*The following mandatory measures have been identified as applicable to the project and must be met in order to demonstrate compliance with Title 24, Part 6.*

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Indoor Lighting Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.9 Lighting Controls and Components**  All lighting control devices and systems,and all light sources shall meet the applicable requirements of §110.9. | 🞏 | 🞏 |
| **110.12(c) demand responsive lighting controls**  lighting controls in nonresidential BUILDINGS >10,000 FT2 shall be capable of automatically reducing lighTIng power in response to a demand response signal. general lighting shall be reduced per **table 130.1-A.** CONTROLS SHALL demonstrate a lighting power reduction of at least 15% below the total installed lighting power IN CONTROLLED SPACES. | 🞏 | 🞏 |
| **§130.0 General Luminaire Requirements**  ALL Luminaires shall be factory-labeled per **§130.0(c).**  Energy Management Control Systems (EMCS) shall meet requirements of **§130.0(e).** | 🞏 | 🞏 |
| **§130.1(a) manual Area Controls**  Each room or area with floor-to-ceiling walls in this building shall have lighting controls that allow lighting to be manually turned on and off. manual controls shall:  1. Be readily accessible  2. be located in the same enclosed area with the lighting it controls.  3. provide separate control of general, floor, wall, window case display, ornamental and special effects lighting so each type can be turned on and off separately without affecting other lighting or equipment. | 🗹  🗹  🞏 | 🞏  🞏  🞏 |
| **§130.1(b) Multilevel LightinG Controls**  general lighting in All rooms and areas 100 FT2 or greater and with more than 0.5 watts per FT2 of lighting load shall have multilevel controls that allow light levels to be adjusted up and down. Controls shall provide number of Control steps and uniform light levels per **Table 130.1-A.** | 🞏 | 🞏 |
| **§130.1(c) Shut-off Controls**  all installed indoor lighting shall be equipped with controls to automatically reduce lighting power when space is typically unoccupied. | 🞏 | 🞏 |
| **§130.1(c)1: control requirements**  All installed indoor lighting shall have all of the following:  A. control(s) capable of automatically shutting off all lighting in the space when typically unoccupied (occupant sensing control, automatic time-switch control, or other)  b. Separate controls for lighting on each floor (other than stairwells)  c. separate controls for a space enclosed by ceiling height partitions not exceeding 5,000 FT2  d. separate controls for general, display, ornamental, and display case lighting  E. automatic time-switch controls may include a manual-on mode | 🞏 | 🞏 |
| **§130.1(c)2: Countdown timer switches**  countdown timer switches only allowed to meet shut-off requirements in closets <70 FT2 and server aisles in server rooms. maximum timer settings: 10 minutes for closets, 30 minutes for server aisles | 🞏 | 🞏 |
| **§130.1(c)3,4 Override for Building Lighting Shut-off**  Areas served by Shut-off Controls (other than occupant sensors): shall:  **§130.1(c)3**. include a manual override control that complies with 130.1(**a**) and allows lighting to remain on for up to 2 hours; and  **§130.1(c)4**. Provide automatic holiday “shutoff”**.** | 🞏  🞏 | 🞏  🞏 |
| **§130.1(c)5 Required Use of full-off Occupant Sensors**  full-off occupant sensing controls that are caPable of automatically shutting off all lighting when the room is unoccupied are required for:   * Offices 250 ft2 or smaller * Multipurpose rooms < 1000 ft2 * Classrooms of any size * Conference rooms of any size * Restrooms of any size   Additional full-off Control functionality:  When multilevel control is required per 130.1(**b**)(enclosed area ≥100 square feet and lighting load >0.5 w/FT2) provide vacancy sensor or partial-ON occupancy sensor. When multilevel control is not required per 130.1(**b**), provide occupant sensor, partial-ON occupant sensor, or vacancy sensor. | 🞏 | 🞏 |
| **§130.1(c)6 Partial or full-OFF Occupant Sensors**  Provide partial or full-OFF occupant sensors, in addition to shut-off controls per **§130.1(c)1 and §130.1(c)2**, in the following spaces:   * Aisle ways and open areas in warehouses * Library book stack aisles * Corridors and stairwells | 🞏 | 🞏 |
| **§130.1(c)7 Partial-OFF Occupant Sensors**  Provide partial-OFF occupant sensors in the following spaces instead of complying with **§130.1(c)1**:   * Parking garages/areas and loading unloading areas with no more than 500 watts per controlled zone. | 🞏 | 🞏 |
| **§130.1(d)** **Automatic Daylighting Controls**  all general lighting in The following zones shall have controls that automatically adjust the installed lighting power up and down to keep total light level stable as incoming daylight changes:   * PRIMARY SIDELIT DAYLIT ZONES * SKYLIT DAYLIT ZONES * combined primary and secondary sidelit daylit zones in parking garages   all DAylit zones must be shown on plans.  *Note: parking areas on the roof of a parking structure are NOt skylit daylit areas.*  in addition, automatic daylighting controls shall provide separate control for luminaires in each type of daylit zone. luminaires that fall in both skylit and sidelit daylit zone shall be controlled as part of the skylit zone.  **§130.1(d)3** The automatic daylighting controls shall achieve all of the following:  a. adjust lighting via continuous dimming or the number of control steps provided by the multilevel controls (for spaces required to install multilevel controls under section 130.1(b)).  b. for each space, ensure combined illuminance from controlled lighting and daylight is not less than illuminance from controlled lighting when no daylight is available.  c. ensure that the general lighting power in a daylit zone shall be reduced by at least 65% when daylight illuminance in that zone is greater than 150% of design illuminance received from the general lighting system at full power(not applicable to parking garages).  D. (for parking garages only) ensure that when illuminance levels measured at the farthest edge of the secondary sidelit zone away from glazing or opening are greater than 150% of The illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power consumption is zero.  **§130.1(d)4** when photosensors are located within the daylit zone, at least one photosensor shall be located so that it is not readily accessible to unauthorized personnel.  **§130.1(d)5** the location where calibration adjustments are made to automatic daylighting controls shall Be readily accessible to authorized personnel but may be inside a locked case or under a cover that requires a tool for access. | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 | |
| **§130.1(f) control interactions**  each lighting control installed to meet 130.1 requirements shall incorporate the functions of other lighting controls required by this section.  1. for general lighting, manual area control shall permit the level of light provided while lighting is on to be set or adjusted by controls specified in 130.1(b), (c), (d) and (e).  2. manual area control shall permit shutoff control to turn the lighting down or off.  3. multilevel control shall permit the automatic daylighting control to adjust electric lighting in repsonse to daylight.  4. multilevel control shall permit the demand responsive (DR) control to adjust lighting during a DR event then return it to the level set by the control after the event.  5. shutoff control shall permit the manual area control to turn the lighting on.  6. automatic daylighting control shall permit multilevel lighting control to adjust the lighting level.  7. for lighting controlled by multilevel lighting controls and occupant sensing controls that provide automatic-on function, controls shall provide a partial-on function that is capable of automatically activating between 50-70% of controlled lighting power. | 🞏 | 🞏 | |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Outdoor Lighting Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.9 OUtdoor Lighting Controls and Components**  All lighting control devices and systems,and all light sources shall meet the applicable requirements of §110.9. | 🞏 | 🞏 |
| **§130.0 General Luminaire Requirements**  All LUMINAIRES SHALL be factory-labeled per **§130.0(c).**  Energy Management Control Systems (EMCS) shall meet the requirements of **§130.0(e).** | 🞏 | 🞏 |
| **§130.2(b) Luminaire Cutoff Requirements**  All outdoor luminaires with initial luminaire lumens ≥ 6,200 shall comply with the Backlight, Uplight AND Glare (BUG) requirements of **Title 24, part 11, section 5.106.8.** | 🞏  🞏 | 🞏  🞏 |
| **§130.2(c) Controls for Outdoor Lighting**  All outdoor lighting shall be independEntly controlled from other electrical loads and shall have the following features:  1.Automatically turns off outdoor lighting when daylight is available  2. Automatic scheduling controls  A. capable of reducing lighting power at least 50% and no more than 90% and separately capable of turning lighting off during unoccupied periods  b. that allow scheduling of at least two nightime periods with independent lighting levels (may include override for no more than 2 hours)  c. acceptance tests shall verifiy scheduled occupied and unoccupied  d. Automatic scheduling controls shall be installed for all outdoor lighting.  3. Motion sensing controls  A. capable of reducing lighting power at least 50% and no more than 90% and separately capable of turning lighting off during unoccupied periods  b. capable of dimming or turning off lighting no longer than 15 minutes after area is vacated and turning lighting on when area becomes occupied  c. single sensors can control no more than 1,500 watts of lighting power  d. shall be installed for the following and may be installed for other outdoor lighting and in combination with other outdoor lighting controls:  (i) outdoor luminaires other than building façade, ornamental hardscape, outdoor dining or outdoor sales frontage lighting, where the bottom of the luminaire is mounted 24 feet or less above grade  (ii) wall mounted luminaires installed for building façade, ornamental hardscape, or outdoor dining lighting that have a bilaterally symmetric distribution (as described in the IES Handbook) mounted 24 feet or less above grade | 🞏  🞏  🞏 | 🞏  🞏  🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Sign Lighting Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.9 Sign Lighting Controls and Components**  All lighting control devices and systems,and all light sources shall meet the applicable requirements of §110.9. | 🞏 | 🞏 |
| **§110.12(d) Demand Response Electronic Message Center controls:**  electronic message centers with new connected lighting power exceeding 15 KW shall have a demand response control able to reduce lighting power by at least 30%. | 🞏  🞏 | 🞏  🞏 |
| **§130.3(a)1 Controls for Indoor Sign Lighting**  All indoor sign lighting, other than exit sign lighting, shall be controlled by either an automatic time-switch control, or an astronomical time-switch control. | 🞏 | 🞏 |
| **§130.3(a)2 Controls for Outdoor Sign Lighting**   1. All outdoor sign lighting shall be controlled by a combination of photocell and automatic time-switch, or by an astronomical time-switch. 2. All outdoor sign lighting that is intended to be on both day and night shall be controlled by a dimmer that can automatically reduce lighting power by at least 65% during the night. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Envelope Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.6(a)1 Manufactured FENESTRATION product and exterior door air leakage**  Manufactured fenestration products and exterior doors shall have air infiltration rates certified by the manufacturer not exceeding 0.3 cfm/ft² of window area, 0.3 cfm/ft² of door area for nonresidential single doors (swinging and sliding), and 1.0 cfm/ft2 for nonresidential double doors (swinging), when tested according to NFRC-400 or [ASTM E283](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_astme283.htm) at a pressure differential of 75 pascals. | 🞏 | 🞏 |
| **§110.6(a)2-4 MANUFACTURED FENESTRATION PRODUCT AND EXTERIOR DOOR RATING**  ALL MANUFACTURED fenestration products And exterior doors SHALL BE RATED FOR U-FACTOR ACCORDING TO NFRC PROCEDURES OR USE THE DEFAULT fenestration VALUES in TABLE 110.6-A and door values in JA4.5.  all manufactured fenestration products shall be RATED FOR SHGC ACCORDING TO NFRC PROCEDURES or use the default values in TABLE 110.6-B.  ALL manufactured FENESTRATION PRODUCTS SHALL BE RATED FOr VT ACCORDING TO NFRC PROCEDURES. | 🞏  🞏 | 🞏  🞏 |
| **§110.6(a)5 FENESTRATION PRODUCT AND EXTERIOR DOOR LABELING**  ALL MANUFACTURED fenestration products And exterior doors using the component modeling approach (CMA) SHALL BE LABELED ACCORDING TO §110.6(a)5. | 🞏 | 🞏 |
