PLEASE LOOK AT THE 2013 nonresidential compliance manual

QUICK CHECKLIST

1. Verifying the lighting fixtures and their wattages, lighting controls, etc. from the Lighting Certificate(s) of Compliance on the Electrical Plans in a lighting schedule, lighting fixture legend for the floor plan, etc.;
2. Verifying the window and skylight U-Factor and SHGC values from the Envelope Certificate(s) of Compliance on the Structural/Architecture Plans in a window/skylight schedule, window/skylight legend for the floor plan, etc.;
3. Verifying the wall, floor, and roof/ceiling insulation R-values from the Envelope Certificate(s) of Compliance on the Structural/Architecture Plans in a framing plan, the structural details, etc.; and
4. Verifying the HVAC equipment SEER, EER, AFUE, etc. efficiency values from the Mechanical Certificate(s) of Compliance on the Mechanical Plans in an Equipment Schedule.

NOTE: The enforcement agency should clearly articulate to the builder/designer the acceptable methods of specifying energy features on the building plans for approval. To obtain a list of Energy Commission-approved energy code compliance software applications, visit the Commission Website at:
http://www.energy.ca.gov/title24/2013standards/index.html; or call the
Energy Standards
Hotline at 1-800-772-3300.

GENERAL

BCNR 01.

NEW ENERGY STANDARDS

California Energy Commission mandated changes in both residential and nonresidential energy requirements. These changes apply to all permits applied on July 1,2014. The version of the computer program that you have used is no longer current. Provide new calculations using acceptable updated nonresidential computer energy programs. As of July 1, 2014, they are the following:

CBECC-Com V3 (http://bees.archenergy.com/software.html)
EnergyPro V6.2 (http://www.energysoft.com/download/energypro-6/)
IES Virtual Environment 2013 Title-24 Feature Pack 1 (VE2013 Title-24 FP1) (http://www.iesve.com/software/title24)

BCNR 02.

PERFORMANCE APPROACH CALCULATIONS

Provide complete calculations to demonstrate that the building's use of source energy calculated is no greater than the energy budget calculated under the provisions of Title 24, Chapter 6, Subchapter 5, Section 140.1

BCNR 03.

PERFORMANCE APPROACH APPROVAL

The computer program used to calculate the energy budget and/or the source energy use must be approved by the California State Energy Resources Conservation and Development Commission.

BCNR 04.

PERFORMANCE APPROACH SOLAR HEAT GAIN COEFFICIENTS

Solar Heat Gain Coefficients (SHGC) must be determined using the National Fenestration Rating Council's NFRC 200 (2011) or NFRC 100-SB, and shall not be adjusted for the effects of interior or exterior shading devices.

BCNR 05.

PRESCRIPTIVE APPROACH CALCULATIONS

Provide complete calculations to demonstrate that the building envelope complies with Title 24, Part 6, Chapter 5, Section 140.3

ROOF

BCNR 06.

INSULATION

Roofs shall have an overall assembly U-factor no greater than the applicable value in Table 140.3-B, C or D, and where required Section 110.8(e), insulation shall be placed in direct contact with a continuous roof or drywall ceiling. (Section 140.3(a),B)

BCNR 07.

OPAQUE PORTIONS

The opaque portions of the roof/ceiling that separates conditioned spaces from unconditioned spaces or ambient air shall and meet the applicable requirements of Items 1 and 2 below: (Section 120.7 (a))

1. Metal Building: The weighted average U-factor of the roof assembly shall not exceed 0.098
2. Wood framed and others: The weighted average U-factor of the roof assembly shall not exceed 0.075.
3. Wood framed and others: A minimum R-11 insulation between framing members, or the weighted average U-factor of the wall assembly shall no exceed U-0.110

BCNR 08.

SOLAR ZONE

The solar zone shall be located on the roof or overhang of the building or on the roof or overhang of another structure located within 250 feet of the building or on covered parking installed within the building project and have a total area no less than 15 percent of the total roof area of the building excluding any skylight area. (Section 110.10(b), 1, B)

BCNR 09.

LOW-SLOPED ROOFS

Low-sloped roofs shall have a minimum aged solar reflectance of 0.63 and a minimum thermal emittance of 0.75; or a minimum solar reflectance index of 75. (Section 140.3(a), 1, A, i, a)

BCNR 10.

STEEP-SLOPED ROOFS

Steep-sloped roofs shall have a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of 16. (Section 140.3(a), 1, i, b)

WALL

BCNR 11.

INSULATION FOR DEMISING WALLS

The opaque portions of framed demising walls in nonresidential buildings shall be insulated with an installed R-value of no less than R-13 between framing members. (Section 110.8(f))

BCNR 12.

INSULATION

The opaque portions of walls that separate conditioned spaces from unconditioned spaces or ambient air shall meet the applicable requirements of Items 1 through 6 below: (Section 120.7(b))

1. Metal building: The weighted average U-factor of the wall assembly shall not exceed 0.113.
2. Metal framed: The weighted average U-factor of the wall assembly shall not exceed 0.105.
3. A 6-inch or greater hollow core concrete masonry unit shall have a U-factor not to exceed 0.440.
4. Heavy mass walls: An 8-inch or greater hollow core concrete masonry unit shall have a U-factor not to exceed 0.690.
5. Wood framed and others: The weighted average U-factor of the wall assembly shall not exceed 0.110.
6. Spandrel Panels and glass curtain wall: The weighted average U-factor of the glass spandrel panels and glass curtain wall assembly shall not exceed 0.280.

BCNR 13.

U-FACTOR

Exterior walls shall have an overall assembly U-factor no greater than the applicable value in Table 140.3-B, C or D. (Section 140.3(a), 2)

BCNR 14.

