
APPENDIX A

ELECTRICAL LOAD ESTIMATING WORKSHEET

This worksheet can be used to determine the required size of the main electrical panel. This worksheet is designed for existing dwelling with 120/240 or 120/208 volt, three wire, single phase services.

1. ____ Square footage of existing living area¹ x 3 watts/sq. ft. = _____ watts
2. ____ 20 amp small appliance circuits @ 1500 watts each = _____ watts
3. ____ Laundry circuits @ 1500 watts each = _____ watts
4. Electrical appliances at nameplate value²
 - a. Range = _____ watts
 - b. Oven = _____ watts
 - c. Garbage Disposal = _____ watts
 - d. Clothes Dryer³ = _____ watts
 - e. Dishwasher = _____ watts
 - f. Other: _____ = _____ watts
 - g. Other: _____ = _____ watts
 - h. Other: _____ = _____ watts

Sub-Total (Lines 1-4) = _____ watts

5. First 8,000 watts @ 100% = _____ watts
6. Balance (sub-total - 8,000) @ 40% = _____ watts
- 7.⁴ Air conditioning @ 100% = _____ watts
 Central space heating @ 100% = _____ watts
 <4 Space heaters @ 100% = _____ watts
 >4 Space heaters @ 100% = _____ watts
 = _____ watts

Total (Lines 5-7) = _____ watts

Convert to amps by dividing by 240 volts (A = watts/volts) = _____ amps

¹ Use outside dimensions

² If values are given in amps, multiply by volts to obtain watts (watts = amps x volts)

³ Minimum 5000 watts

⁴ Use larger connected load of A/C and space heating, not both. Heat pumps are calculated at 100% or 65% if the heat pump is supplementary.

TITLE 24 MANDATORY FORMS

Prescriptive Certificate of Compliance: Residential		CF-1R
<i>Newly Constructed Buildings and Additions Greater Than 1,000 ft²</i>		(Page 1 of 5)
Project Name:	Climate Zone #	# of Stories

General Information		
Site Address:	Enforcement Agency:	Date:
Building Type <input type="checkbox"/> Single Family <input type="checkbox"/> Multi Family	Conditioned Floor Area ¹ (CFA):	
Circle the Front Orientation: N, E, S, W, or Degrees	Project Type: <input type="checkbox"/> New Building Construction <input type="checkbox"/> New Addition ¹ greater than 1,000 ft ² <i>1. Additions greater than 1,000 ft² must comply with Component Package D.</i>	
Component Package: (Check one) C _____ D _____ E (_____ E Alternative) in Climate zone 1 and 16 only. See footnotes to Table 151-D for alternative optional requirements.		

Opaque Surface Details For the furred portioned of Mass Walls see Furring Strips Construction Table below.

A	B	C	D	E	F	G	H	I	J
Proposed <small>See Note</small>			Standard		Values From JA4 Table				
Tag/ID ¹	Assembly Name or Type ¹	Framing Material and Size ²	Thickness, Spacing, or Other ³	U-factor ⁴	JA4 Table Number ⁵	Framed Cavity R-value ⁶	Continuous Insulation R-Value ⁷	JA4 Assembly Cell Value ⁸	Proposed Assembly U-factor ⁹

Note: For furred assemblies, accounting for Continuous Insulation R-value, see Page JA4-3 and Equation 4-1. For calculating furred walls use the Mass and Furring Construction table below.

- For Tag/ID indicate the identification name that matches the building plans.
- Indicate the Assembly Name or type: Roof/Ceiling, Walls, Floors, Slabs, Crawl Space, Doors and etc... Indicate the Frame type and Size: For Wood, Metal, Metal Buildings, Mass, enter 2x4, 2x6, or etc... see JA4 for other possible frame type assemblies.
- Enter the thickness for mass in inches or Spacing between framing members enter; 16" or 24" OC; or Other for all other assembly description such as Concrete Sandwich Panel, Spandrel Panel, Logs, Straw Bale Panel and etc....
- Based on the Climate Zone; enter the Standard U-factor from Table 151-B, C or D for each different assembly Name or type.
- Enter the Table number that closely resembles the proposed assembly.
- Enter the R-value that is being installed in the wall cavity or between the framing; otherwise, enter "0".
- Enter the Continuous Insulation R-value for the proposed assembly; otherwise, enter "0".
- Enter the row and column of the U-factor value based on Column F Table Number and enter the Assembly U-factor in Column J.
- The Proposed Assembly U-factor, Column J, must be equal to or less than the Standard U-factor in Column E to comply.

