California Building Standards Energy Code

PLEASE NOTE: The date of this Supplement is for identification purposes only.
See the History Note Appendix for the adoption and effective dates of the provisions.

It is suggested that the section number as well as the page number be checked when inserting this material and removing the superseded material. In case of doubt, rely on the section numbers rather than the page numbers since the section numbers must run consecutively.

It is further suggested that the superseded material be retained with this revision record sheet so that the prior wording of any section can be easily ascertained.

Please keep the removed pages with this revision page for future reference.

NOTE

Due to the fact that the application date for a building permit establishes the California Building Standards code provisions that are effective at the local level, which apply to the plans, specifications, and construction for that permit, it is strongly recommended that the removed pages be retained for historical reference.

Remove Existing Pages	Insert New Pages
3 and 4	3 through 4.2
29 and 30	29 and 30
85 through 88	85 through 88
89 and 90	89 and 90

Item No. 5510A049

SECTION 101 — DEFINITIONS AND RULES OF CONSTRUCTION

(a) **Rules of Construction.**

1. Where the context requires, the singular includes the plural and the plural includes the singular.

2. The use of "and" in a conjunctive provision means that all elements in the provision must be complied with, or must exist to make the provision applicable. Where compliance with one or more elements suffices, or where existence of one or more elements makes the provision applicable, "or" (rather than "and/or") is used.

3. "Shall" is mandatory and "may" is permissive.

(b) **Definitions.** Terms, phrases, words and their derivatives in Title 24, Part 6, shall be defined as specified in Section 101. Terms, phrases, words and their derivatives not found in Section 101 shall be defined as specified in Title 24, Part 2, Chapter 2 of the California Code of Regulations. Terms, phrases, words and their derivatives not found in either Title 24, Part 6, or Chapter 2 shall be defined as specified in Title 24, Part 2, Chapter 2 of the *California 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 edition), unless the context requires otherwise.

ACCA is the Air-conditioning Contractors of America.

ACCA MANUAL J is the Air-Conditioning Contractors of America document entitled "Manual J — Residential Load Calculation, Eighth Edition." (2003)

ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE is a description of test procedures in the Nonresidential ACM Manual that includes equipment and systems to be tested, functions to be tested, conditions under which the test shall be performed, the scope of the tests, results to be obtained and measurable criteria for acceptable performance.

ACCENT (LIGHT) is a directional luminaire designed to highlight or spotlight objects. It can be recessed, surface mounted, or mounted to a pendant, stem or track.

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. See also, "newly conditioned space." Addition is also any change that increases the floor area or volume of an unconditioned building of an occupancy group or type regulated by Part 6. Addition is also any change that increases the illuminated area of an outdoor lighting application regulated by Part 6.

AGRICULTURAL BUILDING is a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. It is not a structure that is a place of human habitation, a place of employment where agricultural products are processed, treated or packaged, or a place used by the public.

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. Alteration is also any change to an outdoor lighting system that is regulated by Part 6 that is not an addition. Alteration is also any change to signs located either indoors or outdoors that is regulated by Part 6.

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 APPROVAL MANUAL or ACM MANUAL is the Alternative Calculation Method (ACM) Approval Manual for the 2005 Energy Efficiency Standards for Nonresidential Buildings, (P400-03-001F) for nonresidential buildings, hotels, and multifamily residential buildings with four or more stories and the Alternative Calculation Method (ACM) Approval Manual for the 2005 Energy Efficiency Standards for Residential Buildings, (P400-03-003) for all single family and low-rise multifamily residential buildings.

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

ANSI is the American National Standards Institute.

ANSI Z21.10.3 is the American National Standards Institute document entitled "Gas Water Heaters, Volume I, Storage Water Heaters with input ratings above 75,000 Btu per hour," 2001. (ANSI Z21.10.3-2001)

ANSI Z21.13 is the American National Standards Institute document entitled "Gas-Fired Low Pressure Steam and Hot Water Boilers," 2000. (ANSI Z21.13-2000)

ANSI Z21.40.4 is the American National Standards Institute document entitled "Performance Testing and Rating of Gas-Fired, Air Conditioning and Heat Pump Appliances," 1996 (ANSI Z21.40.4-1996)

ANSI Z21.47 is the American National Standards Institute document entitled "Gas-Fired Central Furnaces," 2001 (ANSI Z21.47-2001)

ANSI Z83.8 is the American National Standards Institute document entitled "Gas Unit Heaters and Gas-Fired Duct Furnaces," 2002 (ANSI Z83.8-2002)

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.