AIR BARRIER

All buildings shall have a continuous air permeance not exceeding 0.004 cfm/ft^2. Air barriers must meet the requirements of Table 140.3-B (Section 140.3(a)9)

FLOOR

BCNR 15.

U-FACTOR

Exterior floors and soffits shall have an overall assembly U-factor no greater than the applicable value in Table 140.3-B, C or D. (Section 140.3(a)4)

BCNR 16.

HEATED SLAB INSULATION

Heated slab floors shall be insulated according to the requirements in Table 110.8-A. (Section 110.8(g))

TABLE 110.8-A
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 inches 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

Insulation materials in ground contact must:

A. Be certified by Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation that the insulation conductive thermal performance is approved pursuant to the California Code of Regulations; and
B. Have a water absorption rate for the insulation material alone without facing that is no greater than 0.3 percent when tested in accordance with Test Method A-24 Hour-Immersion of ASTM C 272.
C. Water vapor permeance no greater than 2.0 perm/inch when tested in accordance with ASTM E96.

Insulation installation must:

A. Be covered with a solid guard that protects against damage from ultraviolet radiation, moisture, landscaping operation, equipment maintenance and wind; and
B. Include a rigid plate, which penetrates the slab and blocks the insulation from acting as a conduit for insects from the ground to the structure above the foundation.

FENESTRATION

BCNR 17.

WEST-FACING AREA

Vertical windows shall have a west-facing area no greater than 40 percent of the gross-west facing exterior wall area, or 6 feet times the west-facing display perimeter, whichever is greater. (Section 140.3(a)5A)

BCNR 18.

NON-WEST WINDOW AREA

Vertical windows shall have an area no greater than 40 percent of the gross exterior wall area, or 6 feet times the display perimeter, whichever is greater. (Section 140.3(a)5A)

BCNR 19.

U-FACTOR

Have an area-weighted average U-factor no greater than the applicable value in Table 140.3B, C or D. (Section 140.3(a)5B)

BCNR 20.

RELATIVE SOLAR HEAT GAIN COEFFICIENT

Have an area-weighted average relative solar heat gain coefficient, RSHGC, excluding the effects of interior shading, no greater than the applicable value in Table 140.3-B, C, or D. (Section 140.3(a)5C)

BCNR 21.

VISIBLE TRANSMITTANCE

Have an area-weighted average visible transmittance (VT), no less than the applicable value in Table 140.3-B, and C, or Equation 140.3-B, as applicable. (Section 140.3(a)5D)

BCNR 22.

SKYLIGHT AREA

Skylights shall have an area no greater than 5 percent of the gross exterior roof area. (Section 140.3(a)6A)

BCNR 23.

SKYLIGHT U-FACTOR

Skylights shall have an area-weighted performance rating U-factor no greater than the applicable value in Table 140.3-B, C, or D. (Section 140.3(a)6B)

BCNR 24.

SKYLIGHT RSHGC

Skylights shall have an area-weighted performance rating solar heat gain coefficient no greater than the applicable value in Table 140.3-B, C, or D. (Section 140.3(a)5C)

TABLE 140.3-B
PRESCRIPTIVE ENVELOPE CRITERIA FOR NONRESIDENTIAL BUILDINGS(INCLUDING RELOCATABLE PUBLIC SCHOOL BUILDINGS WHERE MANUFACTURER CERTIFIES USE ONLY IN SPECIFIC CLIMATE ZONE; NOT INCLUDING HIGH-RISE RESIDENTIAL BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS)

				CLIMATE ZONE														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ENVELOPE	Maximum *U*-factor	Roofs/ Ceilings	Metal building	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
			Wood framed and other	0.049	0.039	0.039	0.039	0.049	0.075	0.067	0.067	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
		Walls	Metal building	0.113	0.061	0.113	0.061	0.061	0.113	0.113	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.061
			Metal-Framed	0.098	0.062	0.082	0.062	0.062	0.098	0.098	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
			Mass light[1]	0.196	0.170	0.278	0.227	0.440	0.440	0.440	0.440	0.440	0.170	0.170	0.170	0.170	0.170	0.170	0.170
			Mass heavy[1]	0.253	0.650	0.650	0.650	0.650	0.690	0.690	0.690	0.690	0.650	0.184	0.253	0.211	0.184	0.184	0.160
			Wood-Framed and other	0.102	0.059	0.110	0.059	0.102	0.110	0.110	0.102	0.059	0.059	0.059	0.059	0.059	0.059	0.042	0.059
		Floors/ Soffits	Mass	0.092	0.092	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.092	0.092	0.092	0.092	0.092	0.058
			Other	0.048	0.039	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.039	0.071	0.071	0.039	0.039	0.039
	Roofing Products	Low-sloped	Aged solar reflectance	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
			Thermal emittance	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
		Steep-sloped	Aged solar reflectance	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
			Thermal emittance	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0. 75	0.75	0.75	0.75	0.75	0.75	0.75
	Air Barrier			NR	NR	NR	NR	NR	NR	NR	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ
	Exterior Doors, Maximum *U*-factor		Nonswinging	0.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	0.50
			Swinging	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

1. Light mass walls are walls with a heat capacity of at least 7.0 Btu/h-ft^2 and less than 15.0 Btu/h-ft^2. Heavy mass walls are walls with a heat capacity of at least 15.0 Btu/h-ft^2.