Furring Strips Construction Table for Mass Walls Only

A	B	C	D	E	F	G	H	I	J	K	L	M
Proposed Properties of Masonry and Concrete Walls From Reference Joint Appendix Table 4.3.5, 4.3.6, 4.3.7					Added Interior or Exterior Insulation in Furring Space from Reference Joint Appendix Table 4.3.13						Final Assembly U-factor ^{6,7}	Comment
Mass Thickness ¹	Assembly Name or Type ²	JA4 Table Number ³	JA4-Mass Cell Value ⁴	Mass U-Factor ⁵	Interior or Exterior of Insulation Layer	Frame Thickness	Frame Type Wood or Metal	Furring Cavity R-value ⁸	JA4-Mass Cell Value ⁴	Effective R-value ⁶		

- Indicate the Mass Thickness from Reference Joint Appendix JA.
- Indicate the Assembly Name or type: Roof/Ceiling, Walls, Floors, Slabs, Crawl Space, Doors and etc... Indicate the Frame type and Size: For Wood, Metal, Metal Buildings, Mass, enter 2x4, 2x6, or etc... see JA4 for other possible frame type assemblies.
- Enter the Table number that closely resembles the proposed assembly.
- Enter the row and column of the U-factor value.
- Enter the Effective R-value listed in the JA4 Table Number.
- The Final Assembly is calculated by using Equation 4-1 or Equation 4-4 of the Reference Joint Appendix JA4. Enter the value in Column L.
- Insert the Final Assembly U-factor value back on to the Opaque Surface Details table in Column J.

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FENESTRATION: PROPOSED AREAS					
Fenestration Type and Frame (Window, Glass Door or Skylight)	Orientation (North, East, South, West)	Proposed Area ¹ (ft ²)	Maximum Allowed U-factor ^{2,3}	Maximum Allowed SHGC ^{2,3,4}	NFRC or Default Values ⁵
<i>Total</i>					

1. Fenestration area is the area of total glazed product (i.e. glass plus frame). Exception: When a door is less than 50% glass, the fenestration area may be the glass area plus a 2" "frame" around the glass.

2. Enter value from Component Package Requirements from either Table 151-B, 151-C, or 151-D.

3. Actual fenestration efficiencies installed shall be indicated on the installation form, CF-6R-ENV. The efficiencies should be equivalent to or less than that listed on the CF-1R Form Page 1. Otherwise, revise the CF-1R and resubmit for plan check review.

4. Submit a completed WS-3R Form if a reduced SHGC is calculated with exterior shading or overhangs.

5. If applicable at this stage enter "NFRC" Certified windows or are CEC "Default" values found in Table 116-A or B.

FENESTRATION PROPOSED AREA CALCULATION				
	CFA ft ²	Allowed % of CFA	Allowed Area (CFA x Allowed %)	Total Proposed Area (From Table Above)
Total Fenestration Area ¹				
West Fenestration Area ² (Required only in Climate Zones 2, 4 & 7 -15)		.05		
Total Area ³			≥	

1. For Component Package C, see Table 151-B for Climate Zone Maximum Total Area Allowance. Enter 20% for all other Component Packages.