ARI 210/240 is the Air-conditioning and Refrigeration Institute document entitled "Unitary Air-Conditioning and Air-Source Heat Pump Equipment," 2003. (ARI 210/240-2003)

ARI 310/380 is the Air-conditioning and Refrigeration Institute document entitled "Packaged Terminal Air-Conditioners and Heat Pumps," 1993. (ARI 310/380-93)

ARI 320 is the Air-conditioning and Refrigeration Institute document entitled "Water-Source Heat Pumps," 1998. (ARI 320-98)

ARI 325 is the Air-conditioning and Refrigeration Institute document entitled "Ground Water-Source Heat Pumps," 1998. (ARI 325-98)

ARI 340/360 is the Air-conditioning and Refrigeration Institute document entitled "Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment," 2000. (ARI 340/360-2000)

ARI 365 is the Air-conditioning and Refrigeration Institute document entitled, "Commercial and Industrial Unitary Air-Conditioning Condensing Units," 2002 (ARI 365-2002)

ARI 460 is the Air-conditioning and Refrigeration Institute document entitled "Remote Mechanical-Draft Air-Cooled Refrigerant Condensers," 2000. (ARI 460-2000)

ARI 550/590 is the Air-conditioning and Refrigeration Institute document entitled "Standard for Water Chilling Packages Using the Vapor Compression Cycle," 1998. (ARI 550/590-98)

ARI 560 is the Air-conditioning and Refrigeration Institute document entitled "Absorption Water Chilling and Water Heating Packages," 2000. (ARI 560-2000)

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

ASHRAE CLIMATIC DATA FOR REGION X is the American Society of Heating, Refrigerating and Air-conditioning Engineers document entitled "ASHRAE Climatic Data for Region X, Arizona, California, Hawaii and Nevada," Publication SPCDX, 1982 and "Supplement," 1994.

ASHRAE HANDBOOK, APPLICATIONS VOLUME is the American Society of Heating, Refrigerating and Air-conditioning Engineers document entitled "ASHRAE Handbook: Heating, Ventilating, and Air-Conditioning Applications." (2003)

ASHRAE HANDBOOK, EQUIPMENT VOLUME is the American Society of Heating, Refrigerating and Air-conditioning Engineers document entitled "ASHRAE Handbook: Heating, Ventilating, and Air-conditioning Systems and Equipment." (2000)

ASHRAE HANDBOOK, FUNDAMENTALS VOLUME is the American Society of Heating, Refrigerating and Air-conditioning Engineers document entitled "ASHRAE Handbook: Fundamentals." (2001)

ASHRAE 55 is the American Society of Heating, Refrigerating and Air-conditioning Engineers document entitled "Thermal Environmental Conditions for Human Occupancy," 1992. (ASHRAE Standard 55-1992)

ASME is the American Society of Mechanical Engineers.

ASTM is the American Society for Testing and Materials.

ASTM C55 is the American Society for Testing and Materials document entitled "Standard Specification for Concrete Brick," 2001. (ASTM C55-01)

ASTM C177 is the American Society for Testing and Materials document entitled "Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus," 1997. (ASTM C177-97)

ASTM C272 is the American Society for Testing and Materials document entitled "Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions," 2001. (ASTM C272-01)

ASTM C335 is the American Society for Testing and Materials document entitled "Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation," 1995. (ASTM C335-95)

ASTM C518 is the American Society for Testing and Materials document entitled "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus," 2002. (ASTM C518-02)

ASTM C731 is the American Society for Testing and Materials document entitled "Standard Test Method for Extrudability, After Package Aging of Latex Sealants," 2000. (ASTM C731-00)

ASTM C732 is the American Society for Testing and Materials document entitled "Standard Test Method for Aging Effects of Artificial Weathering on Latex Sealants," 2001. (ASTM C732-01)