| **§110.6(b) Field-fabricated Doors, Windows, and Skylights**  Field-fabricated doors, windows, and skylights:   * may only be installed assuming default Fenestration U-factor from table 110.6-A, default fenstration shgc from table 110.6-b, and default exterior door u-factor from ja4.5 * shall be caulked between the unit and building, and shall be weather-stripped (except for unframed glass doors and fire doors). | 🞏 | 🞏 |
| **§110.7 Exterior Joints**  All exterior joints, PENETRATIONS, and openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weather-stripped, or otherwise sealed. | 🞏 | 🞏 |
| **§110.8(a) Insulation Certification**  Installed insulation shall be certified by the Department of Consumer Affairs per Title 24, Part 12, Chapters 12-13, Article 3 “Standards for Insulating Material.” | 🞏 | 🞏 |
| **§110.8(b) Urea Formaldehyde Insulation**  urea formaldehyde insulation shall not be installed unless in exterior side walls with a four-mil-thick plastic polyethylene vapor retarder or equivalent plastic sheathing vapor retarder installed between the urea formaldehyde foam insulation and the interior space. | 🞏 | 🞏 |
| **§110.8(c) Insulating Material**  All insulating materials shall be installed in compliance with the flame spread rating and smoke density requirements of the California building code. | 🞏 | 🞏 |
| **§110.8(g) Heated Slab Floors**  Heated Slab floors must:   * meet insulation requirements per Table 110.8-a * water absorbtion rate no greater than .3% * insulation installation must be covered with a solid guard to protect from damage * insulation installation must include a rigid plate which penetrates the slab | 🞏 | 🞏 |
| **§110.8(i) Rated roofing products**  ALL ROOFING PRODUCTS SPECIFIED TO MEET AGED SOLAR REFLECTANCE/ THERMAL EMITTANCE REQUIREMENTS SHALL BE CERTIFIED AND LABELED BY THE COOL ROOF RATING COUNCIL (CRRC) per 10-113, OR  use default values in **§110.8(i)1**:   * ASPHALT SHINGLES: 0.08/0.75 * ALL OTHERS: 0.10/0.75   liquid applied roof coating for low slope roofs shall meet coverage, thickness, and performance values per 110.8-C | 🞏 | 🞏 |
| **§110.8(j) Radiant Barrier**  radiant barriers shall have emmittance <=.05, tested according with astm c1371 or astm e408, certified by title 24 part 12 | 🞏 | 🞏 |
| **§120.7(a) ROOF/CEILING INSULATION**  WEIGHTED AVERAGE U-FACTOR OF ROOF ASSEMBLY SHALL BE:  ≤ 0.098 FOR METAL BUILDING  ≤ 0.075 FOR WOOD FRAMED AND OTHER TYPES  INSULATION PLACEMENT SHALL BE PER §120.7(a)3REQUIREMENTS:  **§120.7(a)3A** SHALL BE IN DIRECT CONTACT WITH ROOF OR CEILING SEALED TO LIMIT INFILTRATION AND EXFILTRATION.  **§120.7(a)3B** WHEN INSULATION IS INSTALLED AT ROOF, FIXED VENTS SHALL NOT BE INSTALLED, UNLESS IT IS CONSIDERED ATTIC SPACE.  **§120.7(a)3C** SHALL NOT BE INSTALLED ON SUSPENDED CEILINGS UNLESS ITS 2000 FT2 OR LESS AND THERE IS MORE THAN 12 FT BETWEEN ROOF AND CEILING.  *NOTE: Assembly options can be found in Reference joint appendix JA4* | 🞏 | 🞏 |
| **§120.7(b)1-6 WALL INSULATION**  OPAQUE PORTIONS OF WALLS SEPARATING CONDITIONED SPACE FROM UNCONDITIONED SPACES OR AMBIENT AIR SHALL MEET THE FOLLOWING:  METAL BUILDING: WEIGHTED AVERAGE U-FACTOR OF WALL ASSEMBLY ≤ 0.113  METAL FRAMED: WEIGHTED AVERAGE U-FACTOR OF WALL ASSEMBLY ≤ 0.151  LIGHT MASS WALLS: U-FACTOR FOR 6” OR GREATER HOLLOW CORE CONCRETE MASONRY UNIT ≤ 0.440  HEAVY MASS WALLS: U-FACTOR FOR 8” OR GREATER HOLLOW CORE CONCRETE MASONRY UNIT ≤ 0.690  WOOD FRAMED AND OTHER TYPES: WEIGHTED AVERAGE U-FACTOR OF WALL ASSEMBLY ≤ 0.110  SPANDREL PANELS AND CURTAIN WALLS: WEIGHTED AVERAGE U-FACTOR OF WALL ASSEMBLY ≤ 0.280  *NOTE: Assembly options can be found in Reference joint appendix JA4* | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 |
| **§120.7(b)7B Demising Wall Insulation – Metal Frame**  Metal frame walls shall have a maximum U-factor of 0.151. This project complies with minimum insulation shown for the following framing options from **Reference Joint Appendix JA4**:  4” studs, 16” or 24” o.c.: R-13 Cavity. R-2 continuous insulation required  6” studs, 16” or 24” o.c.: R-19 Cavity. R-2 continuous insulation required  8” studs, 24” o.c.: R-22 batt. No continuous insulation required.  Other: Provide Submitter Notes  *Note: closer stud spacing and/or lower batt R-value and/or smaller studs requires continuous insulative sheathing.*  *Note: Insulation is not required for non-frameD demising walls.* | 🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏 |
| **§120.7(b)7A Demising Wall Insulation – Wood Frame**  Wood frame walls shall have a maximum U-factor of 0.099. This project complies with minimum insulation shown for the following framing options from **Reference Joint Appendix JA4**:  2x4, 24” o.c.: R-13 batt  2x4, 16” o.c.: R-15 batt  2x6 or greater, any spacing: R-19 batt  *Note: Insulation is not required for non-frameD demising walls.* | 🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏 |
| **§120.7(c) FLOOR/SOFFIT INSULATION**  OPAQUE PORTIONS OF FLOORS AND SOFFITS SEPARATING CONDITIONED SPACE FROM UNCONDITIONED SPACES OR AMBIENT AIR SHALL MEET THE FOLLOWING (AS APPLICABLE):  RAISED MASS FLOORS: SHALL HAVE MINIMUM OF 3” OF LIGHTWEIGHT CONCRETE OVER A METAL DECK, OR WEIGHTED AVERAGE U-FACTOR OF FLOOR ASSEMBLY ≤ 0.269  OTHER FLOORS: WEIGHTED AVERAGE U-FACTOR OF FLOOR ASSEMBLY ≤ 0.071  HEATED SLAB ON GRADE FLOORS SHALL BE INSULATED PER §110.8(g) andTable 110.8-A.  *NOTE: Assembly options can be found in Reference joint appendix JA4* | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Solar Ready Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.10(b)1B Solar Ready Buildings**  all NEW nonresidential buildings up to (3) HabitaBle stories, other than healthcare facilities, or additions that increase the roof area > 2,000 FT2 (**Exception 4 to 141.0(a)**) shall have a solar zone located on the roof or other structure within 250 FT for the purpose of adding solar panels at a future time. the minimum solar zone area shall be sized according to **§110.10(b)1B.** | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 |
| **§110.10(b)2 azimuth**  all sections of the solar zone located on steeP-sloped roofs shall be oriented between 90 degrees and 300 degrees of true north. | 🞏 | 🞏 |
| **§110.10(b)3 shading**  no obstructions shall be located in the solar zone and obstructions located on any part of the building thaT projects above a solar zone shall be located at least twice the distance (measured in the horizontal plane) of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone (measured in the vertical plane).  **EXCEPTION:** Any roof obstruction (located anywHere on buildIng)  that is oriented north of all points on the solar zone | 🞏  🞏 | 🞏  🞏 |
| **§110.10(b)4 STRUCTURAL DESIGN LOADS ON CONSTRUCTION DOCUMENTS**  construction documents shall indicate structural design loads for roof dead load and roof live load for areas of the roof designated as solar zone. | 🞏 | 🞏 |
| **§110.10(c) INTERCONNECTION PATHWAYS**  Construction documents shall indicate reserved locations for inverters and metering equipment and a pathway reserved for conduit routing from solar zone to point of connection with electrical service, or a pathway for routing of plumbing from solar zone to water-heating system. | 🞏 | 🞏 |
| **§110.10(d)** a copy of the construction documents indicating information from §110.10(b) AND (c) MUST BE PROVIDED TO THE OCCUPANT. | 🞏 | 🞏 |
| **§110.10(e) Electric Service Panel**  The main electrical service panel should have:   * a minimum busbar rating of 200 amps * reserved space to allow for the installation of a double pole circuit breaker and be permanently marked as such | 🞏 | 🞏 |

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| ***2016 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Space Conditioning Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.2 Certification by Manufacturers**  Any space conditioning equipment listed in §110.2 shall only be installed if certified to the Energy Commission to meet all applicable §110.2 REQUIREMENTS. | 🞏 | 🞏 |
| **§110.2(a) Space Conditioning Equipment Efficiency**  Equipment shall meet applicable efficiency requirements in [**TABLE 110.2-A** through **TABLE 110.2-K**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1102alinktotables1102a1102k.htm)**.** | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 |
| **§110.2(b) Heat Pumps with supplementary electric resistance heat**  Heat pumps with supplementary electric resistance heaters shall have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone. Cut-on temperature for compression heating shall be higher than that for supplementary heating. Cut-off temperature for compression heating shall be higher than that for supplementary heating. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§110.2(c) Setback Thermostats**  All heating or cooling systems not controlled by a central energy management control system (EMCS) shall have a setback thermostat with clock mechanism that allows the building occupant to program the temperature setpoints for at least four periods within 24 hours. | 🞏  🞏 | 🞏  🞏 |
| **§110.2(d) FURNACE Standby Loss Controls**  Gas- and oil-fired forced air furnaces with input ≥225,000 Btu/hr shall HAVE THE FOLLOWING:   * an intermittent ignition or interrupted device (IID) * power venting or a flue damper (A vent damper MAY BE USED INSTEAD OF a flue damper IF combustion air is drawn from conditioned space.) * All furnaces not located within the conditioned space (including electric furnaces) shall have jacket losses ≤ 0.75% of the input rating. | 🞏 | 🞏 |
| **§110.2(e) Open and Closed Circuit Cooling Towers**  All open and closed circuit cooling tower installations shall have:   * Conductivity or Flow-based Controls that maximize cycles of concentration based on water quality conditions. * Documentation of maximum achievable cycles of concentration * Flow Meter with analog output for flow either hardwired or available through a gateway on the makeup water line. * Overflow Alarm to prevent overflow of the sump in case of makeup water valve failure. * Efficient Drift Eliminators that achieve drift reduction to 0.002% of the circulated water volume for counter-flow towers and 0.005% for cross-flow towers. | 🞏  🞏 | 🞏  🞏 |
| **§110.2(f) Low leakage air-handling units (AHUs)**  for Projects taking compliance credit using the performance path, AHU manufacturer shall certify to the energy commission that ahu meets the following specifications per **reference joint appendix Ja9**:   * **Ja9.2.1**: ahu shall be tested in accordance with ashrae Standard 193 * **Ja9.2.2**: testing lab must demonstrate compliance with iso standard 17025 and be accredited for ashrae standard 193 test methods * **Ja9.2.3(a)**: nominal ahu airflow used for determining leakage criterion for heatinG-only systems shall be 21.7 cfm per kBtu/hr of rated heating output capacity * **Ja9.2.3(b)**: nominal ahu airflow used for determining leakage criterion for systems that provide space cooling shall be 400 cfm per nominal ton of cooling capacity, or the heating-only value, whicThever is greater * **Ja9.2.4**: allowable leakage shall be ≤ 1.4% of the nominal AHU airflow determined by Section **JA9.2.3.** | 🞏 | 🞏 |
| **§110.5 Pilot Lights Prohibited for natural gas equipment**  Pilot lights are prohibited on Natural gas fan-type central furnaces, pool heaters, spa heaters, and fireplaces. | 🞏 | 🞏 |
| **§110.8(a) Insulation Certification**  Installed insulation shall be certified by the Department of Consumer Affairs per Title 24, Part 12, Chapters 12-13, Article 3 “Standards for Insulating Material.” | 🞏 | 🞏 |
| **§110.8(b) Urea Formaldehyde Insulation**  urea formaldehyde insulation shall not be installed unless in exterior side walls with a four-mil-thick plastic polyethylene vapor retarder or equivalent plastic sheathing vapor retarder installed between the urea formaldehyde foam insulation and the interior space. | 🞏 | 🞏 |
| **§110.8(c) Insulating Material**  All insulating materials shall be installed in compliance with the flame spread rating and smoke density requirements of the California building code. | 🞏 | 🞏 |
| **§110.8(d) DUCTS**  If insulation is installed on an existing space-conditioning duct, it shall comply with Section 604.0 of the CMC. | 🞏 | 🞏 |
| **§120.1(a) general Ventilation and indoor air quality requirements**  All occupiable spaces in high-rise residential, hotel/motel, and NONRESIDENTIAL BUILDINGS other than healthcare shall comply with applicable requirements of §120.1(a) through (g). the required outdoor air ventilation rate and Air-distribution system design shall be clearly identified on the plans. | 🞏 | 🞏 |