				ALL CLIMATE ZONES				
					Fixed Window	Operable Window	Curtainwall or Storefront	Glazed Doors
ENVELOPE	FENESTRATION	Vertical	Area-Weighted performance rating	Max *U*-factor	0.36	0.46	0.41	0.45
				Max RSHGC	0.25	0.22	0.26	0.23
			Area-Weighted performance rating	Min VT	0.42	0.32	0.46	0.17
			Maximum WWR%	40%				
					Glass, Curb Mounted	Glass, Deck Mounted	Plastic, Curb Mounted	
		Skylights	Area-Weighted performance rating	Max *U*-factor	0.58	0.46	0.88	
				Max SHGC	0.25	0.25	NR	
			Area-Weighted performance rating	Min VT	0.49	0.49	0.64	
			Maximum SRR%	5%				

TABLE 140.3-C
PRESCRIPTIVE ENVELOPE CRITERIA FOR HIGH-RES BUILDINGS AND GUEST ROOMS OF HOTEL/MOTEL BUILDINGS

				Climate Zone														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ENVELOPE	Maximum *U*-factor	Roofs/ Ceilings	Metal building	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
			Wood framed and other	0.034	0.028	0.039	0.028	0.039	0.039	0.039	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
		Walls	Metal building	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.057	0.057	0.057	0.057	0.057
			Metal-Framed	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105
			Mass light[1]	.170	0.170	0.170	0.170	0.170	0.227	0.227	0.227	0.196	0.170	0.170	0.170	0.170	0.170	0.170	0.170
			Mass heavy[1]	0.160	0.160	0.160	0.184	0.211	0.690	0.690	0.690	0.690	0.690	0.184	0.253	0.211	0.184	0.184	0.160
			Wood-Framed and other	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.042	0.059	0.059	0.042	0.042	0.042
		Floors/ Soffits	Mass	0.045	0.045	0.058	0.058	0.058	0.069	0.092	0.092	0.092	0.669	0.058	0.058	0.058	0.045	0.058	0.037
			Other	0.034	0.034	0.039	0.039	0.039	0.039	0.071	0.039	0.039	0.039	0.039	0.039	0.039	0.034	0.039	0.034
	Roofing Products	Low-sloped	Aged solar reflectance	NR	NR	NR	NR	NR	NR	NR	NR	0.55	0.55	0.55	NR	0.55	0.55	0.55	NR
			Thermal emittance	NR	NR	NR	NR	NR	NR	NR	NR	0.75	0.75	0.75	NR	0.75	0.75	0.75	NR
		Steep-sloped	Aged solar reflectance	NR	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	NR
			Thermal emittance	NR	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0. 75	0.75	0.75	0.75	0.75	0.75	NR
	Exterior Doors, Maximum *U*-factor		Nonswinging	0.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	0.50
			Swinging	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

1. Light mass walls are walls with a heat capacity of at least 7.0 Btu/ft^2-°F and less than 15.0 Btu/ft^2-°F. Heavy mass walls are walls with a heat capacity of at least 15.0 Btu/ft^2-°F.

				ALL CLIMATE ZONES				
					Fixed Window	Operable Window	Curtainwall or Storefront	Glazed Doors
ENVELOPE	FENESTRATION	Vertical	Area-Weighted performance rating	Max *U*-factor	0.36	0.46	0.41	0.45
				Max RSHGC	0.25	0.22	0.26	0.23
			Area-Weighted performance rating	Min VT	0.42	0.32	0.46	0.17
			Maximum WWR%	40%				
					Glass, Curb Mounted	Glass, Deck Mounted	Plastic, Curb Mounted	
		Skylights	Area-Weighted performance rating	Max *U*-factor	0.58	0.46	0.88	
				Max SHGC	0.25	0.25	NR	
			Area-Weighted performance rating	Min VT	0.49	0.49	0.64	
			Maximum SRR%	5%				

TABLE 140.3-D
PRESCRIPTIVE ENVELOPE CRITERIA FOR RELOCATABLE PUBLIC SCHOOL BUILDINGS FOR USE IN ALL CLIMATE ZONES

Roofs/Ceilings		
Roofs of metal buildings	Maximum *U*-factor 0.048	
Roofs of all nonmetal buildings	Maximum *U*-factor 0.039	
Roofing Products – Aged Reflectance/Emittance		
Low-sloped/low-sloped	0.63/0.75	
Steep-sloped/steep-sloped	0.20/0.75	
Walls		
Walls of wood frame buildings	Maximum *U*-factor 0.059	
Walls of metal frame buildings	Maximum *U*-factor 0.062	
Walls of metal buildings	Maximum *U*-factor 0.057	
Walls of mass/7.0 ≤ HC, any building	Maximum *U*-factor 0.170	
All other walls	Maximum *U*-factor 0.059	
Floors and soffits of all buildings	Maximum *U*-factor 0.048	
Windows of All Buildings		
U-factor	Maximum *U*-factor 0.47	
RSHGC	Maximum RSHGC 0.26	
Glazed Doors, All Buildings		
Max average weighted *U*-factor	0.45	
Max average weighted RSHGC	0.23	
Exterior Door, All Buildings		
Nonswinging doors	Maximum *U*-factor 0.50	
Swinging doors	Maximum *U*-factor 0.70	
Skylights		
Glass with curb	Maximum *U*-factor 0.99	
Glass without curb	Maximum *U*-factor 0.57	
Plastic with curb	Maximum *U*-factor 0.87	
Glass skylights	0-2% SRR	Maximum SHGC 0.46
	2.1-5% SRR	Maximum SHGC 0.36
Plastic skylights	0-2% SRR	Maximum SHGC 0.69
	2.1-5% SRR	Maximum SHGC 0.57

LIGHTING

BCNR 25.

LIGHTING WATTAGE EXCLUDED

For a list of indoor lighting applications that may be excluded from actual indoor lighting power density please see Section 140.6(a)3

BCNR 26.

LIGHTING CONTROLS

All luminaries shall be functionally controlled with manually switched ON and OFF lighting controls. Each area enclosed by ceiling-height partitions shall be independently controlled. The lighting controls shall meet the following requirements (Section 130.1(a)):

A. Be readily accessible; and
B. Be operable with a manual switch that is located in the same room or area with the lighting that is controlled by the lighting control; and
C. If controlling dimmable luminaires, be a dimmer switch that allows manual ON and OFF functionality, and is capable of manually controlling lighting though all lighting control steps that are required in Section 130.1(b).