ASTM C836 is the American Society of Testing and Materials document entitled, "Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course," 2005. (ASTM C836-05)

ASTM C1167 is the American Society for Testing and Materials document entitled "Standard Specification for Clay Roof Tiles," 1996. (ASTM C1167-96)

ASTM C1371 is the American Society for Testing and Materials document entitled "Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers," 1998. (ASTM C1371-98)

ASTM C1583 is the American Society of Testing and Materials document entitled, "Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension" (Pull-off Method)," 2004. (ASTM C1583-04)

ASTM D522 is the American Society of Testing and Materials document entitled, "Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings," 2001. [ASTM D522-93a (2001)]

ASTM D822 is the American Society of Testing and Materials document entitled, "Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings," 2001. (ASTM D822-01)

ASTM D1003 is the American Society for Testing and Materials document entitled "Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics," 2000. (ANSI/ASTM D1003-00)

ASTM D1653 is the American Society of Testing and Materials document entitled, "Standard Test Methods for Water Vapor Transmission of Organic Coating Films," 2003. (ASTM D1653-03)

ASTM D2370 is the American Society of Testing and Materials document entitled, "Standard Test Method for Tensile Properties of Organic Coatings," 2002. [ASTM D2370-98 (2002)]

ASTM D2824 is the American Society of Testing and Materials document entitled "Standard Specification for Aluminum-Pigmented Asphalt Roof Coatings, Nonfibered, Asbestos Fibered, and Fibered without Asbestos," 2002. (ASTM D2824-02)

ASTM D3468 is the American Society of Testing and Materials document entitled, "Standard Specification for Liquid-Applied Neoprene and Chlorosulfonated Polyethylene Used in Roofing and Waterproofing," 1999. (ASTM D3468-99)

ASTM D3805 is the American Society of Testing and Materials document entitled "Standard Guide for Application of Aluminum-Pigmented Asphalt Roof Coatings," 1997. [ASTM D3805-97 (reapproved 2003)]

ASTM D5870 is the American Society of Testing and Materials document entitled, "Standard Practice for Calculating Property Retention Index of Plastics," 2003. [ASTM D5870-95 (2003)]

ASTM D6083 is the American Society of Testing and Materials document entitled, "Standard Specification for Liquid Applied Acrylic Coating Used in Roofing," 2005. (ASTM D6083-05e1)

ASTM D6694 is the American Society of Testing and Materials document entitled, "Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing," 2001. (ASTM D6694-01)

ASTM D6848 is the American Society of Testing and Materials document entitled "Standard Specification for Aluminum-Pigmented Emulsified Asphalt Used as a Protective Coating for Roofing," 2002. (ASTM D6848-02)

ASTM D4798 is the American Society for Testing and Materials document entitled "Standard Test Method for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method)," 2001. (ASTM D4798-01)

ASTM E96 is the American Society for Testing and Materials document entitled "Standard Test Methods for Water Vapor Transmission of Materials," 2000. (ASTM E96-00)

ASTM E283 is the American Society for Testing and Materials document entitled "Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen," 1991. [ASTM E283-91(1999)]

ASTM E408 is the American Society for Testing and Materials document entitled, "Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques," 1971. [ASTM E408-71(2002)]

ATRIUM is a large-volume space created by openings connecting two or more stories and is used for purposes other than an enclosed stairway, an elevator, hoistway, an escalator opening, or as a utility shaft for plumbing, electrical, air-conditioning or other equipment, and is not a mall.

AUTOMATIC is capable of operating without human intervention.

AUTOMATIC MULTILEVEL DAYLIGHTING CONTROL is a multilevel lighting control that automatically reduces lighting in multiple steps or continuous dimming in response to

(This page intentionally left blank.)

mal emittance of 0.75 and a minimum initial solar reflectance of 0.40 when tested in accordance with CRRC-1.

2. Any roofing product with a minimum initial thermal emittance $\varepsilon_{initial}$ less than 0.75 when tested in accordance with CRRC-1, including but not limited to roof products with metallic surfaces, shall have a minimum initial solar reflectance of 0.70 + 0.34 * (0.75 - $\varepsilon_{initial}$) when tested in accordance with CRRC-1.