| **§120.1(c)1 Nonresidential and hotel/motel buildingsall occupiable spaces shall meet the following §120.1(c)1 air filtration requirements, and either §120.1(c)2 Natural ventilation,** or **§120.1(c)3 Mechanical ventilation:**  A. The following system types shall be provided with air filters to clean outside and return air prior to introduction into occupied spaces:  i. Newly installed Mechanical space conditioning systems that use forced air ducts >10 ft long to supply air to an occupiable space.  ii. mechanical supply-only ventilation systems that provide outside air to an occupiable space.  iii.the supply side of mechanical balanced ventilation systems, including heat recovery ventilation systems and energy recovery ventilation systems that provide outside air to an occupiable space.  B. air filters shall have efficiency ≥ merv 13 when tested per ashrae standard 52.2 or a particle size efficiency rating per **§120.1(c)1B.**  C. system Air filters shall be either  i. nominal 2 inch minimum depth, or  ii. nominal 1 Inch minimum depth, if sized per equation 120.1-A based on a maximum face velocity of 150 ft/min | 🞏 | 🞏 |
| **§120.1(c)2 natural ventilation**  naturally ventilated spaces shall be designed in accordance with **§120.1(c)2A** through **§120.1(c)2C** and include a mechanical ventilation system designed in accordance with **§120.1(c)3.** | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§120.1(c)3 mechanical ventilation**  occupiable spaces shall be ventilated with a mechanical ventilation system capable of providing an outdoor airflow rate (vz) to the zone no less than the larger of (vz) described in **§120.1(c)3A or §120.1(c)3B.** | 🞏  🞏 | 🞏  🞏 |
| **§120.1(c)4 exhaust ventilation**  design exhaust airflow shall be determined by **table 120.1-D.** exhaust makeup air shall be permitted to be any combination of outdoor, recirculated, or transfer air. | 🞏 | 🞏 |
| **§120.1(d)Times of occupancy**  Minimum outdoor air rate shall be met at times when the space is usually occupied in accordiance with **§120.1(c)** | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§120.1(d)2 Pre-occupancy.** The lesser of the minimum rate of outdoor air required by Section 120.1(c) or three complete air changes shall be supplied to the entire building during the 1-Hour period immediately before the building is normally occupied. | 🞏 | 🞏 |

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| **§120.1(d)3 required demand control ventilation.** dcv controls are required for a space with a design occupancy density >= 25 people/1,000 ft2 if the system serving the space has one or more of the following   * an air economizer * modulating outside air control * design outdoor airflow rate > 3,000cfm | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 |
| **§120.1(d)4 Demand Control Ventilation (DCV)**  A. For each system with DCV, at least one CO2 sensor per 10,000 FT2 shall be installed in each room meeting **§120.1(d)3** criteria. When a zone or a space is served by more than one sensor, a signal from any sensor shall trigger an increase in ventilation.  B. CO2 sensors shall be between 3 and 6 ft above the floor.  C. DCV controls shall maintain CO2 concentrations ≤ 600 ppm plusthe OA CO2 concentration in all rooms with CO2 sensors.  .  D. outdoor air CO2 concentration shall be assumed to be 400 ppm if no direct measurement, or shall be dynamically measured using a CO2 sensor located within 4 ft of the outdoor air intake.  E. for systems operating during occupancy, controls shall maintain OA ventilation rates no less than:  the rate listed in TABLE 120.1-A times the conditioned floor area for spaces with CO2 sensors, plus the rate required by **§120.1(c)3** for other spaces served by the system,  **or** the exHaust air rate, whichever is greater.  F. CO2 sensors shall be certified by the manufacturer to meet the accuracy, calibration and reset requirements of **§120.1(d)F**.  G. The CO2 sensor reading for each zone shall be displayed continuously and shall be recorded on systems with ddc to the zone level. | 🞏  🞏 | 🞏  🞏 |
| **§120.1(d)5 Occupant Sensor Ventilation controls**  When required by **§120.2(e)3,** occupant sensors shall be used to reduce the rate of OA flow when occupants are not present per A and B below:  A. Occupant sensor requirements:   * shall Meet applicable Title 20 Appliance Efficiency Regulations per **§110.9(b)4.** * Occupant sensors controlling lighting, may also control ventilation as long as the lighting and ventilation control signals are independENT of each other * Single zones with multiple rooms shall have an occupancy sensor in each room, and the zone is not considered vacant until all rooms in the zone are vacant.   B. Allow pre-occupancy purge one hour prior to normal scheduled occupancy as described in **§120.1(d)2.** | 🞏 | 🞏 |
| **§120.1(e) ducting for zonal heating and cooling units**  where a return plenum is used to distribute outdoor air to a zonal heating or cooling unit which then supplies air to a space to meet **§120.1(c)3**, outdoor air shall be ducted to discharge either:   * within 5 feet of the unit * within 15 feet of the unit, substantially toward the unit, and at a velocity not less than 500 feet per minute | 🞏 | 🞏 |
| **§120.1(f) design and control requirements for quantities of outdoor air**  **§120.1(f)1** ALL MECHANICAL VENTILATION AND SPACE-CONDITIONING SYSTEMS SHALL BE DESIGNED with AND HAVE INSTALLED DUCTWORK, DAMPERS, AND CONTROLS TO ALLOW oa RATES TO BE OPERATED AT THE LARGER OF:  **§120.1(c)3** MINIMUMS OR the RATE REQUIRED FOR MAKE-UP OF EXHAUST SYSTEMS FOR AN EXEMPT OR COVERED PROCESS, CONTROL OF ODORS, OR CONTAMINANT REMOVAL IN A SPACE.  **§120.1(f)2** all vav systems shall include dynamic controls that maintain OA ventilation rates within 10% of the required oa ventilation rate at both full and reduced supply airflow conditions. fixed minimum damper position is not an allowed strategy.  **§120.1(f)3** measured oa rates of constant volume systems shall be within 10% of the required outside air rate. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§120.1(g) air classification and recirculation limitations**  air classification and recirculation limitations of air shall be based on **table 120.1-A** or **table 120.1-c,** and in accordance with **§120.1(g)1** through **4.** | 🞏 | 🞏 |
| **§120.2(a) Thermostatic Controls**  Heating and cooling supply to each space-conditioning zone or [dwelling unit](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_dwellingunit.htm) shall be controlled by an individual thermostatic control that responds to temperature in the zone and meets **§120.2(b)** requirements.   * . | 🞏  🞏 | 🞏  🞏 |
| **§120.2(b) Zonal Thermostatic Controls**  individual thermostatic controls required by [**§120.2(a)**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#athermostaticcontrolsforeachzone.htm)shall be capable of:  **§120.2(b)1** Being set to 55°F or lower, when controlling heating  **§120.2(b)2** Being set up to 85°F or higher, when controling cooling  **§120.2(b)3** Providing a temperature range, or dead band of at least 5°F within which heating and cooling to the zone is shut off or reduced to a minimum.    **§120.2(b)4** THermostatic controls for all single zone air conditioners and heat pumps shall comply with the requirements of[**§110.2(c)**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1102mandatoryrequirementsforspaceconditioningequipment.htm#cthermostats.htm)and [**§110.12(a)**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1102mandatoryrequirementsforspaceconditioningequipment.htm#cthermostats.htm) and, if equipped with DDC to the Zone level, with the [Automatic](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_automatic.htm) Demand Shed Controls of[**§110.12(b)**.](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm) | 🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏 |
| **§120.2(d) HEAT PUMP CONTROLS**  ALL HEAT PUMPS WITH SUPPLEMENTARY ELECTRIC RESISTANCE HEATERS SHALL BE INSTALLED WITH CONTROLS THAT MEET **§110.2(b)** REQUIREMENTS. | 🞏 | 🞏 |
| **§120.2(e)1 Automatic Shut-Off for Space-Conditioning Systems**  Each [space-conditioning system](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_spaceconditioningsystem.htm) shall be installed with one of the following controls capable of automatically shutting off the system during periods of nonuse:   * automatic time switch control per [**§110.9,**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1109mandatoryrequirementsforlightingcontroldevicesandsyst.htm)with [accessible](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_accessible.htm) [manual](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_manual.htm) override allowing system operation for up to 4 hours, or * An occupancy sensor, or * A 4-hour timer that can be manually operated. | 🞏  🞏 | 🞏  🞏 |
| **§120.2(e)2 Automatic Restart for Space-Conditioning Systems**  Each space-conditioning system shall be installed with controls that shall automatically restart and temporarily operate the system as required to maintain:   * **§120.2(e)2A** A setback heating thermostat setpoint if the system provides mechanical heating, and * **§120.2(e)2B** A setup cooling thermostat setpoint if the system provides mechanical cooling. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§120.2(e)3 Occupant Sensors for Space-Conditioning Systems**  space conditioning systems serving rooms required to have occupant senSors per **§130.1(c)** AND WHERE TABLE 120.1-A OCCUPANCY CATEGORY PERMITS VENTILATION AIR TO BE REDUCED TO ZERO WHEN SPACE IS IN OCCUPIED-STANdBY MODE SHALL meet the following:   * ZONE SHALL BE PLACED IN OCCUPIED STANDBY MODE WHEN ALL ROOMS SERVED BY THE ZONE ARE UNOCCUPIED FOR MORE THAN 5 MINUTES AND * DURING OCCUPIED-STANDBY MODE   + AUTOMATICALLY SETUP THE OPERATING COOLING TEMPERATURE SETPOINT BY 2°F or more and setback the operating heating temperature set point by 2˚F or more, OR   + FOR MULTIPLE ZONE SYSTEMS WITH DDC TO THE ZONE LEVEL, SETUP OPERATING COOLING TEMPERATURE SETPOINT BY 2°F or more and setback the operating heating temperature set point by 2˚F or more. * ALL AIRFLOW TO THE ZONE SHALL BE SHUT OFF WHENEVER THE SPACE TEMPERATURE IS BETWEEN the ACTIVE HEATING AND COOLING SETPOINTS. | 🞏  🞏 | 🞏  🞏 |
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| **§120.2(f) Dampers for Air Supply and Exhaust Equipment**  Outdoor air supply and exhaust equipment shall be installed with dampers that automatically close upon fan shutdown. | 🞏 | 🞏 |
| **§120.2(g) Isolation Area Devices**  Each [space-conditioning system serving m](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_spaceconditioningsystem.htm)ultiple zones with a combined conditioned floor area of more than 25,000 FT2 shall be designed, installed, and controlled to serve isolation areas.   * Each zone, or combination of zones < 25,000 FT2, shall be a separate isolation area. * Each isolation area shall be provided with isolation devices, such as valves or dampers that allow the supply of heating or cooling to be reduced or shut-off independently of other isolation areas. * Each isolation area shall be controlled by a device meeting the requirements of **§120.2(e)1.** | 🞏 | 🞏 |
| **§120.2(h) Automatic Demand Shed Controls**  shall meet requirements in §110.12  **§110.12(a)** dEMAND RESPONSIVE (DR) CONTROL requirements:   1. Either certified openadr 2.0a, openadr 2.0b Virtual End node (ven), or certified by the manufacturer as being capable of responding to a DR signal from a certified openadr 2.0b Virtual End node by automatically implementing the control functions requested by the virtual end node for the equipment it controls 2. capable of communicating using wi-fi, zigbee, bacnet, ethernet, and/or hard-wiring. 3. may incorporate and use additional protocols beyond those specified in **§110.12(a)1 AND 2.** 4. shall continue to perform all other control functions provided by the contROl when communications are disabled. 5. thermostats shall comply with Reference joint appendix 5 **(JA5)**   **§110.12(b)** nonresidential hvac systems with ddc to the zone level shall be programmed to allow centralized demand shed for non-critical zones. controls shall be capable of:   1. remotely increasing the operating cooling temperature setpoints by 4 degrees or more in all non-critical zones on signal from a centralized contact or software point within an EMCS 2. remotely decreasing the operating heating temperature setpoints by 4 degrees or more in all non-critical zones on signal from a centralized contact or software point within an EMCS 3. remotely resetting the temperatures in all non-critical zones to original operating levels on signal from a centralized contact or software point within an EMCS 4. providing an adjustable rate of change for the temperature increase, decrease, and reset 5. the following features: 6. disabled by authorized facility operators 7. manual control by authorized facility operators 8. upon receipt of a dR signal, space-conditioning systems shall conduct a centralized demand shed, as specified in 110.12(b)1 and 110.12(b)2, for non-critical zones during the DR period | 🞏 | 🞏 |