2. The Proposed West Fenestration Area includes west-sloping skylights and any skylights with a pitch less than 1:12.

3. To meet energy compliance the Total Proposed Area must be less than or equal to the Allowed Area.

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ROOFING PRODUCTS (COOL ROOFS) §151(f)12								
<i>Check applicable box below if the newly installed roof is exempted from the roofing product "Cool Roof" requirements. Note: If any one of the boxes are checked below, the Aged Solar Reflectance and Thermal Emittance requirements for roofing products in §118(i) are not applicable. Do not fill table below.</i>								
<input type="checkbox"/> Cool Roofs <u>Not</u> Required in Climate Zones 1-12, 14, and 16 with a Low Sloped. Less or 2:12 pitch. <input type="checkbox"/> Cool Roofs <u>Not</u> Required in Climate Zones 1 through 9 and 16 with a Steep-Sloped Roofs (pitch greater than 2:12) and product unit weight less than 5lb/ft ² .								
Other Exceptions								
<input type="checkbox"/> Roofing area covered by building integrated photovoltaic panels and solar thermal panels are exempt from the above Cool Roof criteria. <input type="checkbox"/> Roof constructions that have thermal mass over the roof membrane with at least 25 lb/ft ² is exempt from the above Cool Roof criteria.								
Note: If no CRRC-1 label is available, this compliance method cannot be used, use the Performance Approach to show compliance, otherwise, check the applicable box below if Exempt from the Roofing Products "Cool Roof" Requirement:								
CRRC Product ID Number ¹	Roof Slope ≤ 2:12	Roof Slope > 2:12	Product Weight < 5lb/ft ²	Product Weight ≥ 5lb/ft ²	Product Type ²	Aged Solar Reflectance ^{3,4}	Thermal Emittance	SRI ⁵
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
<ol style="list-style-type: none"> The CRRC Product ID Number can be obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php Indicate the type of product is being used for the roof top, i.e. single-ply roof, asphalt roof, metal roof, etc. If the Aged Reflectance is not available in the Cool Roof Rating Council's Rated Product Directory then use the Initial Reflectance value from the same directory and use the equation $(0.2 + 0.7(p_{initial} - 0.2))$ to obtain a calculated aged value. Where p is the Initial Solar Reflectance. Check box if the Aged Reflectance is a calculated value using the equation above. Calculate the SRI value by using the SRI- Worksheet at http://www.energy.ca.gov/title24/ and enter the resulting value in the SRI Column above and attach acopy of the SRI- Worksheet to the CF- IR. 								
To apply Liquid Field Applied Coatings , the coating must be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the coatings manufacturer and meet minimum performance requirements listed in §118(i)4. Select the applicable coating:								
<input type="checkbox"/> Aluminum-Pigmented Asphalt Roof Coating			<input type="checkbox"/> Cement-Based Roof Coating			<input type="checkbox"/> Other _____		

HVAC SYSTEMS - HEATING					
Heating Equipment Type and Capacity ^{1, 2, 3}	Minimum Efficiency (AFUE or HSPF)	Distribution Type and Location ⁴	Duct or Piping Insulation R-Value	Thermostat Type	Configuration (Central, Split, Space, Package or Hydronic)
<ol style="list-style-type: none"> Indicate Heating Type (Central Furnace, Wall Furnace, Heat pump, Boiler, Electric Resistance, Hydronic, etc.) Electric resistance heating is allowed only in Component Package C, or except where electric heating is supplemental (i.e., if total capacity ≤ 2 KW or 7,000 Btu/hr electric heating is controlled by a time-limiting device not exceeding 30 minutes). See §151(b) 3 exception. Refer to the HERS Verification section on Pages 3 and 4 of the CF- IR Form for additional requirements and check applicable boxes. Indicate Type or Location (Ducts, Hydronic in Floor, Radiators, etc.) 					

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HVAC SYSTEMS - COOLING					
Cooling Equipment Type and Capacity ^{1,2}	Minimum Efficiency (SEER/EER or COP)	Distribution Type and Location ³	Duct or Piping Insulation R-Value	Thermostat Type	Configuration (Central, Split, Space, Package or Hydronic)

1. Indicate Type (A/C, Heat pump, Evaporative Cooling, etc)
2. Refer to the HERS Verification section on Pages 3 and 4 of the CF-1R Form for additional requirements and check applicable boxes.
3. Indicate Type or Location (Ducts, Hydronic in Floor, Radiators, etc.)

WATER HEATING					
List water heaters and boilers for both domestic hot water (DHW) heaters and hydronic space heating. Individual dwelling DHW heaters must be gas or propane fired and may not use recirculation pumps. Hot water pipe insulation from the DHW heater to the kitchen(s) and on all underground hot water pipes is required in all component packages in all climate zones.					
Water Heater Type/Fuel Type ¹	Distribution Type (Standard, Recirculating) ²	Number In System	Tank Capacity (gal)	Energy Factor or Thermal Efficiency	External Tank Insulation R-Value ³

1. Indicate Type (Storage Gas, Heat Pump, Instantaneous, etc)
2. Recirculating systems serving multiple dwelling units shall meet the recirculation requirements of § 150(n). The Prescriptive requirements do not allow the installation of a recirculating water heating system for single dwelling units.
3. The water heating tank and pipes shall be insulated to meet the requirements of § 150(j)