BCNR 27.

MULTI-LEVEL LIGHTING CONTROLS

The general lighting of any enclosed area 100 square feet or larger, with a connected lighting load that exceeds 0.5W per square foot shall meet the requirements of Section 130.1(b).

BCNR 28.

OTHER LIGHTING CONTROLS

Other lighting controls may be installed in addition to the manual lighting controls, provided they do not override the functionality of controls installed in accordance with Section 130.1(a) 1, 2 or 4.

BCNR 29.

AUTOMATIC DAYLIGHT CONTROLS

Any altered luminaires providing general lighting that are in or are partially in daylit zones shall meet the requirements of Section 130.1(d)2.

Daylight requirements do not apply if the installed altered lighting power is less than or equal to 85% of the allowed power using the Area Category Method, defined in Section 140.6. the indicated requirements do not apply to indoor lighting alterations that are replacement-in-kind of parts of an existing luminaire, including any: lamps, lamp holders, or when a replacement of those parts is not a luminaire-modification-in-place in accordance with 141.0(b)2(iii). Additionally, requirements do not apply to lighting alterations directly caused by the disturbance of asbestos. Lighting adjustments in conjunction with asbestos abatement shall comply.

BCNR 30.

SHUT-OFF CONTROLS

In addition to lighting controls installed to comply with Sections 130.1(a) and (b), all installed indoor lighting shall be equipped with controls that meet the following requirements (Section 130.1(c)):

A. Shall be controlled with an occupant sensing control, automatic time-switch control, signal from another building system, or other control capable of automatically shutting OFF all of the lighting when the space is typically unoccupied; and
B. Separate controls for the lighting on each floor; and
C. Separate controls for a space enclosed by ceiling height partitions not exceeding 5,000 square feet; and
D. Separate controls for general, display, ornamental and display case lighting.

BCNR 31.

REDUCTION OF WATTAGE THROUGH CONTROLS

In calculating actual indoor lighting power density, the installed watts of luminaire providing genera lighting in an area listed in Table 140.3-A may be reduced by the product of the number of watts controlled as described in Table 140.6-A, times the applicable power adjustment factor (PAF), if the conditions listed in Section 140.6(a)2 are met. (Section 140.6(a)2)

BCNR 32.

DEMAND RESPONSIVE CONTROLS

Lighting power in buildings larger than 10,000 square feet shall be capable of being automatically reduced in response to a demand response signal; so that the building's total lighting power can be lowered by a minimum of 15 percent below the total installed lighting power. Lighting shall be reduced in a manner consistent with uniform level of illumination requirements in Table 130.1-A. (Section 130.1(e))

TABLE 130.1-A MULTILEVEL LIGHTING CONTROLS AND UNIFORMITY REQUIREMENTS

LUMINAIRE TYPE	MINIMUM REQUIRED CONTROL STEPS (percent of full rated power[1])				UNIFORM LEVEL OF ILLUMINANCE SHALL BE ACHIEVED BY:
Line-voltage sockets except GU-24	Continuous dimming 10-100 percent				
Low-voltage incandescent systems					
LED luminaires and LED source systems					
GU-24 rated for LED					
GU-24 sockets rated for fluorescent > 20 watts	Continuous dimming 20-100 percent				
Pin-based compact fluorescent > 20 watts[2]					
GU-24 sockets rated for fluorescent ≤ 20 watts	Minimum one step between 30-70 percent				Stepped dimming; or continuous dimming; or switching alternate lamps in a luminaire
Pin-based compact fluorescent ≤ 20 watts[2]					
Linear fluorescent and U-bent fluorescent ≤ 13 watts					
Linear fluorescent and U-bent fluorescent > 13 watts	Minimum one step in each range:				Stepped dimming; or continuous dimming; or switching alternate lamps in each luminaire, having a minimum of four lamps per luminaire, illuminating the same area and in the same manner
	20-40%	50-70%	80-85%	100%	
Track Lighting	Minimum one step between 30 – 70 percent				Step dimming; or continuous dimming; or separately switching circuits in multicircuit track with a minimum of two circuits.
HID > 20 watts	Minimum one step between 50 - 70 percent				Stepped dimming; or continuous dimming; or switching alternate lamps in each luminaire, having a minimum of two lamps per luminaire, illuminating the same area and in the same manner.
Induction > 25 watts					
Other light sources					

1. Full rated input power of ballast and lamp, corresponding to maximum ballast factor.
2. Includes only pin based lamps: twin tube, multiple twin tube, and spiral lamps.

BCNR 33.

AREA CATEGORY METHOD – GENERAL LIGHTING

Primary function area and W/ft^2 match Table 140.6-C (per area) (Section 140.6(c)2)

Verify areas qualify for additional lighting allowance Ft^2, additional watts, and total design watts.

TABLE 140.6-C
AREA CATEGORY METHOD – LIGHTING POWER DENSITY VALUES (WATTS/FT²)

PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER (W/ft²)	PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER (W/ft²)
Auditorium area		1.5[3]	Library area	Reading areas	1.2[3]
Auto repair area		0.9[2]		Stack areas	1.5[3]
Beauty salon area		1.7	Lobby area	Hotel lobby	1.1[3]
Civic meeting place area		1.3[3]		Main entry lobby	1.5[3]
Classroom, lecture, training, vocational areas		1.2[5]	Locker/dressing room		0.8
Commercial and industrial storage areas (conditioned and unconditioned)		0.6	Lounge area		1.1[3]
Commercial and industrial storage areas (refrigerated)		0.7	Malls and atria		1.2[3]
Convention, conference, multipurpose and meeting center areas		1.4[3]	Medical and clinical care area		1.2
Corridor, restroom, stair, and support areas		0.6	Office area	> 250 square feet	0.75
Dining area		1.1[3]		≤ 250 square feet	1.0
Electrical, mechanical, telephone rooms		0.7[2]	Parking garage area	Parking Area	0.14
Exercise center, gymnasium areas		1.0		Dedicated Ramps	0.3
Exhibit, museum areas		2.0		Daylight Adaptation Zones[9]	0.6
Financial transaction area		1.2[3]	Religious worship area		1.5[3]
General commercial and industrial work areas	Low bay	0.9[2]	Retail merchandise sales, wholesale showroom areas		1.2[6, 7]
	High bay	1.0[2]			
	Precision	1.2[4]	Theater area	Motion picture	0.9[3]
Grocery sales area		1.2[6, 7]		Performance	1.4[3]
Hotel function area		1.5[3]	Transportation function area		1.2
Kitchen, food preparation areas		1.6	Videoconferencing studio		1.2[8]
Laboratory area, scientific		1.4[1]	Waiting area		1.1[3]
Laundry area		0.9	All other areas		0.6

Notes:

See Section 140.6(c)2 for an explanation of additional lighting power available for specialized task work, ornamental, precision, accent, display, decorative and white boards and chalk boards, in accordance with the footnotes in this table. The smallest of the added lighting power listed in each footnote below, or the actual design wattage, may be added to the allowed lighting power only when using the area category method of compliance.

Footnote number	Type of lighting system allowed	Maximum allowed added lighting power. (W/ft² of task area unless otherwise noted)
1	Specialized task work.	0.2 W/ft²
2	Specialized task work.	0.5 W/ft²
3	Ornamental lighting as defined in Section 100.1 and in accordance with Section 140.6.(c)2.	0.5 W/ft²
4	Precision commercial and industrial work.	1.0 W/ft²
5	Per linear foot of white board or chalk board.	5.5 W per linear foot
6	Accent, display and feature lighting - luminaires shall be adjustable or directional.	0.3 W/ft²
7	Decorative lighting - primary function shall be decorative and shall be in addition to general illumination.	0.2 W/ft²
8	Additional videoconferencing studio lighting complying with all of the requirements in Section 140.6(c)2Gvii.	1.5 W/ft²
9	Daylight adaptation zones shall be no longer than 66 feet from the entrance to the parking garage.	

BCNR 34.

TAILORED METHOD – POWER ALLOWANCE SUMMARY

Check illuminance values, room cavity ratio, and floor area of space for al function areas shown on Table 140.6-D. (Section 140.6(c)3)

TABLE 140.6-D
TAILORED METHOD LIGHTING POWER ALLOWANCES

1	2	3	4	5
Primary Function Area	General Illumination Level (Lux)	Wall Display Power (W/ft)	Allowed Combined Floor Display Power and Task Lighting Power (W/ft²)	Allowed Ornamental/ Special Effect Lighting
Auditorium area	300	2.25	0.3	0.5
Civic meeting place	300	3.15	0.2	0.5
Convention, conference, multipurpose, and meeting center areas	300	2.50	0.4	0.5
Dining areas	200	1.50	0.6	0.5
Exhibit, museum areas	150	15.0	1.2	0.5
Financial transaction area	300	3.15	0.2	0.5
Grocery store area	500	8.00	0.9	0.5
Hotel function area	400	2.25	0.2	0.5
Lobby area:				
Hotel lobby	200	3.15	0.2	0.5
Main entry lobby	200	0	0.2	0
Lounge area	200	7.00	0	0.5
Malls and atria	300	3.50	0.5	0.5
Religious worship area	300	1.50	0.5	0.5
Retail merchandise sales, and showroom areas	400	14.00	1.0	0.5
Theater area:				
Motion picture	200	3.00	0	0.5
Performance	200	6.00	0	0.5
Transportation function area	300	3.15	0.3	0.5
Waiting area	300	3.15	0.2	0.5

BCNR 35.

SPECIAL FUNCTION AREAS

Check illuminance values, room cavity ratio, and floor area space for all function areas NOT shown on Table 140.6-D. Determine allowed indoor lighting power density allotments for general lighting for only specific primary functions areas NOT listed in Table 140.6-D in accordance with Section 140.6(c)3H.

BCNR 36.

OUTDOOR LIGHTING CONTROLS

Check that mandatory lighting controls selected match the scope of project: Type of lighting controls, application of controls, number of luminaires per control, and standard section with which controls apply. (Section 130.2(c))

BCNR 37.

EXEMPT LIGHTING FIXTURES

Verify light fixtures EXEMPT from lighting power calculations. The allowed outdoor lighting shall be calculated according to outdoor lighting zone in Title 24, Part 1, Section 10-114. (Section 140.7(a))

BCNR 38.

CALCULATION OF ALLOWED LIGHTING POWER

The allowed lighting power shall be the combined total of the sum of the general hardscape lighting allowance determined in accordance with Section 140.7(d)1, and the sum of the additional lighting power allowance for specific applications determined in accordance with Section 140.7(d)2. (Section 140.7(d)1)

TABLE 140.7-A
GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

TYPE OF POWER ALLOWANCE	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Area wattage allowance (AWA)	0.035 W/ft^2	0.045 W/ft^2	0.090 W/ft^2	0.115 W/ft^2
Linear wattage allowance (LWA)	0.25 W/lf	0.45 W/lf	0.60 W/lf	0.85 W/lf
Initial wattage allowance (IWA)	340 W	510 W	770 W	1030 W

BCNR 39.

