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Statewide CASE Team Comments On 2028 Title 24 Part 6 Express Terms Pre-Rulemaking Language

Additional submitted attachment is included below.

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

COMMENTS ON THE 2028 TITLE 24, PART 6 PRE-RULEMAKING EXPRESS TERMS

November 5, 2026

California Energy Commission

Docket No. 25-BSTD-03

Commissioner McAllister and Building Standards Office staff,

Thank you for the opportunity to participate in the 2028 Energy Code (Title 24, Part 6) update. The Statewide Utility Codes and Standards Enhancement (CASE) Team and Compliance Improvement (CI) Team appreciate the California Energy Commission (CEC) providing an opportunity for stakeholders to engage in the pre-rulemaking process for updating the statewide building energy code.

The Statewide CASE Team presents recommendations in support of the CEC's efforts to update the Energy Code with new or updated requirements for various technologies. Three California Investor-Owned Utilities (IOUs) — Pacific Gas & Electric Company, San Diego Gas & Electric, and Southern California Edison sponsored this effort as a group. Our goal is to submit proposals that result in cost effective enhancements to improve energy efficiency, energy performance, and GHG emissions reductions in California buildings. The proposed changes to the nonresidential sections of the 2028 Energy Code represent a cost-effective package of updates that will bring additional energy savings for California, which contributes to utility bill reductions for building owners and occupants throughout the state.

CI Team subject matter experts work closely with the CASE proposal authors to address compliance and enforcement objectives in Title 24, Part 6. The CI Team's goal is to reduce roadblocks for industry professionals in the compliance supply chain and bridge gaps between development and implementation of the Energy Code.

This document includes 160+ recommendations to the proposed 2028 Title 24 Pre-Rulemaking standards language and reference appendices. Below is a summary of the highest priority issues. Details are provided in *Table 1: Substantive Recommendations*

Pacific Gas and Electric Company
SOUTHERN CALIFORNIA EDISON Energy for What's Ahead
SDGE

— Express Terms Review and *Table 2: Non-substantive Recommendations — Express Terms Review*.

We welcome collaborative discussions between CEC staff and the individuals who recommended each revision so we can understand the concerns and resolve outstanding issues to achieve enforceable requirements that will lead to sustained energy savings and GHG reductions.

Priority Issues

1. **Data Center Efficiency Improvements (Remarks #10 through 21 and #35 through 36).** The new definition for data centers and the revised definition of computer rooms appear to reduce stringency for spaces that have an ITE load of greater than 20 Watts per square foot and less than 10 kW, as these spaces would no longer be required to comply with the requirements. The Statewide CASE Team estimates this could result in a loss of approximately 182,000 kWh per year of energy use reductions. Additionally, based on the language in the draft Express Terms, the Statewide CASE Team anticipates a potential loss of approximately 1.95 GWh per year for the economizer measure and approximately 0.16 GWh per year for the fan control measure. These estimates reflect the following differences between the draft Express Terms and the Statewide CASE Team's recommended language, which we would welcome the opportunity to discuss:
    a. economizer provisions are excluded from additions and alterations, although the Statewide CASE Team provided justification, including cost effectiveness, it considers sufficient based on the CEC's Energy Code Measure Proposal template;
    b. economizer compliance is not based solely on a supply air temperature of 75°F, but instead specifies two supply air temperature conditions that may lead to compliance implications;
    c. there is no economizer acceptance test for data centers, which may lead to compliance implications;
    d. the integrated economizer definition could benefit from additional clarity;
    e. specific examples of systems that meet or do not meet the definition of computer room economizers could help avoid compliance implications;
    f. heat recovery provisions are extended to additions and alterations beyond newly constructed buildings; and

g. the fan control provision references unitary air conditioner in lieu of direct expansion system, which may impact code compliance, and results in reduced stringency for Group R occupancies due to the exception's exclusion of the 60,000 Btu/hr mechanical cooling capacity limit for unitary air conditioners and chilled water fan systems.