| **§120.2(i) Economizer Fault Detection and Diagnostics (FDD)**  All newly installed air-cooled packaged direct-expansion units, with an air handler [mechanical cooling](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_mechanicalcooling.htm) capacity greater than 54,000 Btu/hr and an installed air economizer shall include a stand-alone or integrated FDD system in accordance with THE FOLLOWING:   1. tEMPERATURE SENSORS SHALL BE permanently installed to monitor system operation: outside air, [supply air](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_supplyair.htm), and when required for differential economizer operation, a return air sensor. 2. Temperature sensors shall have an accuracy of ±2°F over the range of 40°F to 80°F. 3. Controller shall have the capability of displaying the value of each sensor and 4. provide system status by indicating: free cooling available, economizer enabled, compressor enabled, heating enabled (if available), mixed air low limit cycle active. 5. Controller shall allow manual initiation of each operating mode so that the operation of cooling systems, economizers, fans, and heating systems can be independently tested and verified. 6. Faults shall be reported in one of the following ways:  * Reported to an EMCS regularly monitored by facility staff. * annunciated locally on one or more zone thermostats, or a device within 5 ft of zone thermostat(s), clearly visible, at eye level, and with instructions to contact appropriate [building](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_building.htm) staff or an HVAC technician. In buildings with multiple tenants, annunciation shall either be within property management offices or in a common space [accessible](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_accessible.htm) by the property or building manager * reported to a fault management application which automatically provides notification of the fault to remote HVAC service provider.  1. The FDD shall detect: air temperature sensor failure/ fault, failure to economize, economizing when not advised, damper not modulating, and excessive outdoor air. 2. The FDD System shall be certified by the [Energy Commission](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_energycommission.htm) as meeting requirements of **§120.2(i)1** through **§120.2(i)7** in accordance with **§**[**110.0**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1100systemsandequipmentgeneral.htm) and **Joint Appendix** [**JA6.3**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/ja63economizerfaultdetectionanddiagnosticscertificationsubmittal.htm). | 🞏 | 🞏 |
| **§120.2(j) Direct Digital Controls (DDC)**  DDC to the zone shall be provided as specified by **Table 120.2-A**. The DDC system shall meet control logic requirements of **§120.1(c)** and **§**[**120.2(h)**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm) and be capable of all of the following:   1. Monitoring zone and system demand for fan pressure, pump pressure, heating and cooling 2. Transferring zone and system demand information from zones to air distribution system controllers and from air distribution systems to heating and cooling plant controllers 3. Automatically detecting the zones and systems that  may be excessively driving the reset logic and generate an alarm or other indication to the system operator 4. Readily allow operator removal of zones(s) from the reset algorithm 5. For new buildings, trending and graphically displaying input and output points 6. Resetting heating and cooling setpoints in all non-critical zones upon receipt of a signal from a centralized contact or software point as described in **§**[**120.2(h)**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**.** | 🞏 | 🞏 |
| **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**2(k) optimum start/stop controls**  space conditioning systems with ddc to the zone shall have optimum start/stop controls. control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint, outdoor air temp, and amount of time prior to scheduled occupancy.  mass radiant floor slab systems shall incorporate floor temperature onto the optimum start algorithm. | 🞏 | 🞏 |
| **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**3 Pipe Insulation**  pipe insulation is required for:   * space cooling system: refrigerant suction, chilled water, and brine fluid distribution systems; and * space heating system: refrigerant, steam, steam condensate, and hot water fluid distribution systems.   this pipe insulation must show compliance witheither **Table 120.3-A** based on fluid normal operating temperature ranges and pipe diameters**,** or the Insulation Thickness Equation in **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**3(c)**.  Pipe insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Protection shall include but not be limited to the following:   * Insulation exposed to weather shall be protected by a cover suitable for outdoor service. The cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. adhesive tape shall not be used to provide this protection. * Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include, or be protected by, a Class I or Class II vapor retarder. All vapor retarder penetrations and joints shall be sealed. * pipe insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve. | 🞏 | 🞏 |
| **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4Air Distribution System Ducts and Plenums**  Portions of supply- and return-air ducts conveying heated or cooled air located in one or more of the following spaces shall be insulated to a minimum installed level of R-8:   * Outdoors * In a space between the roof and an insulated ceiling * In a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces * Unconditioned spaces, such as unconditioned crawlspace   Portions of supply-air ducts that are not in one of these spaces, including ducts buried in concrete slab, shall be insulated to a minimum installed level of R-4.2 (or any higher level required by **CMC §605.0**), or be enclosed in Directly conditioned space. | 🞏 | 🞏 |
| **duct and plenum materials**  **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(b) Factory-fabricated duct systems** Must:   * comply with ul 181 for ducts and closure systems and be labeled as complying with ul 181 * all pressure sensitive tapes, heat activated tapes, and mastics used in manufacture of rigid fiberglass ducts shall comply with ul 181 and Ul 181A * all pressure sensitive tapes and mastics used in manufacture of flexible ducts shall comply with ul 181 and ul 181B * joints and seams shall not be sealed with cloth back rubber adhesive duct tapes unless combined with mastics and drawbands.   **Field-fabricated duct systems**:   * factory-made rigid fiberglass and flexible ducts for field-fabricated duct systems shall comply with UL 181. all closure systems, including pressure sensitive tapes, mastics, and aerosol sealants, shall meet the applicable requirements of ul 181, ul 181A, and ul 181B. * Mastic sealants shall:   + comply with applicable requirements of ul 181, ul 181a, and ul 181B and be nontoxic and water resistant.   + pass ASTM c731 and D2202, if used in building interior.   + pass astm c731, c732, and D2202, if used on exterior   + sealants and meshes shall be rated for exterior use. * pressure sensitive tapes shall comply with applicable requirements of ul 181, ul 181a, and ul 181b. * joints and seams shall not be sealed with cloth back rubber adhesive duct tapes unless combined with mastics and drawbands. * Drawbands used with flexible ducts shall:   + be either stainless-steel worm-drive hose clamps or uv-resistant nylon duct ties   + have a minimum tensile strenght rating of 150 lbs.   + be tightened as recommended by the manufacturer * Aerosol-sealant closures shall:   + meet requirements of UL 723 and be applied according to manufacturer specifications   + tapes or mastics used in combination with aerosol sealing shall comply with applicable requirements of ul 181, ul 181A and ul 181B, astm c731, c732, AND d2202.   **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(c)** all duct insulation product r-values shall be based on insulation only and tested in accordance with astm c518 or astm c177 and certified per **§110.8.**  **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(d)** installed thickness of duct insulation used to determine its r-value shall be determined as follows:   * duct board, liner, and factory made rigids: use nominal insulation thickness * duct wrap: use 75% (25% compression) of nominal thickness * factory-made flexible air ducts: divide the difference between the actual outside diameter and nominal inside diameter by two.   **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(e)** INSULATED FLEXIBLE DUCT PRODUCTS INSTALLED TO MEET THIS REQUIREMENT MUST INCLUDE LABELS (MAX INTERVALS OF 3 FT) SHOWING THERMAL PERFORMANCE R-VALUE FOR THE DUCT INSULATION ITSELF BASED ON TESTS IN **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(c)** ANDINSTALLED THICKNESS DETERMINED BY **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(d)3.**  **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**4(f)** **PROTECTION OF INSULATION**  INSULATION SHALL BE PROTECTED FROM DAMAGE BY SUNLIGHT, MOISTUIRE, EQUIPMENT MAINTENANCE AND WIND. cELLULAR FOAM INSULATION SHALL BE PROTECTED, OR BE PAINTED WITH A WATER RETARDANT COATING THAT PROVIDES SHIELDING FROM SOLAR RADIATION. | 🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏 |
| **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**9 NEWLY INSTALLED COMMERCIAL BOILERS**  **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**9(a):** COMBUSTION AIR POSITIVE SHUT-OFF REQUIRED FOR THE FOLLOWING BOILERS:   * iNPUT CAPACITY ≥ 2,500,000 BTU/HR AND DESIGNED WITH NONPOSITIVE VENT STATIC PRESSURE * ONE STACK SERVING TWO OR MORE bOILERS WITH TOTAL COMBINED iNPUT CAPACITY ≥ 2,500,000 BTU/HR   **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**9(b):** boiler COMBUSTION AIR fan motors ≥ 10 hp must meet one of the following:   * variable speed drive. * controls limit fan motor demand to ≤ 30% of total Design wattage at 50% design air volume.   **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**9(c):**  boilers with iNPUT CAPACITY ≥ 5,000,000 BTU/HR shall maintain excess (stack gas) oxygen concentrations ≤ 5% by volume on a dry basis over firing rates of 20% to 100%. combustion air volume shall be controlled with respect to firing rate or flue gas oxygen concentration. Use of a common gas and combustion air linkage or jack shaft is prohibited. | 🞏 | 🞏 |

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| ***2016 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Service Water Heating Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§110.3(a) Certification by Manufacturers**  Any service water heating system or equipment may be installed only if certified to the Energy Commission to meet all applicable **§110.3** requirements. | 🞏 | 🞏 |
| **§110.3(a)1 Temperature Controls**  service water heating systems shall be equipped with Automatic Temperature controls capapable of being adjusted from lowest to highest acceptable temperatures for the intended use as listed in Table 3, Chapter 50 of the ASHRAE Handbook, HVAC Applications Volume, or table 613.1 of the california plumbing code for healthcare facilities. Residential Occupancies Are exempt form temperature control requirements | 🞏  🞏 | 🞏  🞏 |
| **§110.3(b) Efficiency**  Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations as required by **§110.1**. | 🞏 | 🞏 |
| **§110.3(c)1 Outlet Temperature Controls**  On systems that have a total capacity greater than 167,000 Btu/hr, outlets that require higher than service water temperatures as listed in the ASHRAE Handbook, Applications Volume, shall have separate remote heaters, heat exchangers, or boosters to supply the outlet with the higher temperature. | 🞏 | 🞏 |
| **§110.3(c)2 Controls for Hot Water Distribution Systems**  Service hot water systems with circulating pumps or with electrical heat trace systems shall be capable of automatically turning off the system. | 🞏 | 🞏 |
| **§110.3(c)3 Insulation**  Unfired water heater storage tanks and backup tanks for solar water-heating systems shall have:  A. External insulation with an installed R-value ≥ R-12; or  B. Internal and external insulation with a combined R-value ≥ R-16; or  C. The heat loss of the tank surface based on an 80°F water-air temperature difference shall be < 6.5 BTU/hr/FT2. | 🞏 | 🞏 |
| **§110.3(c)4**  **Water Heating Recirculation Loops**  Water heating recirculation loops serving multiple dwelling units, high-rise residential, hotel/motel and nonresidential occupancies shall have:  A. Air release valve or vertical pump installation  B. Recirculation loop backflow prevention  C. Equipment for pump priming  D. Pump isolation valves  E. Cold water supply and recirculation loop connection to hot water storage tank  F. Cold water supply backflow prevention | 🞏 | 🞏 | |
| **§110.3(c)5 State Buildings**  At least 60% of the energy for service water heating in newly constructed state buildings shall be provided by site solar energy or recovered energy. | 🞏 | 🞏 |
| **§110.3(c)6 Isolation Valves**  Instantaneous water heaters with an input rating > 6.8 kBTU/hr (2kW) shall have isolation valves on both cold water supply and hot water pipe leaving the water heater, and hose bibs or other fittings on each valve for flushing the water heater when the valves are closed. | 🞏 | 🞏 |