3. Liquid applied roof coatings applied to low-sloped roofs in the field as the top surface of a roof covering shall:

A. Be applied across the entire roof surface to meet the dry mil thickness or coverage recommended by the coating manufacturer, taking into consideration the substrate on which the coating is applied, and

B. Meet the minimum performance requirements listed in Table 118-C or the minimum performance requirements of ASTM C836, D3468, D6083 or D6694, whichever are appropriate to the coating material.

EXCEPTION 1 to Section 118 (i) 3B: Aluminum-pigmented asphalt roof coatings shall meet the requirements of ASTM D2824 or ASTM D6848 and be installed as specified by ASTM D3805.

EXCEPTION 2 to Section 118 (i) 3B: Cement-based roof coatings shall contain a minimum of 20% cement and shall meet the requirements of ASTM C1583, ASTM D822 and ASTM D5870.

TABLE 118-A—INSULATION REQUIRING CERTIFICATION TO STANDARDS FOR INSULATING MATERIALS

TYPE	FORM
Aluminum foil	Reflective foil
Cellular glass	Board form
Cellulose fiber	Loose fill and spray applied
Mineral aggregate	Board form
Mineral fiber	Blankets, board form, loose fill
Perlite	Loose fill
Phenolic	Board form
Polystyrene	Board form, molded or extruded
Polyurethane	Board form and field applied
Polyisocyanurate	Board form and field applied
Urea formaldehyde	Foam field applied
Vermiculite	Loose fill

TABLE 118-B—SLAB INSULATION REQUIREMENTS FOR HEATED SLAB-ON-GRADE

INSULATION LOCATION	INSULATION ORIENTATION	INSTALLATION REQUIREMENTS	CLIMATE ZONE	INSULATION R-FACTOR
Outside edge of heated slab, either inside or outside the foundation wall	Vertical	From the level of the top of the slab, down 16″ or to the frost line, whichever is greater. Insulation may stop at the top of the footing where this is less than the required depth. For below grade slabs, vertical insulation shall be extended from the top of the foundation wall to the bottom of the foundation (or the top of the footing) or to the frost line, whichever is greater.	1 - 15	5
			16	10
Between heated slab and outside foundation wall	Vertical and Horizontal	Vertical insulation from top of slab at inside edge of outside wall down to the top of the horizontal insulation. Horizontal insulation from the outside edge of the vertical insulation extending 4 feet toward the center of the slab in a direction normal to the outside of the building in plan view.	1 - 15	5
			16	10 vertical and 7 horizontal

TABLE 118-C—MINIMUM PERFORMANCE REQUIREMENTS FOR LIQUID APPLIED ROOF COATINGS FOR LOW-SLOPED ROOFS

PHYSICAL PROPERTY	ASTM TEST PROCEDURE	REQUIREMENT
Initial percent elongation (break)	D 2370	Minimum 200% 73°F (23°C)
Initial percent elongation (break) or Initial flexibility	D 2370 D 522, Test B	Minimum 60% 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Initial tensile strength (maximum stress)	D 2370	Minimum 100 psi (1.38 Mpa) 73°F (23°C)
Initial tensile strength (maximum stress) or Initial flexibility	D 2370 D 522, Test B	Minimum 200 psi (2.76 Mpa) 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Final percent elongation (break) after accelerated weathering 1000 h	D 2370	Minimum 100% 73°F (23°C)
Final percent elongation (break) after accelerated weathering 100 h or Flexibility after accelerated weathering 1000 h	D 2370 D 522, Test B	Minimum 40% 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Permeance	D 1653	Maximum 50 perms
Accelerated weathering 1000 h	D 4798	No cracking or checking[1]

[1]Any cracking or checking visible to the eye fails the test procedure.

SECTION 119 — MANDATORY REQUIREMENTS FOR LIGHTING CONTROL DEVICES

Any automatic time switch control device, occupant-sensor, motion sensor, photosensor, or automatic daylighting control device shall be installed only if the manufacturer has certified to the commission that the device complies with all of the applicable requirements of Subsections (a) through (f) and Subsections (h) through (j), and if the device is installed in compliance with Subsection (g).

(a) **All Devices: Instructions for Installation and Calibration.** The manufacturer shall provide step-by-step instructions for installation and start-up calibration of the device.