2. **Solar Pool Heating (see comment letter docketed separately).** Hardship, technical infeasibility, and hazardous-condition exceptions were added. After conferring with compliance experts, the Statewide CASE Team finds that these exceptions, as written, would be difficult to enforce and ignore the flexibility for compliance offered by the measure. The Statewide CASE Team is docketing a separate comment letter to discuss this issue.
3. **HVAC Air Distribution PVAV and Modulating DOAS (see comment letter docketed separately).** The proposed cost-effective changes were not included in the draft Express Terms. The Statewide CASE Team is docketing a separate comment letter which outlines the impacts.
4. **HVAC Fault Detection and Diagnostics (Remark #34).** The draft Express Terms language omitted the construction inspection requirements of FDD for Air Handling Units and Zone Terminal Units from the Nonresidential Appendices. The Statewide CASE Team proposes adding these requirements in the appendix to ensure that FDD systems are correctly commissioned to achieve the intended energy savings.
5. **Compressed Air Dryers (Remark #27).** The draft Express Terms language is ambiguous on how alterations requirements apply to compressed air dryers and systems. The Statewide CASE Team's proposed updates clarify that alterations are applicable to individual components of the compressed air system and that only the altered components need to comply with requirements.
6. **Traction Elevators (Remark #1).** The requirements for alterations were not included but constitute most of the energy savings for this measure. The Statewide CASE Team recommends including alterations and has recommended clarifying language for when this requirement would be triggered.
7. **Parking Garage Daylight Responsive Controls (Remark # 39**). The intent of this requirement is to describe how controlled lights should be shut off during times of sufficient daylight in parking garages. However, the updates as written, may be interpreted as requiring controlled lights to shut off when both of the following conflicting conditions are met: 1) when there's no daylight, and 2) when daylight illuminance exceeds 150% of design illuminance. The Statewide CASE Team believes this code language was revised with the good intent to simplify,

but the requirements are currently more confusing. Additional edits are needed to clarify the requirements.

8. **Controlled Environment Horticulture Space Conditioning Systems (Remarks #28-33)** Several provisions in the draft Express Terms need correction or clarification to ensure Indoor Growing spaces and systems are covered as intended and the requirements can be applied consistently. These include clarifying the envelope requirements applicable to indoor growing spaces, correcting commercial dehumidifier test conditions that underpin the proposed efficiency requirements, resolving ambiguities in the applicability of HVAC and dehumidification requirements, and clarifying the additions and alterations requirements. Based on docketed stakeholder input, the Statewide CASE Team recommends expanding the equipment types eligible for coordinated decoupled systems, giving facilities more options while maintaining efficiency. With more equipment types eligible, applying a recovered heat requirement to all systems will prevent overcooling without heat recovery and the resulting electric reheat.
9. **Hotel/Motel Requirements (Remarks #7-8).** The Statewide CASE Team appreciates the addition of use designations to provide clarity between nonresidential and residential buildings, but there is still potential for confusion when it comes to hotel/motel. The Statewide CASE Team recommends a few more updates to clarify which requirements apply to hotel/motel and also recommends that all hotel/motel requirements be removed from nonresidential sections in a future code cycle.

Recommended Revisions

All recommended revisions are provided in *Table 1: Substantive Recommendations – Pre-Rulemaking Express Terms Review* and *Table 2: Non-substantive Recommendations – Pre-Rulemaking Express Terms Review* along with a justification for each change. Substantive changes are those where there is a difference in what the code is compelling, allowing, or limiting. The following revisions are substantive: scope changes, stringency changes, new requirements added, existing requirements are removed. Revisions that impact field verification requirements are considered substantive. In many cases, substantive changes impact the energy and GHG savings potential of the code.

In some instances, it was challenging to provide marked-up code language within the body of the tables. See the Appendix for additional mark-up language.