| **§110.8(a) Insulation Certification**  Installed insulation shall be certified by the Department of Consumer Affairs per Title 24, Part 12, Chapters 12-13, Article 3 “Standards for Insulating Material.” | 🞏 | 🞏 |
| **§110.8(b) Urea Formaldehyde Insulation**  urea formaldehyde insulation shall not be installed unless in exterior side walls with a four-mil-thick plastic polyethylene vapor retarder or equivalent plastic sheathing vapor retarder is installed between the urea formaldehyde foam insulation and the interior space. | 🞏 | 🞏 |
| **§110.8(c) Insulating Material**  All insulating materials shall be installed in compliance with the flame spread rating and smoke density requirements of the California building code. | 🞏 | 🞏 |
| **§110.8(d)2 water heater insulation added to existing tank**  if external insulation is installed on existing unfired water storage tank or existing back-up tank for a solar water-heating system, it shall have:   * r-value ≥ r-12, or * the heat loss of the tank surface based on an 80°F water-air temperature difference shall be < 6.5 btu/hr/fT2. | 🞏 | 🞏 |
| **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**3 Pipe Insulation**  Pipe insulation That complies with **Table 120.3-A,** or insulation thickness equation in **§**[**120.**](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1202requiredcontrolsforspaceconditioningsystems.htm#hautomaticdemandshedcontrols.htm)**3(c)** is required for:   * Recirculation system piping, including water heater supply and return; * The first 8 feet of hot and cold outlet piping, including piping between the storage tank and a heat trap, for nonrecirculation storage system; * Pipes that are externally heated   Pipe insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Protection shall include but not be limited to the following:   * Insulation exposed to weather shall be protected by a cover suitable for outdoor service. The cover shall be water retardant and provide shielding from solar radiation that can cause degradation of the material. adhesive tape shall not be used to provide this protection. * pipe insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve. | 🞏 | 🞏 |
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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6, Ch.1)***  ***Covered Process Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§120.6(a) Refrigerated Spaces < than 3,000 FT2**  refrigerated spaces < 3000 FT2 shall meet the requirements of the [Appliance Efficiency Regulations](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_applianceefficiencyregulations.htm) for walk-in coolers or freezers contained in the Appliance Efficiency Regulations **(California Code of Regulations, Title 20, Sections 1601 through 1608).** | 🞏 | 🞏 |
| **§120.6(a) Refrigerated Warehouses ≥ 3,000 FT2** **and refrigerated spaces with a sum total of ≥ 3,000 FT2** **served by the same refrigeration system**  **§120.6(a)1** Exterior surfaces of refrigerated warehouses shall be insulated To the following minimum R-values from TABLE 120.6-A: FREEZERS:ROOF CEILING: R-40WALL: R-36FLOOR: R-35FLOOR WITH ALL HEATING FROM PRODUCTION REFRIGERATION CAPACITY: R-20COOLERS:ROOF/CEILING: R-28WALL: R-28 | 🞏 | 🞏 |
| **§120.6(a)2 Underslab heating**  **§120.6(a)2** Electric resistance heat shall not be used for underslab heating.  **EXCEPTION** to **§120.6(a)2**: Underslab heating systems WHEN electric resistance heat is thermostatically controlled AND disabled during the summer on-peak period defined by electric utility. | 🞏  🞏 | 🞏  🞏 |

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| **§120.6(a)3 Evaporators in coolers and freezers**  **§120.6(a)3A** Single phase fan motors < 1 hp and < 460 Volts shall be electronically commutated motors or have a minimum motor efficiency of 70% when rated in accordance with NEMA Standard MG 1-2006 at full load rating conditions.  **§120.6(a)3b** Evaporator fans served by either a suction group with multiple compressors, or by a single compressor with variable capacity capability shall be variable speed and speed shall be controlled in response to space temperature or humidity.  **§120.6(a)3C** Evaporator fans served by a single compressor that does not have variable capacity shall utilize controls to reduce airflow by at least 40% for at least 75%of the time when the compressor is not running. |  |  |
| **§120.6(a)4 Condensers on refrigeration systems**  **§120.6(a)4A** Design saturated condensing temperatures for evaporative-cooled condensers and water-cooled condensers served by fluid coolers or cooling towers shall be ≤ The design wetbulb temperature:   * + plus 20°F in locations where the design wetbulb temperature is ≤ 76°F; or   + plus 19°F in locations where the design wetbulb temperature is between 76°F and 78°F; or   + plus 18°F in locations were the design wetbulb temperature is ≥ 78°F   **§120.6(a)4B** Design saturated condensing temperatures for air-cooled condensers shall be ≤ to the design drybulb temperature:   * plus 10°F for systems serving freezers * plus 15°F for systems serving coolers   **§120.6(a)4C** Saturated condensing temperature necessary for adiabatic condensers to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be ≤ the design drybulb temperature:   * plus 20°F for systems serving freezers * Plus 30°F for systems serving coolers   **§120.6(a)4d** All condenser fans for air-cooled, Evaporative-cooled, and adiabatic condensers, Gas coolers, air or water fluid coolers, or cooling towers shall be continuously variable speed. the speed of all fans serving a common condenser high side shall be controlled in unison.  **§120.6(a)4e** the minimum condensing temperature set point shall be ≤  70°F for air-cooled, evaporative-cooled, and adiabatic condensers, gas coolers, air or water-cooled fluid coolers, or cooling towers.  **§120.6(a)4F** The condensing temperature set point of systems served by air-cooled condensers shall be reset in response to ambient drybulb temperature and for evaporative-cooled condensers or water-cooled condensers (via cooling towers or fluid coolers) shall be reset in response to ambient wetbulb temperatures.the condensing temperature setpoint for systems served by adiabatic condensers shall be reset in response to ambient drybulb temperature while operating in dry mode.  **§120.6(a)4G** Fan-powered condensers shall meet the condenser efficiency requirements listed in [**TABLE 120.6-B**](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1206mandatoryrequirementsforcoveredprocesses.htm#table1206bfanpoweredcondensersminimumefficiencyrequirements.htm)**:**  oUTDOOR EVAPORATIVE COOLED:  thr cAPACITY> 8,000 mbh: 350 btuh/waTT  THR Capacity<8,000 MBH: 160 BTUH/WATT  outdoor air-cooled:  with ammonia refrigerant: 75 BTUH/WATT  with halocarbon refrigerant: 65 BTUH/WATT  INDOOR AIR-COOLED: exempt  Condenser efficiency = [Total Heat of Rejection](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_totalheatofrejection.htm) (THR) capacity  all electrical input power including fan  power at 100% fan speed, and Power of  spray pumps for evaporative condensers  **§120.6(a)4H** Air-cooled condensers shall have a fin density ≤10 fins per inch. | 🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏 |
| **§120.6(a)5 compressor systems in refrigerated warehouses**  **§120.6(a)5A** designed to operate at condensing temperature of ≤ 70°F.  **§120.6(a)5B** new open-drive screw compressors in new refrigeration systems with an SST of ≤ 28°F that discharges to the system condenser pressure shall control compressor speed in response to the refrigeration load.  **§120.6(a)5C** New screw compressors with nominal electric motor power > 150 HP shall include the ability to automatically vary the compressor volume ratio in response to operating Pressures. | 🞏 | 🞏 |
| **§120.6(a)6 Infiltration Barriers**  **§120.6(a)6** Passageways between freezers and higher-temperature spaces, and between coolers and nonrefrigerated spaces, shall have [infiltration](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_infiltration.htm) barrier consisting of strip curtains, automatically-closing [door](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_door.htm), or an air curtain designed for use in the passageway and temperature for which it is applied. | 🞏 | 🞏 |
| **§120.6(a)7 Refrigeration System Acceptance**  Before an occupancy permit is granted for a new [refrigerated warehouse](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_refrigeratedwarehouse.htm), or before a new refrigeration system serving a refrigerated warehouse is operated for normal use, the following shall be certified as meeting the Acceptance Requirements PER the Reference Nonresidential [Appendix NA7](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/appendixna7installationandacceptancerequirementsfornonresidentia.htm):  a. Electric resistance underslab heating systems  b. Evaporators fan motor controls  C. Evaporative condensers  D. Air-cooled condensers  E. adiabatic condensers  f. Variable speed compressors  NOTE: A Certificate of Acceptance shall be submitted to the [enforcement agency](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_enforcementagency.htm). | 🞏 | 🞏 |
| **§120.6(b)1 Fan-powered condensers Serving Refrigeration systems:**  a. All condenser fans for air-cooled, evaporative-cooled and adiabatic condensers,gas coolers, air or water-cooled fluid coolers or cooling towers shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.  refrigeration system condenser controls shall use variable-setpoint control logic to reset the condensing temperature setpoint in response to:  b. ambient drybulb temperature for air-cooled condensers, AND  c. ambient wetbulb temperature for evaporative-cooled condensers.  D. refrigeration system condenser controls for systems with adiabatic condensers shall use variable setpoint control logic to reset the condensing temperature setpoint in response to ambient drybulb temperature while operating in dry mode.  e. the satureated condensing temperature necessary for adiabatic condensers to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be ≤ design drybulb temperature:   * plus 20°F for systems serving freezers * Plus 30°F for systems serving coolers   F. the minimum condensing temperature setpoint shall be ≤ 70°F  g. Fan-powered condensers shall meet the specific efficiency requirements listed in **Table 120.6-C**:  evaporative-cooled: 160 Btu/W  Air-cooled: 65 BTUH/W  adiabatic dry mode: 45btu/w (halocarbon) | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§120.6(b)2 COMPRESSOR SYSTEMS in refrigeration systems**  A. Compressors and multiple-compressor suction groups shall include control systems that use floating suction pressure logic to reset the target saturated suction temperature based on the temperature requirements of the attached refrigeration display cases or walk-ins.  b. Liquid subcooling shall be provided for all low temperature compressor systems with a design cooling capacity equal or greater than 100,000 Btu/hr with a design saturated suction temperature of -10°F or lower, with the subcooled liquid temperature maintained continuously at 50°F or less at the exit of the subcooler, using compressor economizer port(s) or a separate medium or high temperature suction group operating at a saturated suction temperature of 18°F or higher. | 🞏  🞏 | 🞏  🞏 |
| **§120.6(b)3** **refrigerated display cases**  Lighting in refrigerated display cases, and lights on glass doors installed on walk-in coolers and freezers shall be controlled by one of the following:  a. [Automatic](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_automatic.htm) time switch controls to turn off lights during nonbusiness hours. Timed overrides for any line-up or walk-in case may only be used to turn the lights on for up to one hour.  [Manual](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_manual.htm" \t "popup) overrides shall time-out automatically to turn the lights off after one hour.  B. Motion sensor controls on each case that reduce display case lighting power by at least 50% within 30 minutes after the area near the case is vacated. | 🞏 | 🞏 |
| **§120.6(b)4 refrigeration heat recovery**  a. HVAC systems shall utilize heat recovery from refrigeration system(s) for space heating, using no less than 25% of the sum of the design Total Heat of Rejection of all refrigeration systems that have individual Total Heat of Rejection values of 150,000 Btu/h or greater at [design conditions](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_designconditions.htm).  b. The increase in hydrofluorocarbon refrigerant charge associated with refrigeration heat recovery equipment and piping shall be no greater than 0.35 lbs per 1,000 Btu/h of heat recovery heating capacity. | 🞏  🞏 | 🞏  🞏 |