"USE IT OR LOSE IT" OUTDOOR LIGHTING ALLOWANCE

Specific lighting applications is appropriate to the project scope

Qualify locations, wattage allowance per lighting zone, number of luminaires, watts per luminaire

TABLE 140.7-B
ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

LIGHTING APPLICATION	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
WATTAGE ALLOWANCE PER APPLICATION. Use all that apply as appropriate.				
Building entrances or exits. Allowance per door. Luminaires qualifying for this allowance shall be within 20 feet of the door.	30 watts	60 watts	90 watts	90 watts
Primary entrances to senior care facilities, police stations, hospitals, fire stations and emergency vehicle facilities. Allowance per primary entrance(s) only. Primary entrances shall provide access for the general public and shall not be used exclusively for staff or service personnel. This allowance shall be in addition to the building entrance or exit allowance above. Luminaires qualifying for this allowance shall be within 100 feet of the primary entrance.	45 watts	80 watts	120 watts	130 watts
Drive up windows. Allowance per customer service location. Luminaires qualifying for this allowance shall be within two mounting heights of the sill of the window.	40 watts	75 watts	125 watts	200 watts
Vehicle service station uncovered fuel dispenser. Allowance per fueling dispenser. Luminaires qualifying for this allowance shall be within two mounting heights of the dispenser.	120 watts	175 watts	185 watts	330 watts
WATTAGE ALLOWANCE PER UNIT LENGTH (W/linear ft). May be used for one or two frontage side(s) per site.				
Outdoor sales frontage. Allowance for frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides, provided that a different principal viewing location exists for each side. Luminaires qualifying for this allowance shall be located between the principal viewing location and the frontage outdoor sales area.	No Allowance	22.5 W/linear ft	36 W/linear ft	45 W/linear ft
WATTAGE ALLOWANCE PER HARDSCAPE AREA (W/ft^2). May be used for any illuminated hardscape area on the site.				
Hardscape ornamental lighting. Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130.0(d), and shall be post-top luminaires, lanterns, pendant luminaires or chandeliers.	No Allowance	0.02 W/ft^2	0.04 W/ft^2	0.06 W/ft^2
WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft^2). Use as appropriate, provided that none of the following specific applications shall be used for the same area.				
Building facades. Only areas of building facade that are illuminated shall qualify for this allowance. Luminaires qualifying for this allowance shall be aimed at the facade and shall be capable of illuminating it without obstruction or interference by permanent building features or other objects.	No Allowance	0.18 W/ft^2	0.35 W/ft^2	0.50 W/ft^2
Outdoor sales lots. Allowance for uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale. Driveways, parking lots or other nonsales areas shall be considered hardscape areas even if these areas are completely surrounded by sales lot on all sides. Luminaires qualifying for this allowance shall be within five mounting heights of the sales lot area.	0.164 W/ft^2	0.555 W/ft^2	0.758 W/ft^2	1.285 W/ft^2
Vehicle service station hardscape. Allowance for the total illuminated hardscape area less area of buildings, under canopies, off property, or obstructed by signs or structures. Luminaires qualifying for this allowance shall be illuminating the hardscape area and shall not be within a building, below a canopy, beyond property lines or obstructed by a sign or other structure.	0.014 W/ft^2	0.155 W/ft^2	0.308 W/ft^2	0.485 W/ft^2
Vehicle service station canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	0.514 W/ft^2	1.005 W/ft^2	1.300 W/ft^2	2.200 W/ft^2
Sales canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	No Allowance	0.655 W/ft^2	0.908 W/ft^2	1.135 W/ft^2
Nonsales canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	0.084 W/ft^2	0.205 W/ft^2	0.408 W/ft^2	0.585 W/ft^2
Guard stations. Allowance up to 1,000 square feet per vehicle lane. Guard stations provide access to secure areas controlled by security personnel who stop and may inspect vehicles and vehicle occupants, including identification, documentation, vehicle license plates and vehicle contents. Qualifying luminaires shall be within two mounting heights of a vehicle lane or the guardhouse.	0.154 W/ft^2	0.355 W/ft^2	0.708 W/ft^2	0.985 W/ft^2
Student pick-up/drop-off zone. Allowance for the area of the student pick-up/drop-off zone, with or without canopy, for preschool through 12th grade school campuses. A student pick-up/drop off zone is a curbside, controlled traffic area on a school campus where students are picked-up and dropped off from vehicles. The allowed area shall be the smaller of the actual width or 25 feet, times the smaller of the actual length or 250 feet. Qualifying luminaires shall be within two mounting heights of the student pick-up/drop-off zone.	No Allowance	0.12 W/ft^2	0.45 W/ft^2	No Allowance
Outdoor dining. Allowance for the total illuminated hardscape of outdoor dining. Outdoor dining areas are hardscape areas used to serve and consume food and beverages. Qualifying luminaires shall be within two mounting heights of the hardscape area of outdoor dining.	0.014 W/ft^2	0.135 W/ft^2	0.240 W/ft^2	0.400 W/ft^2
Special security lighting for retail parking and pedestrian hardscape. This additional allowance is for illuminated retail parking and pedestrian hardscape identified as having special security needs. This allowance shall be in addition to the building entrance or exit allowance.	0.007 W/ft^2	0.009 W/ft^2	0.019 W/ft^2	No Allowance

BCNR 40.

INDOOR SIGNS

All indoor sign lighting shall be controlled with an automatic time-switch control or astronomical time-switch control. (Section 130.3)

BCNR 41.

OUTDOOR SIGNS

Outdoor sign lighting shall meet the following requirements as applicable (Section 130.3):

A. All outdoor sign lighting shall be controlled with a photocontrol in addition to an automatic time-switch control, or an astronomical time-switch control.

B. All outdoor sign lighting that is ON both day and night shall be controlled with a dimmer that provides the ability to automatically reduce sign lighting power by a minimum of 65 percent during nighttime hours. Signs that are illuminated at night and for more than 1 hour during daylight hours shall be considered ON both day and night.

BCNR 42.