Table 1: Substantive Recommendations – Pre-Rulemaking Express Terms Review

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
1	Energy Recovery for Traction Elevators	Traction Elevators (Additions and Alterations)	906.4.1	Sean Steffensen	Stephen Becker	Additions and alterations to traction elevators with a new elevator control system and drive shall meet the requirements of Section 906.1.1. Exception 1 to Section 906.4.1: Elevator additions and alterations where the lowest measured or calculated total building electrical load under normal operation is less than the load needed to absorb regenerated power.	Clarification on trigger to energy recovery requirement for addition and alterations of elevators to be both the elevator control system and elevator drive. The clarification will ensure that the requirements to use regenerative drive are only triggered during an elevator modernization effort.	Yes	No	No
2	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1 Exception 6	Sean Steffensen	Danny Tam	**Exception 6 to Section 801.65.2.1.1:** If the *alteration* includes circumstances that make compliance with Section 801.5.2.1.1 a ~~constitute~~ hardship or ~~infeasibility~~ infeasible, the applicant may request approval ~~an exception~~ from the *enforcement agency* to comply to the maximum extent feasible. The applicant shall bear the burden of demonstrating to the *enforcement agency* that hardship or infeasibility exists and no reasonable alternative is available that complies with ~~the intent of~~ Section 801.~~6~~15.2.1.1. The enforcement agency shall determine the maximum feasible level of compliance. Circumstances that constitute hardship or infeasibility shall include one or more of the following:	The Statewide CASE Team recommends removal of exception 6 to 801.5.2.1.1. The hardship exception would be difficult to enforce and implement consistently. If CEC retains the exception, the mark-up is provided to clarify the language.	Yes	No	No
3	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1 Exception 6 to Section Part 1	Sean Steffensen	Danny Tam	1. The combined cost of ~~infrastructure~~ for the physical site work, building systems and primary utility upgrades to meet Section 801.65.2.1.1 exceeds 20 percent of the adjusted construction total cost of the project. ~~Infrastructure upgrades include but are not limited to an electrical panel upgrade, physical space modification, and venting upgrade, etc. Cost of infrastructure upgrades does not include the cost of equipment.~~ When the adjusted construction costs for full compliance with Section 801.5.2.1 would exceed 20 percent, compliance shall be provided to the greatest extent possible without exceeding 20 percent;	The proposed changes clarify costs to include and exclude from a calculation of cost for determination of economic hardship. The changes also provide the enforcement agency with discretion to require compliance up to 20 percent of the adjusted construction cost. The proposed changes align the cost with a previously defined term in the California Building Code of "adjusted construction cost" to clarify the requirement.	Yes	No	No
4	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1 Exception 6 to Section Part 2	Sean Steffensen	Danny Tam	2. ~~It~~ Compliance with all alternatives in Section 801.5.2.1.1 is technically infeasible ~~to meet any of the options in Section 801.6.1.1~~ due to physical space limitations, ~~or~~ electrical *service* constraints ~~including any alternatives considered but not feasible due to conditions specific to the project~~;	The proposed changes clarify that all alternatives to comply must be analyzed and shown to be infeasible due only to space limitations or electrical service constraints. The Statewide CASE Team requests that CEC further clarify the term electrical service constraint to identify the reason, circumstance, or entity that prevent the electrical service from meeting the proposed project need.	Yes	No	No
5	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1 Exception 6 to Section Part 3	Sean Steffensen	Danny Tam	~~3. Compliance with Section 801.6.1 would create or maintain a hazardous condition(s) and present a life safety risk to the occupants.~~	The proposed changes to improve pool heating efficiency do not create hazardous conditions. The hazardous condition exception is not needed.	Yes	No	No
6	Nonresidential Fenestration	Vertical Fenestration - Alterations	301.5.2.2.2.3	Maureen Guttman	Payam Bozorgchami	**301.5.2.2.2.3 Added Fenestration** Added vertical fenestration alterations shall meet the requirements in ~~Table 301.3(4)~~ Table 301.2(3) in Section 301.3.9.	Table 301.3(4) contains the prescriptive envelope criteria for guest rooms of hotel/motel use designations. Table 301.3(3) is a new table with the prescriptive fenestration values for new construction and additions in nonresidential use designations. The fenestration values for guest rooms are less stringent than the new values for fenestration, and less stringent than the existing requirement for added fenestration in alterations.	Yes	No	No