| §120.6(c)  Enclosed Parking GaragesMechanical ventilation systems for enclosed parking garageswhere the total design exhaust rate for the garage is ≥ 10,000 cfm shall: 1. Automatically detect contaminant levels and stage fans or modulate fan airflow rates to 50% or less of design capacity  2. Have controls/ devices that will result in fan motor demand of no more than 30% of design wattage at 50% design airflow.  3. monitor co with at least one sensor per 5,000 FT2 located in the highest expected concentration locations with at least two sensors per proximity zone.  4. maintain co concentraton at 25 ppm or less at all times.  5. maintain ventilation rate at at least 0.15 cfm/ft2 when the garage is scheduled to be occupied.  6. maintain negative or neutral pressure relative to other occupiable spaces when the garage is scheduled to be occupied.  7. CO sensors shall be:   * Certified by the manufacturer to be accurate within plus or minus 5% * drift no more than 5% per year and require calibration no more than once per year, And * Be Factory calibrated * Monitored by a control system with logic that automatically checks for sensor failure. Upon detection of a failure, system shall reset to design ventilation rates and transmit an alarm to the facility operators | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 |
| **§120.6(c)8  Parking Garage Ventilation System Acceptance**  Before an occupancy permit is granted for a parking garage system A Certificate of Acceptance shall be submitted to the [enforcement agency](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_enforcementagency.htm) that certifies that the equipment and systems meet the acceptance requirements specified in **nonresidential reference appendices** [**NA7.12**](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/na712parkinggarageventilationsystemacceptancetests.htm)**.** | 🞏 | 🞏 |
| **EXCEPTION** **1** to **§120.6(c)**: Garage (or portion of garage) where > 20% of the stored vehicles have non-gasoline combustion engines  **EXCEPTION** **2** to **§120.6(c)**: Additions and alterations to existing garages where < 10,000 cfm of new exhaust capacity is added. | 🞏  🞏 | 🞏  🞏 |
| §120.6(d) Mandatory Requirements for Process Boilers **§120.6(d)1** [Combustion air positive shut-off](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_combustionairpositiveshutoff.htm) shall be provided on all newly installed [process](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_process.htm) boilers with an input capacity of 2.5 MMBtu/h and above, in which the boiler is designed to operate with a non-positive vent static pressure, And/or   All process boilers where one stack serves two or more boilers with a total combined input capacity per stack of 2.5 MMBtu/h.  **§120.6(d)2** [Process boiler](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_processboiler.htm) combustion air fans with motors 10 hP or larger shall:  a. fan motor shall be driven by a variable speed drive;  b. fan motor shall include controls that limit the fan motor demand to no more than 30% of total design wattage at 50% of design air volume.    **§120.6(d)3** Newly installed process boilers:   * input capacity of 5 MMBtu/h (5,000,000 Btu/h) to 10 MMBtu/h (10,000,000 Btu/h) shall maintain excess (stack-gas) oxygen concentrations at less than or equal to 5% by volume on a dry basis over firing rates of 20-100 %. * input capacity greater than 10 MMBtu/h (10,000,000 Btu/h) shall maintain excess (stack-gas) oxygen concentrations at less than or equal to 3.0 percent by volume on a dry basis over firing rates of 20 percent to 100 percent.   In both cases, Combustion air volume shall be controlled with respect to firing rate or measured flue gas oxygen concentration.  Use of a common gas and combustion air control linkage or jack shaft is prohibited. | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 |
| §120.6(e) Compressed Air Systems All new compressed air systems, and all additions or alterations of compressed air systems with total combined online hp of the compressor(s) is 25 hp or more shall meet the following:  **EXCEPTION** **1** to **§120.6(e)**: Alterations of existing compressed air systems that include one or more centrifugal compressors.  **EXCEPTION** **2** to **§120.6(e)**: Compressed air systems, including medical gas, serving healthcare facilities. | 🞏  🞏  🞏 | 🞏  🞏  🞏 | |
| **§120.6(e)1** [Compressed](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_compressedairsystem.htm) air systems shall be equipped with an appropriately sized trim compressor and [primary storage](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_primarystorage.htm) to provide acceptable performance across the range of the system and to avoid control gaps. The compressed air system shall comply with ONE of the following:  a. Include one or more variable speed drive (VSD) compressors  b. Include a compressor or set of compressors with total effective trim capacity at least the size of the largest net capacity increment between combinations of compressors, or the size of the smallest compressor, whichever is larger.  **EXCEPTION 1** to **§120.6(e)1**: Compressed air systems in existing facilities that are adding or replacing less than 50 percent of the [online capacity](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_onlinecapacity.htm) of the system.  **EXCEPTION 2** to **§120.6(e)1**: Compressed air systems that have been approved by the [Energy Commission](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_energycommission.htm) Executive Director as having demonstrated that the system serves loads for which typical air demand fluctuates less than 10%.  **§120.6(e)2** Compressed air systems with more than one compressor online, having a combined hp rating of more than 100 hp, must operate with a controller that is able to choose the most energy efficient combination of compressors within the system based on the [current air demand](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_currentairdemand.htm) as measured by a sensor.  **§120.6(e)3**  Before an occupancy permit is granted for a compressed air system, a Certificate of Acceptance shall be submitted to the [enforcement agency](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_enforcementagency.htm) that certifies that the equipment and Systems meet the acceptance requirements specified in **Nonresidential Reference appENDICES** [**NA 7.13**](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/na713compressedairsystemacceptancetests.htm). | 🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏 | |
| §120.6(f)  Mandatory Requirements for Elevators1. The light power density for the luminaires inside the elevator cab shall be no greater than 0.6 watts per square foot. **EXCEPTION 1** to **§120.6(f)1**: Interior signal lighting and interior display lighting are not included in the calculation of lighting power density.  2. Elevator cab ventilation fans for cabs without space conditioning shall not exceed 0.33 watts per CFM as measured at maximum speed.  3. When stopped and unoccupied with doors closed for over 15 minutes, the cab interior lighting and ventilation fans shall be switched off.  4. Lighting and ventilation shall remain operational in the event that the elevator cabin gets stuck when passengers are in the cabin.  5. Before an occupancy permit is granted for elevators, A Certificate of Acceptance shall be submitted to the [enforcement agency](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_enforcementagency.htm) that certifies that the equipment and systems meet the acceptance requirements specified in **nonresidential reference appendices**[**NA7.14**](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/na714elevatorlightingandventilationcontrols.htm)**.**  **EXCEPTION** to **§120.6(f)**: Elevators in healthcare facilities. | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏  🞏  🞏 |
| §120.6(g) Mandatory Requirements for Escalators and Moving Walkways 1. Escalators and moving walkways located in airports, hotels, and transportation function areas shall automatically slow to the minimum permitted speed in accordance with [ASME A17.1/CSA B44](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_asmea171csab44.htm) when not conveying passengers.  2. Before an occupancy permit is granted for escalators and moving walkways, A Certificate of Acceptance shall be submitted to the ENFORCEMENT AGENCY that certifies that the equipment and systems meet the acceptance requirements specified in **nonresidential reference appendices** [**NA7.15**](https://energycodeace.com/site/custom/public/reference-ace-2016/Documents/na715escalatorandmovingwalkwayspeedcontrol.htm)**.** | 🞏 | 🞏 |
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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6, Ch.1)***  ***Electrical Power Distribution Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |

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| §110.12(a) demand responsive (DR) controls ALL DEMAND RESPONSIVE CONTROLS SHALL:   1. BE EITHER A. CERTIFIED OPENADR 2.0a OR OPENADR 2.0b VIRTUAL END NODE (VEN); OR B. CERTIFIED BY THE MANUFACTURER AS BEING CAPAPBLE OF RESPONDING TO A DR SIGNAL FROM A CERTIFIED OPENADR 2.0b VEN BY AUTOMATICALLY IMPLEMENTING THE CONTROL FUNCTIONS REQUESTED BY THE VEN FOR THE EQUIPMENT IT CONTROLS. 2. BE CAPABLE OF COMMUNICATING USING ONE OR MORE OF THE FOLLOWING: WI-FI, ZIGBEE, BACNET, ETHERNET, OR HARD-WIRING. 3. DR CONTROLS MAY INCORPORATE AND USE ADDITIONAL PROTOCOLS BEYOND THOSE SPECIFIED IN §110.12(a) 1 and 2. 4. CONTINUE TO PERFORM ALL OTHER CONTROL FUNCTIONS PROVIDED BY THE CONTROL WHEN COMMUNICATIONS ARE DISABLED OR UNAVAILABLE. 5. DR CONTROL THERMOSTATS SHALL COMPLY WITH REFERENCE JOINT APPENDIX 5 (JA5), TECHNICAL SPECIFICATIONS FOR OCCUPANT CONTROLLED SMART THERMOSTATS. | 🞏 | 🞏 |
| §110.12(d) DEMAND RESPONSIVE ELECTRONIC MESSAGE CENTER CONTROL CONTROLS FOR ELECTRONIC MESSAGE CENTERS GREATER THAN 15KW SHALL BE CAPABLE OF REDUCING THE LIGHTING POWER BY A MINIMUM OF 30% WHEN RECEIVING A DR SIGNAL.  **EXCEPTION** TO **§110.12(d):** ELECTRONIC MESSAGE CENTERS THAT ARE NOT PERMITTED BY A HEALTH OR LIFE SAFETY STATUTE, ORDINANCE, OR REGULATION TO BE REDUCED. | 🞏  🞏 | 🞏  🞏 |
| §130.5(a) SERVICE ELECTRICAL METERING EACH ELECTRICAL SERVICE OR FEEDER SHALL HAVE A PERMANENTLY INSTALLED METERING SYSTEM WHICH MEASURES ELECTRICAL ENERGY ACCORDING TO **TABLE 130.5-a.** EXCEPTION 1 to §130.5(a): SERVICE OR FEEDER FOR WHICH UTILITY COMPANY PROVIDES A METERING SYSTEM THAT INDICATES INSTANTANEOUS KW DEMAND AND KWH FOR A UTILITY-DEFINED PERIOD. **EXCEPTION 2** to **§130.5(a):** ELECTRICAL POWER DISTRIBUTION SYSTEMS SUBJECT TO CALIFORNIA ELECTRICAL CODE ARTICLE 517. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§130.5(b) SEPARATION OF CIRCUITS FOR ELECTRICAL ENERGY MONITORING**  ELECTRICAL POWER DISTRIBUTION SYSTEMS SHALL BE DESIGNED SO THAT MEASUREMENT DEVICES CAN MONITOR ENERGY USE OF LOAD TYPES ACCORDING TO **TABLE 130.5-b.**  **EXCEPTION 1** to **§130.5(b):** FOR EACH SEPARATE LOAD TYPE, UP TO 10% OF THE CONNECTED LOAD MAY BE OF ANY TYPE.  **EXCEPTION 2** to **§130.5(b):** ELECTRICAL POWER DISTRIBUTION SYSTEMS SUBJECT TO CALIFORNIA ELECTRICAL CODE ARTICLE 517. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |
| **§130.5(c) VOLTAGE DROP**  the MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER AND BRANCH CIRCUIT CONDUCTORS TO the FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5%.  **EXCEPTION** to **§130.5(c):** VOLTAGE DROP PERMITTED BY CALIFORNIA ELECTRICAL CODE SECTIONS 647.4, 695.6, AND 695.7. | 🞏  🞏 | 🞏  🞏 |