(b) **All Devices: Status Signal.** The device shall have an indicator that visibly or audibly informs the device operator that it is operating properly, or that it has failed or malfunctioned.

EXCEPTION to Section 119 (b): Photosensor or other devices where a status signal is infeasible because of inadequate power.

(c) **Automatic Time Switch Control Devices.** Automatic time switch control devices shall:

1. Be capable of programming different schedules for weekdays and weekends; and

2. Have program backup capabilities that prevent the loss of the device's program and time setting for at least 10 hours if power is interrupted.

(d) **Occupant Sensors and Motion Sensors.** Occupant sensors and motion sensors shall be capable of automatically turning off all the lights in an area no more than 30 minutes after the area has been vacated. In addition, ultrasonic and microwave devices shall have a built-in mechanism that allows calibration of the sensitivity of the device to room movement in order to reduce the false sens-

ing of occupants, and shall comply with either Item 1 or 2 below, as applicable:

1. If the device emits ultrasonic radiation as a signal for sensing occupants within an area, the device shall:

A. Have had a Radiation Safety Abbreviated Report submitted to the Center for Devices and Radiological Health, Federal Food and Drug Administration, under 21 Code of Federal Regulations, Section 1002.12 (1996), and a copy of the report shall have been submitted to the California Energy Commission; and

B. Emit no audible sound; and

C. Not emit ultrasound in excess of the decibel (dB) values shown in Table 119-A, measured no more than 5 feet from the source, on axis.

2. If the device emits microwave radiation as a signal for sensing occupants within the area, the device shall:

A. Comply with all applicable provisions in 47 Code of Federal Regulations, Parts 2 and 15 (1996), and have an approved Federal Communications Commission Identifier that appears on all units of the device and that has been submitted to the California Energy Commission; and

B. Not emit radiation in excess of 1 milliwatt per square centimeter measured at no more than 5 centimeters from the emission surface of the device; and

C. Have permanently affixed to it installation instructions recommending that it be installed at least 12 inches from any area normally used by room occupants.

(e) **Automatic Daylighting Control Devices.** Automatic daylighting control devices used to control lights in daylit zones shall:

1. Be capable of reducing the light output of the general lighting of the controlled area by at least one half in response to the availability of daylight while maintaining relatively uniform illumination throughout the area; and

2. If the device is a dimmer, provide electrical outputs to lamps for reduced flicker operation through the dimming range and without causing premature lamp failure; and

3. If the devices reduce lighting in control steps, incorporate time-delay circuits to prevent cycling of light level changes of less than three minutes and have sufficient separation (deadband) of on and off points for each control step to prevent cycling; and

4. If the devices have a time delay, have the capability for the time delay to be over-ridden or set to less than 5 seconds time delay for the purpose of set up and calibration, and automatically restore its time delay settings to normal operation programmed time delays after no more than 60 minutes; and

5. Have a setpoint control that easily distinguishes settings to within 10 percent of full scale adjustment; and

6. Have a light sensor that has a linear response with 5 percent accuracy over the range of illuminances measured by the light sensor; and

7. If the device is a stepped switching control device, show the status of lights in the controlled zone by an indicator on the control device; and

8. If the device is a dimming control device, display the light level measured by the light sensor, if the controlled electric lighting cannot be viewed from where setpoint adjustments are made.

EXCEPTION to Section 119(e) 7 & 8: If the control device is part of a networked system with a central display of each control zone status, the status indicator or light level display on each individual control device shall not be required if control setpoint adjustments can be made at the central display.

(f) **Interior Photosensors.** Interior photosensors shall not have a mechanical slide cover or other device that permits easy unauthorized disabling of the control, and shall not be incorporated into wall-mounted occupant-sensors.

(g) **Installation in Accordance with Manufacturer's Instructions.** If an automatic time switch control device, occupant-sensor, automatic daylighting control device, or interior photosensor is installed, it shall comply with both Items 1 and 2 below.

1. The device shall be installed in accordance with the manufacturer's instructions; and

2. Automatic daylighting control devices shall:

A. Be installed so that automatic daylighting control devices control only luminaires within the daylit area; and

B. Have photosensors that are either ceiling mounted or located so that they are accessible only to authorized personnel, and that are located so that they maintain adequate illumination in the area in accordance with the designer's or manufacturer's instructions.