7	Nonresidential Fenestration	Hotel/Motel Designations	201	Maureen Guttman	Payam Bozorgchami	**NONRESIDENTIAL BUILDING** is any *building* ~~which is identified in the California Building Code Table; Description of~~includes in Occupancy~~(s) as~~ Group(s) A, B, E, F, H, I, L, M, ~~or~~ S, and ~~is a~~ U.~~; as defined by Part 2 of Title 24 of the California Code or Regulations. (~~See "Use Designations".) ~~**NOTE:** Requirements for hotels/motels are included in the nonresidential sections of Part 6.~~ **USE DESIGNATION** ... **Residential Use Designations** **Hotel/Motel Use** (CBC Groups R-1; R-3 ~~Congregate Residences Boarding Houses~~ serving Transient Occupants)... **NOTE:** Requirements for hotels/motels are included in the nonresidential sections of Part 6.	The change is intended to add clear designation of where Hotel/Motel buildings are categorized and where their requirements can be found.	Possible	No	No
8	Nonresidential Fenestration	Vertical Fenestration - New Construction and Additions	301.3.9	Maureen Guttman	Payam Bozorgchami	**TABLE 301.3(3) - PRESCRIPTIVE OPAQUE ENVELOPE CRITERIA FOR NONRESIDENTIAL USE DESIGNATIONS INCLUDING RELOCATABLE PUBLIC SCHOOL BUILDINGS (WHERE MANUFACTURER CERTIFIES USE ONLY IN SPECIFIC CLIMATE ZONES)** **TABLE 301.3(3.1) - PRESCRIPTIVE FENESTRATION CRITERIA FOR NONRESIDENTIAL USE DESIGNATIONS (INCLUDING RELOCATABLE PUBLIC SCHOOL BUILDINGS (WHERE MANUFACTURER CERTIFIES USE ONLY IN SPECIFIC CLIMATE ZONES)** **~~TABLE 301.3(3.1)~~ TABLE 301.3(4) - PRESCRIPTIVE ENVELOPE CRITERIA FOR ~~GROUP R OCCUPANCIES~~ HOTEL/MOTEL USE DESIGNATIONS. NOT INCLUDING GUEST ROOMS** **~~TABLE 301.3(4)~~ TABLE 301.3(4.1)- PRESCRIPTIVE ENVELOPE CRITERIA FOR GUEST ROOMS OF HOTEL/MOTEL USE DESIGNATIONS** (Note: Changes will also be required in the charging language sections of the code referring to these tables.)	Proposed clarification of table numbering and labeling, including renaming the table for Group R Use Designations (which does not belong in this section) to be specific to Hotel/Motel Use Designations. Hotel/Motel buildings are the only Residential building type with envelope provisions located in the Nonresidential section of Chapter 3. The Statewide CASE Team recommends that Hotel/Motel buildings be appropriately relocated to the Residential section of Chapter 3 next code cycle.	Possible	No	No
9	Energy Recovery for Traction Elevators	Traction Elevators (Additions and Alterations)	906.1.6 Exception	Sean Steffensen	Stephen Becker	Exception to Section 906.1.6: Elevators located in Group R occupancies have no acceptance requirements for regenerative drive requirements.	Elevators in Group R occupancies should continue to have the existing elevator acceptance requirements for lighting and ventilation but not the new acceptance requirements for regenerative drives. The proposed edits clarify this point that these elevators will not experience a change in acceptance requirements.	Yes	no	no
10	Data Centers Efficiency Improvements	Computer Room Economizers	1001.2.11.2	Hillary Weitze	Hab Tewelde	**1001.2.11.2.2 Economizer Acceptance Testing:** In addition to meeting the requirements in 1001.2.8, an integrated economizer cooling functional test shall be performed that demonstrates cooling system operation in full economizing mode, such that compressor cooling shall not occur at the conditions specified in Table 910.2-(1), and in partial economizing mode and full compressor cooling mode.	Requiring an economizer Acceptance Test for data centers as is required for other nonresidential airside economizers will improve compliance and achieved operational energy savings.	Yes	Yes	No
11	Data Centers Efficiency Improvements	Fan Control Requirements	910.1	Hillary Weitze Ben Lalor	Hab Tewelde	**910.1** *[Section 120.6(j)]* **Mandatory requirements (Newly Constructed, Additions, Alterations).** *Space-conditioning systems* serving a ~~computer room~~*computer room* with an ITE load greater than 20 W/ft^2 or *data center* shall meet the requirements of Sections 910.1 through 910.4. ~~this section.~~	By making the mandatory requirements only apply to data centers and not computer rooms, computer rooms with ITE loads that are greater than 20 W/sf and less than 10 kW are no longer required to comply with this code section. This reduces code stringency compared to 2025 Title 24, Part 6 requirements. This revised language change also reduces the energy savings potential of the Fan Control submeasure by only applying it to data centers (ITE loads greater than or equal to 10 kW) and not computer rooms; the savings would be eliminated for ITE loads 8.8-10 kW (the CASE Report included computer rooms with 8.8 kW – 17.6 kW ITE load).	Yes	No	No (CEC did not present on exempting computer rooms from existing requirements)