| **§130.5(d) CIRCUIT CONTROLS FOR 120-VOLT RECEPTACLES AND CONTROLLED RECEPTACLES**  BOTH CONTROLLED AND UNCONTROLLED 120-VOLT RECEPTACLES SHALL BE PROVIDED IN OFFICE AREAS, LOBBIES, CONFERENCE ROOMS, KITCHEN AREAS IN OFFICE SPACES, AND COPY ROOMS.  CONTROLLED RECEPTACLES SHALL:   * BE CAPABLE OF AUTOMATICALLY SHUTTING OFF WHEN THE SPACE IS UNOCCUPED, EITHER AT RECEPTACLE OR CIRCUIT LEVEL. AUTOMATIC TIME SWITCH CONTROL SHALL INCORPORATE OVERRIDE CONTROL ALLOWING CONTROLLED RECEPTALE TO REMAIN ON FOR NO MORE THAN 2 HOURS AND AN AUTOMATIC HOLIDAY SHUT-OFF TO TURN OFF ALL LOADS FOR AT LEAST 24 HOURS THEN RESUME NORMAL SCHEDULE. COUNTDOWN TIMER SWITCHES SHALL NOT BE USED FOR COMPLIANCE. * EITHER A SPLITWIRE RECEPTACLE SHALL BE INSTALLED, OR AT LEAST ONE CONTROLLED RECEPTACLE SHALL BE INSTALLED WITHIN 6 ft OF EACH UNCONTROLLED RECEPTABLE. FOR MODULAR FURNITURE, INSTALL ONE CONTROLLED RECEPTACLE PER WORKSTATION. * INCLUDE PERMANENT AND DURABLE MARKINGS TO DIFFERENTIATE THEM FROM UNCONTROLLED RECEPTACLES OR CIRCUITS.   **EXCEPTION** **1** to **§130.5(d):** RECEPTACLES SPECIFICALLY FOR:   * REFRIGERATORS AND WATER DISPENSERS IN KITCHEN AREAS * LOCATED A MINIMUM OF 6 FT ABOVE THE FLOOR FOR CLOCKS * USED FOR NETWORK COPIERS, FAX MACHINES, A/V AND DATA EQUIPMENT OTHER THAN PERSONAL COMPUTERS IN COPY ROOMS * ON CIRCUITS RATED MORE THAN 20 AMPERES * CONNECTED TO AN UNINTERRUPTIBLE POWER SUPPLY (UPS) INTENDED TO BE IN CONTINUOuS USE, 24 HOURS/7 DAYS A WEEK/365 DAYS A YEAR AND MARKED TO DIFFERENTIATE THEM FROM OTHER UNCONTROLLED RECEPTACLES OR CIRCUITS   **EXCEPTION** **2** to **§130.5(d):** RECEPTACLES IN HEALTHCARE FACILITIES.  *nOTE*: A HARDWIRED POWER STRIP CONTROLLED BY AN OCCUPANT SENSING CONTROL MAY BE USED TO COMPLY WITH **§130.5(d).** PLUG-IN DEVICES MAY NOT BE USED FOR COMPLIANCE. | 🞏  🞏  🞏 | 🞏  🞏  🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6, Ch.1)***  ***Dwelling Unit and Guest Room Electrical Power Distribution* Mandatory Measures*:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§130.5(d) CIRCUIT CONTROLS FOR 120-VOLT RECEPTABLES AND CONTROLLED RECEPTACLES IN HOTEL/MOTEL GUESTROOMS**  CONTROLLED RECEPTACLES SHALL BE INSTALLED FOR AT LEAST ONE-HALF OF THE 120-VOLT RECEPTALBES IN EACH GUESTROOM. ELECTRIC CIRCUITS SERVING CONTROLLED RECEPTACLES SHALL HAVE CAPTIVE CARD KEY CONTROLS, OCCUPANCY SENSING CONTROLS, OR AUTOMATIC CONTROLS SO THE POWER IS SWITCHED OFF NO LONGER THAN 30 MINUTES AFTER GUESTROOM IS VACATED. | 🞏 | 🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6, Ch.1)***  ***Building Commissioning Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| §120.8 BUILDING COMMISSIONING **NONRESIDENTIAL BUILDINGS, OTHER THAN HEALTHCARE FACILITIES, WITH CONDITIONED SPACE ≥ 10,000 FT2 OR COMPLEX MECHANICAL SYSTEM, OR**  **HIGH-RISE RESIDENTIAL ≥ 4 STORIES, HOTEL/MOTEL, AND MIXED-USE BUILDINGS WITH NONRESIDENTIAL CONDITIONED SPACES ≥ 10,000 FT2**  *nOTE:*MECHANICAL SYSTEMS OTHER THAN UNITARY OR PACKAGED EQUIPMENT EACH SERVING ONE ZONE, OR TWO-PIPE HEATING ONLY SYSTEMS ARE CONSIDERED COMPLEX and MUST MEET ALL REQUIREMENTS OUTLINED BELOW.  commissioning shall include completion of the following:  **§120.8(b)** Owner’s project requirements (opr) shall be documented before the design phase begins. the opr shall include the owner’s goals, requiremetns and expectations for everything related to energy consumption and operation.  **§120.8(c)** THE BASIS OF DESIGN (BOD) SHALL BE DOCUMENTED AT THE DESIGN PHASE AND UPDATED THROUGHOUT DESIGN AND CONSTRUCTION AS NEEDED. THE BOD SHALL DOCUMENT THE DESIGN ELEMENTS SUCH AS CALCULATIONS AND PRODUCT SELECTIONS THAT MEET THE OWNER’S PROJECT REQUIREMENTS AND APPLICABLE REGULATORY REQUIREMENTS.  **§120.8(d)** during schematic design a design review kickoff meeting shall be held to establish who will play the role of the design reviewer, the project schedule, and identify the owner’s requirements. during the design phase, The design reviewer(s) SHALL review the construction documents for claritY, completeness, and adherence to the owner's goals.  **§120.8(e)** Commissioning measures must be included in the construction documents to facilitate the design review and commissioning process.  **§120.8(f)** A COMMISSIONING PLAN SHALL BE DEVELOPED BY THE COMMISSIONING PROVIDER WITH INPUT FROM THE DESIGNER AND SHALL DEFINE THE SCOPE OF THE COMMISSIONING PROJECT. THIS SHALL BE DRAFTED DURING DESIGN AND COMPLETED DURING EARLY CONSTRUCTION.  **§120.8(g)** FUNCTIONAL PERFORMANCE TESTING SHALL BE CONDUCTED ON BUILDING SYSTEMS TO DEMONSTRATE CORRECT INSTALLATION AND OPERATION.  **EXCEPTION** TO **§120.8(g):** hEALTHCARE FACILITIES.  **§120.8(h)** DOCUMENTATION OF THE OPERATIONAL ASPECTS OF THE BUILDING SHALL BE COMPLETED WITHIN THE SYSTEMS MANUAL AND DELIVERED TO THE BUILDING OWNER OR REPRESENTATIVE AND FACILITIES OPERATOR. TRAINING OF APPROPRIATE MAINTENANCE STAFF SHALL BE DOCUMENTED IN THE COMMISSIONING REPORT.  **§120.8(i)** A COMPLETE REPORT OF COMMISSIONING PROCESS ACTIVITIES UNDERTAKEN THROUGH THE DESIGN, CONSTRUCTION AND REPORTING RECOMMENDATIONS FOR POST-CONSTRUCTION PHASES OF THE BUILDING PROJECT SHALL BE COMPLETED AND PROVIDED TO THE OWNER OR REPRESENTATIVE. | 🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏 | 🞏  🞏  🞏  🞏  🞏  🞏  🞏  🞏 |

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| **nONRESIDENTIAL BUILDINGS, OTHER THAN HEALTARE FACILITIES, CONDITIONED SPACE OF <10,000** FT2 **AND SIMPLE MECHANICAL SYSTEM, OR**  **HIGH-RISE RESIDENTIAL ≥ 4 STORIES, HOTEL/MOTEL, AND MIXED-USE BUILDINGS WITH NONRESIDENTIAL CONDITIONED SPACES <10,000** FT2  NOTE: UNITARY OR PACKAGED EQUIPMENT EACH SERVING ONE ZONE AND TWO-PIPE HEATING ONLY SYSTEMS ARE SIMPLE MECHANICAL SYSTEMS. ALL OTHER HVAC SYSTEM TYPES ARE COMPLEX and PROJECTS MUST MEET ALL REQUIREMENTS OF §120.8.  COMMISSIONING SHALL INCLUDE COMPLETION OF THE FOLLOWING:  **§120.8(d)** during schematic design a design review kickoff meeting shall be held to establish who will play the role of the design reviewer, the project schedule, and identify the owner’s requirements. during the design phase, The design reviewer(s) SHALL review the construction documents for clarity, completeness, and adherence to the owner's goals.  **§120.8(e**) Commissioning measures must be included in the construction documents to facilTiate the design review and commissioning process. | 🞏 | 🞏 |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Dwelling Unit & Guest Room Interior Lighting Mandatory Measures:*** | ***Does this measure apply to your project?*** | |
| **Y** | **N** |
| **§130.0(b) areas requiring residential lighting standards**  LIGHTING for HIGH-RISE residential DWELLING UNITS, HOTEL/MOTEL GUEST ROOMS, DORMITORYand SENIOR HOUSING DWELLING accomodationS, AND FIRE STATION DWELLING AREAS SHALL MEET REQUIREMENTS OF §150.0(k). This includes outdoor lighting attached to high-rise residential or hotel/motel buildings and separately controlled from inside a dwelling unit or guest room. | 🞏 | 🞏 |
| **§130.1(c)7 REQUIRED USE OF OCCUPANT SENSORS**  PROVIDE PARTIAL-OFF OCCUPANT SENSORS IN THE FOLLOWING SPACES:  CORRIDORS AND STAIRWELLS PROVIDING A120.CCESS TO DWELLING UNITS AND GUEST ROOMS IN HIGH-RISE RESIDENTIAL AND HOTEL/MOTELS | 🞏 | 🞏 |
| **§130.1(c)8 HOTEL/MOTEL GUEST ROOM LIGHTING SHUT-OFF**  guest ROOMS SHALL HAVE CAPTIVE CARD-KEY CONTROLS, OCCUPANT SENSOR CONTROLS, OR AUTOMATIC CONTROLS, WHICH TURN OFF LIGHTS NO MORE THAN 20 MINUTES AFTER ROOM IS VACATED.  **EXCEPTION:** ONE HIGH EFFICACY FIXTURE SWITCHED SEPARATELY  with switch located ≤ 6 ft from ENTRY DOOR | 🞏  🞏 | 🞏  🞏 |
| **§130.5(d)4 HOTEL/MOTEL GUEST ROOM CONTROLLED RECEPTACLES**  AT LEAST HALF OF ALL 120-VOLT RECEPTACLES IN EACH GUEST ROOM SHALL BE CONTROLLED RECEPTACLES. ELECTRIC CIRCUITS SERVING CONTROLLED RECEPTACLES SHALL HAVE CAPTIVE KEY CARD CONTROLS, OCCUPANCY SENSING CONTROLS, OR AUTOMATIC CONTROLS SO POWER IS SWITCHED OFF NO LONGER THAN 30 MINUTES AFTER GUEST ROOM IS VACATED. | 🞏 | 🞏 |
| **§150.0(k)1A** **LUMINAIRE EFFICACY**  ALL INSTALLED LUMINAIRESshall meet the requirements in TABLE 150.0-A. | 🞏 | 🞏 |
| **§150.0(k)1B BLANK ELECTRICAL BOXES**  THE NUMBER OF ELECTRICAL BOXES THAT ARE MORE THAN 5 FTABOVE THE FINISHED FLOOR AND DO NOT CONTAIN A LUMINAIRE OR OTHER DEVICE MUST BE NO GREATER THAN THE NUMBER OF BEDROOMS. THESE ELECTRICAL BOXES MUST BE SERVED BY A DIMMER, VACANCY SENSOR CONTROL, OR FAN SPEED CONTROL. | 🞏 | 🞏 |
| **§150.0(k)1C RECESSED DOWNLIGHT LUMINAIRES IN CEILINGS**  LUMINAIRES RECESSED INTO CEILINGS MUST MEET ALL OF THE REQUIREMENTS FOR: INSULATION CONTACT (IC) LABELING; AIR LEAKAGE; SEALING; MAINTENANCE; AND SOCKET. | 🞏 | 🞏 |
| **§150.0(k)1D ELECTRONIC BALLASTS**  BALLASTS FOR FLUORESCENT LAMPS RATED ≥ 13 WATTS MUST BE ELECTRONIC AND HAVE AN OUTPUT FREQUENCY ≥ 20 KHZ. | 🞏 | 🞏 |
| **§150.0(k)1F LIGHTING INTEGRAL TO EXHAUST FANS**  LIGHTING INTEGRAL TO EXHAUST FANS MUST MEET THE APPLICABLE REQUIREMENTS OF § 150.0(k).  **EXCEPTION** TO **§150.0(k)1F:** LIGHTING IN KITCHEN EXHAUST HOODS  INSTALLED BY MANUFACTURER. | 🞏 | 🞏 |
| **§150.0(**k**)1G SCREW BASED LUMINAIRES**  screw based luminaires SHALL CONTAIN LAMPS that COMPLY WITH REFERENCE JOINT APPENDIX JA8.  EXCEPTION TO **§150.0(**k**)1G**: LUMINAIRES WITH HARD-WIRED BALLASTS FOR HIGH INTENSITY DISCHARGE LAMPS | 🞏 | 🞏 |
| **§150.0(k)1H ENCLOSED OR RECESSED LUMINAIRES**  seperable LIGHT SOURCES INSTALLED IN ENCLOSED OR RECESSED LUMINAIRES MUST comply with JA8 elevated temperature requirements AND MUST BE MARKED WITH “ja8-2019-e.””. | 🞏 | 🞏 |
| **§150.0(k)1I drawers,cabinets, and linen closets**  light sources that are <=5 watts, <=150 lumens, and installed internal to drawers, cabinets, or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors as long as they are equipped with controls that automatically turn off the light when the opening is closed. | 🞏 | 🞏 |
| **§150.0(k)2 INTERIOR SWITCHES AND CONTROLS**  ALL INTERIOR SWITCHES AND CONTROLS SHALL HAVE THE FOLLOWING FEATURES:   1. FORWARD PHASE CUT DIMMERS USED WITH LEDS MUST COMPLY WITH NEMA SSL 7A 2. EXHAUST FANS controllED SEPARATELY FROM LIGHTING SYSTEMS   **EXCEPTION §150.0(k)2B** : LIGHTING INTEGRAL TO AN EXHAUST FAN may be on the same control as the fan, IF lighting CAN BE SWITCHed OFF PER §150.0(k)2 and allow FAN TO continue OPERATing   1. READILY ACCESSIBLE wall-mounted CONTROLS PERMITTING lighting TO BE MANUALLY SWITCHED ON AND OFF   **EXCEPTION §150.0(k)2c** : LIGHTING INTEGRAL TO ceiling FANs may have remote controls.   1. must be installed per manufacturer’s instructions 2. NO CONTROL SHALL BYPASS A DIMMER, occupant sensor OR VACANCY SENSOR FUNCTION IF THE CONTROL IS INSTALLED TO COMPLY WITH §150.0(k) 3. LIGHTING CONTROLS MUST COMPLY WITH THE APPLICABLE REQUIREMENTS OF §110.9. 4. AN ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) MAY BE USED TO COMPLY WITH §150.0(k) control REQUIREMENTS IF IT MEETS functionality of §110.9, INSTALLATION certificate REQUIREMENTS OF §130.4, EMCS REQUIREMENTS OF §130.0(e) AND ALL OTHER REQUIREMENTS OF §150.0(k)2 5. A MULTISCENE PROGRAMMABLE CONTROLLER MAY BE USED TO COMPLY WITH DIMMER REQUIREMENTS IF IT COMPLIES WITH §110.9 AND ALL OTHER APPLICABLE REQUIREMENTS IN §150.0(k)2. 6. AT LEAST ONE LUMINAIRE IN EACH OF THE FOLLOWING SPACES MUST BE CONTROLLED BY A manual-on occupancy sensor (vacancy sensor): BATHROOMS, GARAGES, LAUNDRY ROOMS, UTILITY ROOMS. 7. JA8 COMPLIANT LIGHT SOURCES must have dimmers unless controlled by occupancy or VACANCY SENSORS   **EXCEPTIONs 1 and 2 to §150.0(k)2J**: LUMINAIRES IN CLOSETS <70 FT2 AND HALLWAYS   1. UNDERCABINET LIGHTING MUST BE controlled SEPARATELY FROM ceiling-installed LIGHTING | 🞏  🞏 | 🞏  🞏 |
| |  |  |  |  | | --- | --- | --- | --- | | ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Dwelling Unit & Guest Room Outdoor Lighting Mandatory Measures:*** | ***Does this measure apply to your project?*** | | | | **Y** | **N** | | | **§130.0(b) areas requiring residential lighting standards**  LIGHTING for HIGH-RISE residential DWELLING UNITS, HOTEL/MOTEL GUEST ROOMS, DORMITORYand SENIOR HOUSING DWELLING accomodationS, AND FIRE STATION DWELLING AREAS SHALL MEET REQUIREMENTS OF §150.0(k). This includes outdoor lighting attached to high-rise residential or hotel/motel buildingsbuilding and separately controlled from inside a dwelling unit or guest room. | 🞏 | 🞏 | | | **§150.0(k)1A** **LUMINAIRE EFFICACY**  ALL INSTALLED LUMINAIRES shall meet the requirements in TABLE 150.0-A. | 🞏 | 🞏 | | | **§150.0(k)1D ELECTRONIC BALLASTS**  BALLASTS FOR FLUORESCENT LAMPS RATED ≥ 13 WATTS MUST BE ELECTRONIC AND HAVE AN OUTPUT FREQUENCY ≥ 20 KHZ. | 🞏 | 🞏 | | | **§150.0(k)1E NIGHT LIGHTS, step lights, and path lights**  night lights, step lights and path lights RATED at 5 WATTS OR LESS and 150 LUMENS or less are not required to comply wth table 150.0-a or be controlled by vacaNCY SENSORS. | 🞏 | 🞏 | | | **§150.0(**k**)1G SCREW BASED LUMINAIRES**  screw based luminaires SHALL CONTAIN LAMPS that COMPLY WITH REFERENCE JOINT APPENDIX JA8.  EXCEPTION TO **§150.0(**k**)1G**: LUMINAIRES WITH HARD-WIRED BALLASTS FOR HIGH INTENSITY DISCHARGE LAMPS | 🞏 | 🞏 | | | **§150.0(k)1H ENCLOSED OR RECESSED LUMINAIRES**  seperable LIGHT SOURCES INSTALLED IN ENCLOSED OR RECESSED LUMINAIRES MUST comply with JA8 elevated temperature requirements AND MUST BE MARKED WITH “ja8-2019-e.””. | 🞏 | 🞏 | | | **§150.0(k)3B RESIDENTIAL OUTDOOR LIGHTING**  OUTDOOR LIGHTING (CONTROLLED from WITHIN UNIT) FOR PRIVATE PATIOS, ENTRANCES, BALCONIES AND PORCHES, and RESIDENTIAL PARKING LOTS AND CARPORTS WITH <8 VEHICLES PER SITE SHALL MEET THE REQUIREMENTs IN §150.0(k)3Ai (ON AND OFF SWITCH) AND THE REQUIREMENTS IN EITHER §150.0(k)3Aii (PHOTOCELL AND MOTION SENSOR) OR §150.0(k)3Aiii (PHOTO CONTROL AND AUTOMATIC TIME SWITCH CONTROL, ASTRONOMICAL TIME CLOCK, OR EMCS), OR MEET THE nonresidentail REQUIREMENTS IN §110.9, §130.0, §130.2, §130.4, §140.7 AND §141.0. outdoor lighting for residential parking lots and carports with ≥ 8 vehicles per site shall meet the nonresidnetial requirements in §110.9, §130.0, §130.2, §130.4, §140.7 AND §141.0. | 🞏 | 🞏 | | | **§130.2(b) Luminaire Cutoff Requirements**  All outdoor luminaires with initial luminaire lumens ≥ 6,200 shall comply with the Backlight, Uplight AND Glare (BUG) requirements of **Title 24, part 11, section 5.106.8**  **Exception 7 to 130.2(b):** outdoor lighting attached to high-rise residential or hotel/motel building and separately controlled from the inside of a dwelling unit or guest room. | 🞏  🞏 | 🞏  🞏 | | | ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Dwelling Unit & Guest Room Solar Ready Mandatory Measures:*** | ***Does this measure apply to your project?