DEMAND RESPONSE ELECTRONIC MESSAGE CENTER CONTROL

An electronic message center (EMC) having a new connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal. (Section 130.3)

BCNR 43.

MAXIMUM ALLOWED LIGHTING POWER

1. For internally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 12 watts per square foot. For double-faced sign, only the area of a single face shall be used to determine the allowed lighting power.
2. For externally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 2.3 watts per square foot. Only areas of an externally lighted sign that are illuminated without obstruction or interference, by one or more luminaires, shall be used.
3. Lighting for unfiltered light emitting diodes (LEDs) and unfiltered neon shall comply with section 140.8(b). (Section 140.8(a))

BCNR 44.

ALTERNATE LIGHTING SOURCES

The sign shall comply if it is equipped only with one or more of the light sources listed in Section 140.8(b).

MECHANICAL

BCNR 45.

HEATING AND COOLING EFFICIENCIES

Any appliance regulated by the Appliance Efficiency Regulations, Title 20 California Code of Regulations, Section 1601 et seq., may be installed only if the appliance fully complies with Section 1608(a) of those regulations; OR the equipment shall meet the applicable efficiency requirements in Tables 110.2-A through 110.2-K, subject to the items listed in Section 110.2(a). (Sections 110.1(a) and 110.2(a))

BCNR 46.

CONTROLS FOR HEAT PUMPS WITH SUPPLEMENTARY ELECTRIC RESISTANCE HEATERS

Heaters with supplementary electric resistance heaters shall have controls (Section 110.2(b)):

1. That prevent supplementary heater operation when the heating load can be met by the heat pump alone; and
2. In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.

BCNR 47.

THERMOSTATS

All unitary heating or cooling systems, including heat pumps not controlled by a central energy management control system (EMCS) shall have a setback thermostat meeting the requirements of Section 110.2(b). (Section 110.2(c))

BCNR 48.

GAS-FIRED AND OIL-FIRED FURNACE STANDBY LOSS CONTROLS

Gas-fired and oil-fired furnaces with input ratings greater than or equal to 225,000 Btu/hr shall also have an intermittent ignition or interrupted device (IID), and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input rating greater than or equal to 225,000 Btu/hr, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input rating. (Section 110.2(d))

BCNR 49.

LOW LEAKAGE AIR-HANDLING UNITS

Low leakage air-handling units must be HERS certified (Sections 110.2(f), 150.1(b), and 140.1)

BCNR 50.

NATURAL VENTILATION

A. Naturally ventilated spaces shall be permanently open to and within 20 feet of operable wall or roof openings to the outdoors, the openable area of which is not less than 5 percent of the conditioned floor area of the naturally ventilated space. Where openings are covered with louvers or otherwise obstructed, openable area shall be based on the free unobstructed area through the opening.
B. The means to open required operable openings shall be readily accessible to building occupants whenever the space is occupied. (Section 120.1(b)1)

BCNR 51.

MECHANICAL VENTILATION

Each space that is not naturally ventilated shall be ventilated with a mechanical system capable of providing an outdoor air rate no less than the larger of (Section 120.1(b)2):

A. The conditioned floor area of the space times the applicable ventilation rate from Table 120.1-A; or
B. 15cfm per person times the expected number of occupants. For meeting the requirement in Section 120.1(b)2B for spaces without fixed seating, the expected number of occupants shall be either the expected numer specified by the building designer or one half of the maximum occupant load assumed for egress purposes in the *California Building Code,* whichever is greater. For spaces with fixed seating, the expected number of occupants shall be determined in accordance with the *California Building Code*.

BCNR 52.

REQUIRED DEMAND CONTROL VENTILATION

HVAC systems with the following characteristics shall have demand ventilation controls complying with Section 120.1(c)4: (Section 120.1(c)3)

A. They have an air economizer; and
B. They serve a space with a design occupant density, or a maximum occupant load factor for egress purposes in the *California Building Code*, greater than or equal to 25 perople per 1,000 square feet; and
C. They are either single zone systems with any controls or multiple zone systems with Direct Digital Controls (DDC) to the zone level.

BCNR 53.

OCCUPANT SENSOR VENTILATION CONTROLS

Occupant sensor ventilation controls are required for multipurpose rooms <1000 ft^2, classrooms > 750 ft^2 and conference, convention, auditorium and meeting center rooms > 750 ft^2 (without contaminants). (Sections 120.1(c)5 and 120.2(e))

BCNR 54.

AUTOMATIC SHUTOFF AND RESET CONTROL TIMERS

Each space-conditioning system shall have automatic shutoff and reset control timers unless an exception applies. (Section 120.2(e))

BCNR 55.

DAMPERS FOR AIR SUPPLY AND EXHAUST EQUIPMENT

Outdoor air supply and exhaust equipment shall be installed with dampers that automatically close upon fan shutdown. (Section 120.2(f))

BCNR 56.

ISOLATION AREA DEVICES

Each space-conditioning system serving multiple zones with a combined conditioned floor area of more than 25,00 square feet shall be designed, installed and controlled to serve isolation areas. (Section 120.2(g))

BCNR 57.

AUTOMATIC DEMAND SHED CONTROLS

Demand shed control capability is required if the system has DDC to the zone level. (Section 120.1(h))

BCNR 58.

ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD)

Economizer fault detection and diagnostics are required for systems >54 kBtuh with an economizer. (Section 120.2(i))

BCNR 59.

DUCT INSULATION

Duct insulation must be R-8 or better for ducts in unconditioned spaces; R-4.2 or better for ducts in indirectly conditioned spaces. (Section 120.4)

BCNR 60.

PRESCRIPTIVE MEASURES

Equipment sizing calculations are provided on the plans or in the specifications. (Section 140.4(a)(b))

Supply fan pressure control locations must be shown on the plans. (Section 140.4(c))

Simultaneous heating and cooling must be minimized in accordance with Section 140.4(d). The method must be shown on the plans or in the specifications. (Section 140.4(d))

BCNR 61.