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
12	Data Centers Efficiency Improvements	Fan Control Requirements, Computer Room Economizers	910.1.1	Hillary Weitze	Hab Tewelde	**910.1.1** *[Section 120.6(j)1]* **Reheat.** ~~Each~~Systems serving ~~computer room~~*computer rooms with an ITE load greater than 20 W/ft^2* or *data centers* ~~zone~~ shall have controls that prevent *reheating, recooling* and simultaneous provisions of heating and cooling to the same zone, such as mixing or simultaneous supply of air that has been previously mechanically heated and air that has been previously cooled, either by *cooling equipment* or by economizer systems.	By making the reheat requirement only apply to data centers and not computer rooms, computer rooms with ITE loads that are greater than 20 W/sf and less than 10 kW are no longer required to comply with this code section. This reduces code stringency compared to 2025 Title 24, Part 6 requirements.	Yes	No	No (CEC did not present on exempting computer rooms from existing requirements)
13	Data Centers Efficiency Improvements	Fan Control Requirements	910.1.3	Hillary Weitze	Hab Tewelde	**910.1.3** *[Section 120.6(j)3]* **Fan control.** Each ~~unitary air conditioner~~ direct expansion system with *mechanical cooling* capacity exceeding ~~60,000~~ 30,000 Btu/hr and each chilled water *fan system* shall be designed to vary the airflow rate as a function of actual load. Fan motor demand shall not exceed 50 percent of design wattage at 66 percent of design fan speed. **Exception to 910.1.3:** Direct expansion systems with up to 60,000 Btu/hr of mechanical cooling capacity ~~Data centers~~ in Group R occupancies.	The proposed language mark up addresses 2 issues: 1. Changing 'unitary air conditioner' to 'direct expansion system' clarifies that the fan control requirement applies to all direct expansion cooling systems and improve code compliance. 2. The new Exception to 910.1.3 would exempt data centers in Group R occupancies from all fan control requirements, including exemption from the existing requirements for unitary air conditioners above 60,000 Btu/hr and chilled water fan systems. This reduces code stringency compared to 2025 Title 24, Part 6 requirements.	Yes	No	Yes
14	Data Centers Efficiency Improvements	Fan Control Requirements, Computer Room Economizers	910.2	Hillary Weitze Ben Lalor	Hab Tewelde	**910.2** *[Section 140.9(a)]* **Prescriptive requirements (Newly Constructed).** ~~Computer rooms with a power density greater than 20 W/ft2~~*Computer rooms* with an ITE load greater than 20 W/ft^2 and *d~~D~~ata centers* shall comply with this section.	By making the prescriptive requirements only apply to data centers, computer rooms with ITE loads that are greater than 20 W/sf and less than 10 kW are no longer required to comply with this code section. This reduces code stringency compared to 2025 Title 24, Part 6 requirements. Further, omitting computer rooms from the 910.2 language conflicts with subsection requirements that apply to computer rooms, such as 910.2.4, so the proposed language markup also removes this conflict.	Yes	No	No (CEC did not present on exempting computer rooms from existing requirements)