(h) **Multi-level Astronomical Time-Switch Controls.** Multi-level astronomical time-switch controls used to control lighting in daylit zones shall:

1. Contain at least 2 separately programmable steps (relays) per zone that reduce illuminance in a relatively uniform manner as specified in Section 131(b); and

2. Have a separate offset control for each step of 1 to 240 minutes; and

3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and

4. Store time zone, longitude and latitude in nonvolatile memory; and

5. Display date/time, sunrise and sunset, and switching times for each step; and

6. Have an automatic daylight savings time adjustment; and

7. Have automatic time switch capabilities specified in Section 119 (c).

(i) **Automatic Multilevel Daylighting Controls.** An automatic multilevel daylighting control used to control lighting in daylit zones shall:

1. Meet all the requirements of section 119 (e) for automatic daylighting control devices; and

2. Meet all the multilevel and uniformity requirements of section 131 (b); and

3. Have a light sensor that is physically separated from where setpoint adjustments are made; and

4. Have controls for calibration adjustments to the lighting control device that are readily accessible to authorized personnel.

(j) **Outdoor Astronomical Time-Switch Controls.** Outdoor astronomical time-switch controls used to control outdoor lighting as specified in Section 132 (c) shall:

1. Contain at least 2 separately programmable channels per function area; and

2. Have the ability to independently offset the on and off times for each channel by 0 to 99 minutes before or after sunrise or sunset; and

3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and

APPENDIX 1-A
STANDARDS AND DOCUMENTS REFERENCED IN THE ENERGY EFFICIENCY REGULATIONS

AIR-CONDITIONING AND REFRIGERATION INSTITUTE

ARI 210/240–2003 Unitary Air Conditioning and Air-Source Heat Pump Equipment (2003)

ARI 310/380–93 Packaged Terminal Air-Conditioners and Heat Pumps (1993)

ARI 320–98 Water-Source Heat Pumps

ARI 325–98 Ground Water-Source Heat Pumps (1998)

ARI 340/360-2000 Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment (2000)

ARI 365-2002 Commercial and Industrial Unitary Air-Conditioning Condensing Units (2002)

ARI 460-2000 Remote Mechanical-Draft Air-Cooled Refrigerant Condensers (2000)

ARI 550/590-98 Standard for Water-Chilling Packages Using the Vapor Compression Cycle (1998)

ARI 560-2000 Absorption Water Chilling and Water Heating Packages (2000)

Available from: Air-Conditioning and Refrigeration Institute
4301 North Fairfax Drive, Suite 425
Arlington, Virginia 22203
(703) 524-8800

AIR CONDITIONING CONTRACTORS OF AMERICA

Manual J—Residential Load Calculation, Eighth Edition (2003)

Available from: Air Conditioning Contractors of America, Inc.
2800 Shirlington Road, Suite 300
Arlington, VA 22206
www.acca.org
(703) 575–4477

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI Z21.10.3-2001 Gas Water Heaters, Volume 1, Storage Water Heaters with Input Ratings above 75,000 Btu/h (2001)

ANSI Z21.13-2000 Gas-Fired Low Pressure Steam and Hot Water Boilers (2000)

ANSI Z21.40.4-1996 Performance Testing and Rating of Gas-Fired, Air-Conditioning and Heat Pump Appliances (1996)

ANSI Z21.47-2001 Gas-Fired Central Furnaces (2001)

ANSI Z83.8-2002 Gas Unit Heaters and Gas-Fired Duct Furnaces (2002)

Available from: American National Standards Institute
25 West 43rd Street, 4th floor
New York, NY 10036
(212) 642-4900

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (NATIONAL PUBLICATIONS)

ASHRAE 55-1992 Thermal Environment Conditions for Human Occupancy (1992)

ASHRAE Handbooks

Applications Volume, Heating, Ventilating and Air-Conditioning Applications (2003)

Equipment Volume, Heating, Ventilating and Air-Conditioning Systems and Equipment (2000)

Fundamentals Volume, Fundamentals (2001)