*** | | | | **Y** | **N** | | |  |  |  | | | **§110.10(b)1B Solar Ready buildings**  ALL NEW LOW-RISE AND HIGH-RISE multifamily BUILDINGS AND HOTEL/MOTEL OCCUPANCIES 10 STORIES OR FEWER SHALL HAVE A SOLAR ZONE LOCATED ON THE ROOF OR ANOTHER STRUCTURE WITHIN 250 FT FOR THE PURPOSE OF ADDING SOLAR PANELS AT A FUTURE TIME. THE MINIMUM SOLAR ZONE AREA SHALL BE SIZED ACCORDING TO §110.10(b)1B AND IS APPLICABLE TO THE ENTIRE BUILDING, INCLUDING MIXED OCCUPANCY.  **Exception 1 to §110.10(b)1B** high-rise multifamily buildings and hotel/motel occupancies with a permanent solar electric  system having a nameplate DC power rating, measured under  standard test conditions, of at least one watt per FT2 of roof  area.  **Exception 2 to §110.10(b)1B** high-rise multifamily buildings and hotel/motel occupancies equipped with a permanent solar  domestic Water heating system complying with **§150.1(c)8Biii**  **Exception 3 to §110.10(b)1B** Designated solar zone area no less  than 50% of the potential solar zone area (as calculated per  Exception)  **Exception 4** to **§110.10(b)1B**:LOW-RISE AND High-rise multifamily buildings where All thermostats in each dwelling unitARE DEMAND RESPONSE (DR) CONTROLS THAT COMPLY WITH **§110.12(a)** and are capable of receiving and responding to DR signals.    In addition, comply with either a or b below:  a. in each dwelling unit, comply with one of the following:   * install a dishwasher that meets or exceeds energy star requirements, and install either a refrigerator that meets or exceeds enerGY star requirements, or a whole house fan driven by an electronically commutated motor; or * install a home automation system that complies with **§110.12(a)** and is capable of controlling appliances and lightIng of the dwelling and responding to DR signals; or * install alternative plumbing piping to permit discharge from washer, showers and bathtubs to be used for irrigation in compliance with california plumbing code and local codes; or * install a rainwater catchment system designed to comply with California plumbing code and local codes that uses rainwater from at least 65% of available roof area.   B. Meet title 24, part 11, section a4.106.8.2 requirements for electrical vehicle charging spaces. | 🞏  🞏 | 🞏  🞏 | | |  |  |  | | | **§110.10(b)2 azimuth**  all sections of the solar zone located on steeP-sloped roofs shall be oriented between 90 degrees and 300 degrees of true north. | 🞏 | | 🞏 | | | **§110.10(b)3 shading**  no obstructions shall be located in the solar zone and obstructions located on any part of the building thaT projects above a solar zone shall be located at least twice the distance (measured in the horizontal plane) of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone (measured in the vertical plane).  **EXCEPTION:** Any roof obstruction (located anywHere on builidng)  that is oriented north of all points on the solar zone | 🞏  🞏 | | 🞏  🞏 | | | **§110.10(b)4 STRUCTURAL DESIGN LOADS ON CONSTRUCTION DOCUMENTS**  construction documents shall indicate structural design loads for roof dead load and roof live load for areas of the roof designated as solar zone. | 🞏 | | 🞏 | | | **§110.10(c) INTERCONNECTION PATHWAYS**  Construction documents shall indicate reserved locations for inverters and metering equipment and a pathway reserved for conduit routing from solar zone to point of connection with electrical service, or a pathway for routing of plumbing from solar zone to water-heating system. | 🞏 | | 🞏 | | | **§110.10(d)** a copy of the construction documents indicating information from §110.10(b) AND (c) MUST BE PROVIDED TO THE OCCUPANT. | 🞏 | | 🞏 | | |  |  |

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| ***2019 Nonresidential Energy Standards Compliance***  ***(Title 24, Part 6)***  ***Dwelling Unit & Guest Room Space Conditioning Mandatory Measures:*** | ***Does this measure apply to your project?*** | | |
| ***Y*** | ***N*** | |
| **§110.5 Pilot Lights Prohibited for natural gas equipment**  Pilot lights are prohibited on natural gas fan-type central furnaces, household cooking appliances, pool heaters, spa heaters, and fireplaces.  **Exception** to **§110.5**: Household cooking appliances without an electrical supply voltage connection and in which each pilot consumes less than 150 Btu/hr. | 🞏  🞏 | 🞏  🞏 | |
| **§120.1(b)1 air filtration requirements for high-rise residential attached dwelling units**  A.the following system types shall be provided with air filters to meet **§120.1(b)1b** through **1d**.  Ai. Newly installed Mechanical space conditioning systems that use forced air ducts > 10 ft long to supply air to an occupiable space. NOTE: air filters for these systems must be labeled by manufacturer to disclose efficiency and pressure drop ratings that show product meets **§120.1(b)1.**  Aii. mechanical supply-only ventilation systems that provide outside air to an occupiable space.  Aiii.the supply side of mechanical balanced ventilation systems, including heat recovery ventilation systems and energy recovery ventilation systems that provide outside air to an occupiable space.  Bisystem shall be designed to ensure all recirculated/outdoor air supplied to the occupiable space is filtered before passing through any thermal conditioning system components.  Bii.system Air filters shall be either  a. nominal 2 inch minimum depth, or  b. nominal 1 Inch minimum depth, if sized per equation 120.1-A based on a maximum face velocity of 150 ft/min  Biii.ALL System AIR FILTERS SHALL BE ACCESSIBLE FOR REGULAR SERVICE BY THE SYSTEM OWNER.  Biv.aLL sYSTEM aIR fILTERS SHALL BE LABELED TO DISCLOSE THE APPLICABLE DESIGN AIRFLOW RATE AND the MAXIMUM ALLOWABLE CLEAN AIR-FILTER PRESSURE DROP. THE LABELS SHALL BE PERMANENTLY AFFIXED TO the AIR FILTER AND BE LEGIBLE AND VISIBLE TO A PERSON REPLACING THE AIR FILTER  C.air filters shall have efficiency ≥ merv 13 when tested per ashrae standard 52.2 or a particle size efficiency rating per    **exception** to **§120.1(b)1:** evaporative coolers are not subject to air filtration requirements | 🞏  🞏 | 🞏  🞏 | |
| **§120.1(b)2A ASHRAE 62.2 requirements for high-rise residential attached dwelling units**  all dwelling units shall meet requirements of ashrae 62.2, ventilation and acceptable indoor air quality in residential buildings subject to amendments in **§120.1(b)2a:**  i. window operation is not permissabLe for providing dwelling unit ventilation specified in **§120.1(b)2aiv** or **v**  ii. continuous operation of central forced air system air handlers used in central fan integrated ventilation systems is not a permissable method for providing dwelling unit ventilation required in section 4 of ashrae 62.2.  **exception** to **§120.1(b)2aii:** the energy commission may approve continuous operation of central fan integrated ventilation systems per section 10-109(h).  iii. air filtration shall conform to **§120.1(b)1.** compliance with ashrae 62.2 sections 6.7 (Minimum filtration) and 6.7.1 (Filter pressure drop) is not required.  iv. multifamily attached dwelling units shall comply with **§120.1(b)2iva VENTILATION AIRFLOW** and **§120.1(b)2ivb SYSTEM TYPES.**  v. multifamily building central ventilation systems serving multiple dwelling units shall be balanced to provide ventilation airfloW to each dwelling unit served. the ventilation airflow rate shall be equal to, or up to 20% greater than, that specified in **equation 120.1-B.** systems shall use balancing means such as constant air regulation devices, orifice plates, variable speed central fans, or other methods to meet this balancing requirement.  vi. kitchen range hoods shall be rated for sound in accordance with ashrae 62.2 section 7.2.  **exception** to **§120.1(b)2Avi** kitchen range hoods may be rated for sound at a static pressure determined at working speed as specified in hvi 916 section 7.2.  viii. manual switches associated with dwelling unit ventilation systems shall be clearly labeled with the following or equivalent text: “this switch controls the indoor air quality ventilation for the home. leave it on unless the outdoor air quality is very poor.” | 🞏  🞏  🞏 | 🞏  🞏  🞏 | |
| **§120.1(b)2B high-rise residential dwelling unit acceptance**  i. the dwelling unit ventilation airflow required by **§120.1(b)2Aiv** or **§120.1(b)2Av** shall be confirmed with field verification and testing per reference nonresidential appendix **na7.18.1.**  ii. kitchen range Hoods shall be field verified per reference nonresidential appendix **na7.18.1** to confirm model is rated by hvi to comply with the following:  a. minimum ventilation airflow rate per ashrae 62.2 section 5  b. maximum sound rating per **§120.1(b)2Avi.** |  |  | |
| **§120.2(c)1** **Hotel/Motel Guest Room Thermostats**  Hotel/motel guest room thermostat requirements:  a: Numeric setpoints in °F and °C  B: Setpoint stops, which are [accessible](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_accessible.htm) only to authorized personnel, such that guest room occupants cannot adjust the setpoint more than ±5°F (±3°C)  C: meet **§110.2(c):** All heating or cooling systems not controlled by a central energy management control system (EMCS) shall have a setback thermostat with clock mechanism that allows building occupant to Program the temperature setpoints for at least four periods within 24 hours. Thermostats for heat pumps shall meet requirements of **§110.2(b**).  **Exception** to **§120.2(c)1:** Thermostats that are integrated into the room heating and cooling equipment.  **Exception** to **§110.2(c)**: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, noncentral electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners, and room air-conditioner heat pumps. | 🞏  🞏  🞏 | 🞏  🞏  🞏 | |
| **§120.2(c)2 High-rise Residential Dwelling Unit thermostats** Required to meet **§110.2(c)**: All heating or cooling systems not controlled by a central energy management control system (EMCS) shall have a setback thermostat with clock mechanism that allows building occupant to Program the temperature setpoints for at least four periods within 24 hours. Thermostats for heat pumps shall meet requirements of **§110.2(b**).  **Exception** to **§110.2(c)**: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, noncentral electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners, and room air-conditioner heat pumps.. | 🞏  🞏 | 🞏  🞏 | |
| **§120.2(e)1 Automatic Shut-Off for Space-Conditioning Systems**  Each [space-conditioning system](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_spaceconditioningsystem.htm) shall be installed with controls capable of automatically shutting off the system during periods of nonuse and shall have one of the following:  A: An automatic time switch control device complying with [**§110.9**,](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/section1109mandatoryrequirementsforlightingcontroldevicesandsyst.htm) with an [accessible](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_accessible.htm) [manual](http://energycodeace.com/site/custom/public/reference-ace-2016/Documents/gloss_manual.htm) override that allows operation of the system for up to 4 hours.  B: An occupancy sensor.  c: A 4-hour timer that can be manually operated.  **Exception 1** to **§120.2(e)1, 2, 3:** where it can be demonstrated to the enforcing agency that the system serves an area that must operate continously.  **Exception 2** to **§120.2(e)1, 2, 3:**: Systems with full load demands of 2 kW or less, if they have a readily accessible manual shut-off switch.  **Exception 3** to **§120.2(e)1, 2**: Systems serving hotel/motel guest rooms, if they have a readily accessible manual shut-off switch. | 🞏  🞏  🞏 | 🞏  🞏  🞏 | |
| **§120.2(e)2 Automatic Restart for Space-Conditioning Systems**  Each space-conditioning system shall be installed with controls that automatically restart and temporarily operate the system as required to maintain:  a: A setback heating thermostat setpoint IFthe system provides mechanical heating.  b: A setup cooling thermostat setpoint if the system provides mechanical cooling.  **Exception 1** to **§120.2(e)1, 2, 3:** where it can be demonstrated to the enforcing agency that the system serves an area that must operate continously.  **Exception 2** to **§120.2(e)1, 2, 3:**: Systems with full load demands of 2 kW or less, if they have a readily accessible manual shut-off switch.  **Exception 3** to **§120.2(e)1, 2**: Systems serving hotel/motel guest rooms, if they have a readily accessible manual shut-off switch. | 🞏  🞏  🞏 | 🞏  🞏  🞏 | |
| **§120.2(e)4 Vacancy Controls for Hotel/Motel Guest Rooms**  Rooms shall have captive card key controls, occupancy sensing controls, or automatic controls such that, no longer than 30 minutes after the guest room has been vacated, setpoints are setup at least +5°F (+3°C) in cooling mode and set-down at least -5°F (-3°C) in heating mode. | 🞏 | 🞏 | |
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