15	Data Centers Efficiency Improvements	Computer Room Economizers	910.2.1	Hillary Weitze	Hab Tewelde	**910.2.1** *[Section 140.9(a)1]* **Economizers.** Each cooling system serving computer room(s) shall include a computer room economizer, and comply with the requirements of this section. 1. Systems that meet the definition of a computer room economizer include but are not limited to the following: 1.1 Waterside economizer heat exchangers that are piped in series with chillers on the chilled water side. 1.2 Air-cooled chillers with integrated economizer coils that are piped into the secondary circuit of a primary/secondary system. The fans serving the integrated economizer coils must be able to modulate speed without being limited by the need to maintain a minimum refrigerant head pressure. 1.3 Air-cooled chillers with integrated economizer coils that are served by dedicated economizer fans and not by condenser fans that serve refrigerant condenser coils. 1.4 Refrigerant economizer systems where 10-90% of the load on a refrigerant circuit can be met by a passive condenser or refrigerant pump, while the other 90% to 10% of the load is met by an active condenser or refrigerant compressor. 2. Systems that DO NOT meet the definition of a computer room economizer and do not meet the requirements of this section include the following: 2.1 Waterside economizer heat exchangers that are piped in parallel with chillers on the chilled water side. 2.2 Air-cooled chillers with integrated economizer coils that are piped into the primary circuit of a primary/secondary system, or on the chiller side of a chiller minimum flow bypass valve. 2.3 Air-cooled chillers with integrated economizer coils that are served by the same condenser fans that serve refrigerant condenser coils whose speed is limited by the need to maintain a minimum refrigerant head pressure. 2.4 Refrigerant economizer systems with one or more refrigerant circuits that must switch from refrigerant compressor operation to refrigerant pump operation.	Providing examples of computer room economizers that meet and do not meet the computer room economizer definition will improve compliance and reduce instances of systems that are currently being installed that do not meet the intent of the existing code requirements for computer room/data center economizers. Without including this language, energy savings will decrease because more non-compliant systems will be installed. If this language is not included in the code language, then it is recommended for inclusion in the Compliance Manual. While the Compliance Manual is not enforceable code language, including these additional clarifications in the Compliance Manual could help improve compliance by clarifying the code.	Yes	No	Yes
16	Data Centers Efficiency Improvements	Computer Room Economizers	910.2.1.1	Hillary Weitze	Hab Tewelde	**910.2.1** *[Section 140.9(a)1]* **Economizers.** 1. *Air-Cooled ITE*: 1.1. Each individual ~~*air-cooled ITE*~~ cooling system ~~primarily~~ serving *air-cooled ITE* in *computer rooms* or *data centers* shall include an integrated economizer, designed and operated to provide 100 percent of the design cooling load without *mechanical cooling* at the outdoor conditions specified in Table 910.2-(1). Compliance shall be demonstrated at either the design *supply air* temperature or at a *supply air* temperature of 75 degrees Fahrenheit. 2. *Liquid-Cooled ITE*: 2.1. Each individual ~~*liquid-cooled ITE*~~ cooling system ~~primarily~~ serving *liquid-cooled ITE* in *computer rooms* or *data centers* shall include an integrated economizer, designed and operated to provide 100 percent of the design cooling load without *mechanical cooling* at the outdoor conditions specified in Table 910.2-(1). Compliance shall be demonstrated at the design ~~supply~~ fluid temperature.	By making the mandatory requirements only apply to data centers and not computer rooms, computer rooms with ITE loads that are greater than 20 W/sf and less than 10 kW are no longer required to comply with this code section. This reduces code stringency compared to 2025 Title 24, Part 6 requirements. This language change also reduces the energy savings potential of the Computer Room Economizers submeasure by only applying it to data centers (ITE loads greater than or equal to 10 kW) and not computer rooms; energy savings would be eliminated for ITE loads less than 10 kW served by waterside economizers because the new economizer thresholds would not apply. Additional edits are recommended as noted for clarity. An economizer is part of the cooling system that serves the ITE load.	Yes	No	Yes