Available from: American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle N.E.
Atlanta, Georgia 30329
(404) 636-8400 or (800) 527-4723

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (REGIONAL PUBLICATION)

ASHRAE Climatic Data for Region X Arizona, California, Hawaii, Nevada, Publication SPCDX, 1982, ISBN #20002196 and Supplement, 1994, ISBN #20002596

Available from: Order Desk
Building News
10801 National Boulevard
Los Angeles, CA 90064
(800) 873-6397 or (310) 474-7771
http://www.bnibooks.com/

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM C55-01 Standard Specifications for Concrete Brick (2001)

ASTM C177-97 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus (1997)

ASTM C272-01 Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions (2001)

ASTM C335-95 Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation (1995)

ASTM C518-02 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus (2002)

ASTM C731-00 Standard Test Method for Extrudability, After Package Aging, of Latex Sealants (2000)

ASTM C732-01 Standard Test Method for Aging Effects of Artificial Weathering on Latex Sealants (2001)

ASTM C836-05 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course (2005)

ASTM C1167-96	Standard Specification for Clay Roof Tiles
ASTM C1371-98	Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers (1998)
ASTM C1583-04	Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method) (2004)
ASTM D522-93a (2001)	Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings (2001)
ASTM D822-01	Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings (2001)
ASTM D1003-00	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics (2000)
ASTM D1653-03	Standard Test Methods for Water Vapor Transmission of Organic Coating Films (2003)
ASTM D2370-98 (2002)	Standard Test Method for Tensile Properties of Organic Coatings (2002)
ASTM D2824-02	Standard Specification for Aluminum-Pigmented Asphalt Roof Coatings, Nonfibered, Asbestos Fibered, and Fibered without Asbestos, 2002
ASTM D3468-99	Standard Specification for Liquid-Applied Neoprene and Chlorosulfonated Polythylene Used in Roofing and Waterproofing (1999)
ASTM D3805-97	Standard Guide for Application of Aluminum-Pigmented Asphalt Roof Coatings, 1997 (reapproved 2003)
ASTM D4798-01	Standard Test Method Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method) (2001)
ASTM D5870-95 (2003)	Standard Practice for Calculating Property Retention Index of Plastics (2003)
ASTM D6083-05e1	Standard Specification for Liquid Applied Acrylic Coating Used in Roofing (2005)
ASTM D6694-01	Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing (2001)
ASTM E96-00	Standard Test Methods for Water Vapor Transmission of Materials
ASTM E283-91	Standard Test Method for Determining the (1999) Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E408-71 (2002)	Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques (2002)

Available from: American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, Pennsylvania
19428-2959
(610) 832-9500

CALIFORNIA BUILDING STANDARDS COMMISSION

2001 California Electrical Code

Available from: California Building Standards Commission
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833-2936
(916) 263-0916
www.bsc.ca.gov

CALIFORNIA ENERGY COMMISSION

Appliance Efficiency Standards

Nonresidential Alternative Calculation Method (ACM) Manual

Nonresidential Manual

Residential Alternative Calculation Method (ACM) Manual

Residential Manual

Available from: California Energy Commission
1516 Ninth Street
Sacramento, CA 95814
(916) 654-5106 or
(800) 772-3300 (in California)
http://www.energy.ca.gov/title24

CALIFORNIA DEPARTMENT OF CONSUMER AFFAIRS

Standards for Insulating Material

Available from: California Department of Consumer Affairs
Bureau of Home Furnishings and Thermal Insulation
3485 Orange Grove Ave
North Highlands, CA 95660
(916) 574-2041

CODE OF FEDERAL REGULATIONS

21 Code of Federal Regulations, Section 1002.12 (1996)

47 Code of Federal Regulations, Parts 2 and 15 (1996)

Available from: Department of Energy
Washington, D.C. 20585

COOLING TOWER INSTITUTE

CTI ATC-105-00	Acceptance Test Code for Water Cooling Towers (2000)
CTI STD-201-02	Certification Standard for Commercial Water Cooling Towers (2002)

Available from: Cooling Tower Institute
530 Wells Fargo, Suite 218
Post Office Box 73383
Houston, Texas 77273
(281) 583-4087