SPECIAL FEATURES The enforcement agency should pay special attention to the Special Features specified in this checklist below. These items may require written justification and documentation and special verification.
Radiant Barrier (Roof) <input type="checkbox"/> YES <input type="checkbox"/> NO YES: Required in Climate Zones 2, 4, and 8-15 in Component Packages C, D and E.
Slab Edge (Perimeter) Insulation <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In all Climate Zones using Component Package C, and in Climate Zone 16 under Component Packages D and E, R-7 insulation is required.
Heated Slab Insulation <input type="checkbox"/> YES <input type="checkbox"/> NO YES: Slab edge insulation required for heated slabs in all Component Packages in all Climate Zones. See details in Table 118-A of the standards.
Raised Slab Insulation <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In Climate Zones 1, 2, 11, 13, 14 & 16 R-8 insulation is required, and in Climate Zones 12 & 15 R-4 insulation is required under Component Packages D and E. Raised slab insulation is not required in Component Package C.
Thermal Mass <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In Component Package C for all Climate Zones, a Minimum Interior Mass Capacity (IMC) must be achieved per Table 151-A of the standards. If Yes, submit a completed WS-1R Form.

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<p>HERS VERIFICATION SUMMARY <i>The enforcement agency should pay special attention to the HERS Measures specified in this checklist below. A completed and signed CF-4R Form for all the measures specified shall be submitted to the building inspector before final inspection.</i></p>	
<p>Duct Sealing & Testing <input type="checkbox"/> YES <input type="checkbox"/> NO YES: New ducted systems are to be sealed and duct leakage shall be less than 6% per §151(f)10 in all Component Packages in all Climate Zones. <i>HERS verification is required for this measure.</i></p>	
<p>Refrigerant Charge - Split System <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In Climate Zones 2 and 8-15 in all Component Packages, when a newly ducted split A/C or heat pump is installed, a refrigerant charge measurement shall be verified per §151(f)7A. <i>HERS verification is required for this measure.</i></p>	
<p>Central Forced Air Handlers: Integrated Ventilation System Watt Draw <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In all Component Packages and in all Climate Zones, when a central fan integrated ventilation system is installed to meet the ventilation requirements of §150(o), the central forced air system fans must draw less than 0.58 watts per CFM per §151(f)11. <i>HERS verification is required for this measure.</i></p>	
<p>Ducted Split Central Air Conditioners and Heat Pumps: Airflow and Watt Draw <input type="checkbox"/> YES <input type="checkbox"/> NO YES: In all Component Packages in Climate Zones 10 through 15, when a newly ducted split A/C or heat pump system is installed, the airflow and fan watt draw shall be verified per §151(f)7B. <i>HERS verification is required for this measure.</i></p>	

Documentation Author's Declaration Statement	
<ul style="list-style-type: none"> • I certify that this Certificate of Compliance documentation is accurate and complete. 	
Name:	Signature:
Company:	Date:
Address:	If Applicable <input type="checkbox"/> CEA or <input type="checkbox"/> CEPE (Certification #):
City/State/Zip:	Phone:
Responsible Building Designer's Declaration Statement	
<ul style="list-style-type: none"> • I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance. • I certify that the energy features and performance specifications for the building design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 1 and 6 of the California Code of Regulations. • The building design features identified on this Certificate of Compliance are consistent with the information provided to document this building design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application. 	
Name:	Signature:
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

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Mandatory Measures Summary		MF-1R
Residential		(Page 1 of 3)
Site Address:	Enforcement Agency:	Date:

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk () below. This Mandatory Measures Summary shall be incorporated into the permit documents and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.*

DESCRIPTION

Building Envelope Measures:

- §116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.
- §116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).
- §117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.
- §118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.
- §118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.
- *§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.
- §150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.
- *§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.
- *§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.
- §150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.
- §150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.
- §150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%, water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

- §150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.
- §150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.
- §150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

- §110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.
- §113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.
- §115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.
- §150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.
- §150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).
- §150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.
- §150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
- §150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.
- §150(j)2: Cooling system piping (suction, chilled water, or brine lines), and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.
- §150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.
- §150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
- §150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.

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§150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

Ducts and Fans Measures:

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used.

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft² or 100 watts for dwelling units larger than 2,500 ft² may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaires in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.

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<p>EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.</p> <p>EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupant sensor.</p>		
<p>§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luminaires.</p> <p>EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119.</p> <p>EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.</p>		
<p>§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the luminaire is airtight with air leakage less than 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.</p>		
<p>§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy.</p> <p>EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on</p> <p>EXCEPTION 2: Outdoor luminaires used to comply with Exception 1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours.</p> <p>EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.</p>		
<p>§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).</p>		
<p>§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146</p>		
<p>§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires.</p> <p>EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.</p>		