17	Data Centers Efficiency Improvements	Computer Room Economizers	910.2.1.1	Hillary Weitze, Ben Lalor	Hab Tewelde	1. *Air-Cooled ITE*: 1.1 Each individual *air-cooled ITE* system primarily serving *data centers* shall include an integrated economizer, designed and operated to provide 100 percent of the design cooling load without *mechanical cooling* at the outdoor conditions specified in Table 910.2-(1). Compliance shall be demonstrated ~~at either the design *supply air* temperature or~~ at a *supply air* temperature of 75 degrees Fahrenheit.	Providing two supply air temperature conditions is confusing and will lead to lower compliance and more difficult enforcement because the "either/or" lets the designer pick whichever is easier. A warmer design SAT (say 80°F) means the same economizer passes the same outdoor thresholds with less capacity, so the thresholds stop meaning what was used for the CASE analysis. A single 75°F rating point is what was analyzed and presented at the workshop	Yes	No	Yes
18	Data Centers Efficiency Improvements	Computer Room Economizers	910.2.1.3	Hillary Weitze	Hab Tewelde	3.1 The economizer shall be integrated to provide partial cooling when outside air conditions do not allow for full economizing. If a computer room economizer is part of a cooling system that also includes a refrigerant compressor, then the system shall be fully integrated, meaning it shall be capable of providing partial economizer cooling without limiting the capacity of compressor cooling and without limiting the capacity of compressor-less cooling.	Including a clear description of an integrated economizer clarifies how an economizer serving a computer room or data center must operate under all conditions to meet the efficiency requirements of 910. The inclusion of this definition will improve compliance and help avoid the use of non-compliant products that do not meet the code intent. Alternatively, the proposed additional integrated economizer language could be added to the *Economizer, Computer Room or Data Center* definition in Section 201.	Yes	No	Yes
19	Data Centers Efficiency Improvements	Computer Room Heat Recovery	910.4	Hillary Weitze	Hab Tewelde	**910.4** *[Section 141.1, 141.1(b)]* **Additions and alterations to existing buildings.** Covered processes in additions or alterations to existing buildings that ~~will be~~are *nonresidential or Group R occupancies*, hotel/motel, or multifamily occupancies shall comply with the applicable requirements of ~~Section 910.1 *[Section 120.6(j)]*~~ Section 910.1.1, 910.1.2, and 910.1.3 *[Sections 120.6(j)1, 2, and 3]*, Sections 910.2.2 and 910.2.4 *[Sections 140.9(a)2 and 4]*, Section 910.4.1 *[Section 141.1(b)]*, and the applicable requirements of Section 400.5.1 *[Section 110.2(a)]* and Section 913 *[Section 120.3]*.	Section 910.1 includes a new mandatory requirement for heat recovery (Section 910.1.4), which was intended to apply only to newly constructed buildings. The CASE Report did not provide justification to support requiring heat recovery in additions/alterations; requiring heat recovery in additions/alterations per the requirements in 910.1.4 may not be cost-effective or feasible.	Yes	No	No