COOL ROOF RATING COUNCIL

CRRC-1 Product Rating Program Manual (2002)

Available from: Cool Roof Rating Council
1738 Excelsior Avenue
Oakland, CA 94602
(866) 465-2523
www.coolroofs.org

HYDRONICS INSTITUTE

HI Heating Boiler Standard 86, 6th Edition (1989)

Available from: Hydronics Institute
35 Russo Place, P.O. Box 218
Berkeley Heights, New Jersey 07922
(908) 464-8200

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA

The IESNA Lighting Handbook, Ninth Edition (2000)

Available from: IESNA
120 Wall Street, 17th Floor
New York, New York 10005-4001
(212) 248-5000
Email: iesna@iesna.org

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS

2001 California Mechanical Code

Available from: International Association of Plumbing and Mechanical Officials
2001 E. Walnut Drive South
Walnut, California 91789-2825
(800) 85-IAPMO (854-2766)
http//:www.iapmo.org

INTERNATIONAL CODE COUNCIL (formerly ICBO)

2001 California Building Code

Available from: International Code Council Los Angeles District Office
5360 South Workman Mill Road
Whittier, California 90601-2298
(800) 284-4406
http//:www.iccsafe.org

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO-13256-1 Water-Source Heat Pumps-Testing and Rating for Performance-Part 1: Water-to-Air and Brine-to-Air Heat Pumps (1998)

Available from: ISO
1, rue de Varembe
Case postale 56
CH-1211
Geneve 20, Switzerland

NATIONAL FENESTRATION RATING COUNCIL

NFRC 100 Procedure for Determining Fenestration Product U-factors (1997, 2002)

NFRC 200 Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence (1997, 2002)

NFRC 400 Procedure for Determining Fenestration Product Air Leakage (1995, 2002)

Available from: National Fenestration Rating Council
8484 Georgia Avenue, Suite 320
Silver Spring, Maryland 20910
(301) 589-1776
Email: info@nfrc.org

SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION

Residential Comfort System Installation Standards Manual (1998)

Available from: Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1209
(703) 803-2980
ww.smacna.org

UNDERWRITERS LABORATORIES

UL 181 Standard for Safety for Factory-made Air Ducts and Connectors (1996)

UL 181A Standard for Safety for Closure Systems for Use with Rigid Air Ducts and Air Connectors (1994)

UL 181B Standard for Safety for Closure Systems for Use with Flexible Air Ducts and Air Connectors (1995)

UL 723 Standard for Test for Surface Burning Characteristics of Building Materials (1996)

UL 727 Standard for Oil-Fired Central Furnaces (1994)

UL 731 Standard for Oil-Fired Unit Heaters (1995)

UL 1598 Standard for Luminaires (2000)

Available from: Underwriters Laboratories
333 Pfingsten Road
Northbrook, Illinois 60062-2096
(847) 272-8800

(This page intentionally left blank.)

HISTORY NOTE APPENDIX

CALIFORNIA ENERGY CODE
(Title 24, Part 6, California Code of Regulations)

For prior history, see History Note Appendix to the 2001 *California Energy Code,* effective November 1, 2002.

1. The 2001 Triennial Edition, *California Energy Code*, was published May 1, 2002. The California Building Standards Commision established November 1, 2002 as the effective date.

2. (CEC 03/02) Approval of energy efficiency standards, which adopt by reference the National Fenestration Rating Council's (NFRC) 2002 window rating and labeling procedures; CCR, Title 24, Parts 1 and 6. Approved by the California Building Standards Commission on May 14, 2003, and filed with the Secretary of State on May 16, 2003. Effective June 14, 2003.

3. (CEC 01/03) 2005 building energy efficiency standards approved by the California Building Standards Commission on July 21, 2004, for publication in the 2005 *California Energy Code;* filed with the Secretary of State September 24, 2004; published April 1, 2005; effective October 1, 2005.

4. (CEC 01/05) Modify testing requirements for liquid applied cool roof coatings, Section 118 (i) 3 and Table 118-C "Minimum Performance Requirements for Liquid Applied Roof Coatings." Add standards to Section 101 (b) and reference standards to Appendix 1-A. Effective September 11, 2006.