ECONOMIZERS

If cooling capacity is greater than 54 kBtuh verify a 100% water or air economizer. See exceptions. (Section 140.4(e))

BCNR 62.

AIR DISTRIBUTION SYSTEM DUCT LEAKAGE SEALING

Greater than 25% duct surface in unconditioned space including under a roof that does not meet current prescriptive insulation requirements for CAV single zone system serving less than 5,000 ft^2 require duct sealing and leak testing. (Section 140.4(l))

WET SYSTEMS (HYDRONIC)

BCNR 63.

DUCT LEAKAGE SEALING VERIFICATION

Duct systems shall be sealed to a leakage rate not to exceed 6 percent of the nominal air handler airflow rate as confirmed through field verification and diagnostic testing, in accordance with the applicable procedures in Reference Nonresidential Appendices NA1 and NA2. (Sections 110.1 or 140.4(l))

BCNR 64.

OPEN AND CLOSED CIRCUIT COOLING TOWERS

For cooling towers greater than or equal to 150 tons, verify that the Maximum Achievable Cycles of Concentration calculation, signed by the Professional Engineer of record with flow meter, overflow alarm and efficient drift eliminators addressed on plans. (Section 110.2(e)1-5)

BCNR 65.

PIPE INSULATION

Piping insulation shown on the plans meets the requirements of Section 120.3 and Table 120.3-A. (Section 120.3)

TABLE 120.3-A
PIPE INSULATION THICKNESS

FLUID TEMPERATURE RANGE, (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)				
			< 1	1 to < 1.5	1.5 to < 4	4 to < 8	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)				
Space heating, hot water systems (steam, steam condensate and hot water) and service water heating systems							
Above 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
251-350	0.29-0.31	200	3.0	4.0	4.5	4.5	4.5
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5
Space cooling systems (chilled water, refrigerant and brine)							
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0

PRESCRIPTIVE MEASURES

BCNR 66.

COOLING TOWER FAN

1. Each fan powered by a motor of 7.5 hp or larger shall have the capability to operate that fan at two thirds of full speed or less, and shall have controls that automatically change the fan speed to control the leaving fluid temperature or pressure of the heat rejection device. (Section 140.4(h)2)
2. Tower flow turndown: Open cooling towers configured with multiple condenser water pumps shall be designed so that all cells can be run in parallel with the larger of the flow that is produced by the smallest pump, or 50 percent of the design flow for the cell. (Section 140.4(h)3)
3. Multiple cell heat rejection equipment: Multiple cell heat rejection equipment with variable speed fan drives shall operate the maximum number of fans allowed that comply with the manufacturer's requirements for all system components, and control all operating fans to the same speed. Minimum fan speed shall comply with the minimum allowable speed of the fan drive per the manufactures recommendation. Staging of fans is allowed once the fans are at the minimum operating speed. (Section 140.4(h)5)

BCNR 67.

LIMITATION ON CENTRIFUGAL FAN COOLING TOWERS

Open Cooling Towers greater than 900 GPM have propeller fans. (Section 140.4(h)4)

BCNR 68.

LIMITATION OF AIR-COOLED CHILLERS

Air cooled chillers greater than 300 tons are not allowed. Chillers greater than 300 tons are not air cooled unless an exception applies. (Section 140.4(j))

BCNR 69.

HYDRONIC VARIABLE FLOW SYSTEMS

HVAC chilled and hot water pumping shall be designed for variable fluid flow and shall be capable of reducing pump flow rates to no more than the larger of: a)50 percent or less of the design flow rate; or b) the minimum flow required by the equipment manufacturer for the proper operation of equipment served by the system. (Section 140.4(k)1)

BCNR 70.

CHILLER ISOLATION

When a chilled water system includes more than one chiller, provisions shall be made so that flow through any chiller is automatically shut off when the chiller is shut off while still maintaining flow

through other operating chiller(s). Chillers that are piped in series for the purpose of increased temperature differential shall be considered as one chiller. (Section 140.4(k)2)

BCNR 71.

BOILER ISOLATION

When a hot water plant includes more than one boiler, provisions shall be made so that flow through any boiler is automatically shut off when that boiler is shut off while still maintaining flow through other operating boiler(s). (Section 140.4(k)3)

BCNR 72.

CHILLED AND HOT WATER TEMPERATURE RESET CONTROLS

Chilled water (CHW) and Heating hot water (HHW) systems greater than 500 kBtuh include automatic water temperature reset unless variable low is used in accordance with Sectioin 140.4(k)1. (Section 140.4(k)4)

BCNR 73.

WATER-COOLED AIR CONDITIONER AND HYDRONIC HEAT PUMP SYSTEMS

Water loop heat pump (WLHP) systems over 5 HP total pumping power have two-positions automatic isolation valves on each air conditioner or heat pump. (Section 140.4(k)5)

BCNR 74.

VARIABLE FLOW CONTROLS

Variable speed control (VSD) on CHW, CW, and WLHP systems over 5 HP total power. (Section 140.4(k)6.A)

BCNR 75.

WATER LOOP SYSTEMS WITHOUT DDC

For water loop systems without DDC, VSD Pressure Sensor is located at the most remote (or limiting) heat exchanger. (Section 140.4(k)6.B.i)

BCNR 76.

WATER LOOP SYSTEMS WITH DDC

For water loop systems with DDC, VSD control pressure is reset based on the limiting valve at not less than 80% open, based on the specifications and sequence of operations. (Section 140.4(k)6.B.ii)

BCNR 77.

DOMESTIC WATER-HEATING-SYSTEMS

Water heating systems shall meet the requirements of either Item A, B, C or D listed in Section 150.1(c)8