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
20	Data Centers Efficiency Improvements	Computer Room Economizers	910.4.1	Hillary Weitze, Ben Lalor	Hab Tewelde	**910.4.1** *[Section 141.1(b)]* **Economizers – Hotel/motel buildings and nonresidential buildings with Group R occupancies.** Each individual cooling system primarily serving ~~*computer rooms*~~ *computer rooms* with an *ITE load* greater than 20 W/ft^2 or ***data centers*** in an existing building shall include either:	By making Section 910.4.1 requirements only apply to data centers and not computer rooms, computer rooms with ITE loads that are greater than 20 W/sf and less than 10 kW are no longer required to comply with this code section. This reduces code stringency compared to 2025 Title 24, Part 6 requirements. If new economizer requirements are introduced in new section 910.4.2 for other nonresidential building types (see row below), applying the existing requirements in 910.4.1 to buildings with Group R occupancies is needed to maintain existing code stringency for those buildings.	Yes	No	No (CEC did not present on exempting computer rooms from existing requirements)
21	Data Centers Efficiency Improvements	Computer Room Economizers	910.4.2 [New Section]	Hillary Weitze	Hab Tewelde	See Appendix for language markup.	Increasing stringency of economizer requirements for additions/alterations is needed and will increase statewide energy savings. Significant ITE load is anticipated to be added through additions/alterations in the next decade, and increasing efficiency standards will cost-effectively reduce energy use.	Yes	No	Yes
22	Process Boilers	Automatic Blowdown submeasure	904.1.5, Exception 1	Emma Conroy	Haile Bucaneg	~~Exception 1 to Section 904.1.5: Steam boilers with returned condensate composed of more than 90 percent boiler feedwater flow.~~ Exception 1 to Section 904.1.5: Steam boilers with boiler feedwater flow composed of more than 90 percent returned condensate.	Clarifies that the exception applies when returned condensate makes up more than 90 percent of the boiler feedwater flow, consistent with the CASE Report.	Yes	No	No
23	Process Boilers	Automatic Blowdown submeasure	NA7.22.2.2	Emma Conroy	Haile Bucaneg	NA7.22.2.2 Functional Testing A field technician~~.~~ shall verify and document the following for newly installed process boilers with an input capacity greater than or equal to 10 MMBtu/h:	Aligns the acceptance-test threshold with the Express Terms language in Section 904.1.5 so boilers rated exactly 10 MMBtu/h are included and removes an unnecessary comma. The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No
24	Process Boilers	Deaerator Pressure submeasure	NA7.22.3.2	Emma Conroy	Haile Bucaneg	NA7.22.3.2 Functional Testing A field technician~~.~~ shall verify and document the following for newly installed process boilers with an input capacity greater than or equal to 10 MMBtu/h: Step 2: Deaerator Pressure Verification 2.2. Confirm that the temperature of the returning condensate matches the temperature at the deaerator. If the condensate return temperature is lower than the deaerator temperature, reduce the supply line pressure ~~regular~~ regulator setpoint.	Aligns the acceptance-test threshold with the Express Terms language in Section 904.1.6 so boilers rated exactly 10 MMBtu/h are included and corrects two typos. The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No
25	Process Boilers	Stack Oxygen Concentration (Comment Letter)	904.1.3	Emma Conroy	Haile Bucaneg	904.1.3 [Section 120.6(d)3] Stack-gas oxygen. Newly installed process boilers with an input capacity equal to or greater than 5 MMBtu/h (5,000,000 Btu/h) shall ~~M~~maintain stack-gas oxygen concentrations at less than or equal to 3.0 percent by volume on a dry basis over firing rates of 20 to 100 percent when in a nonresidential building with Group R occupancies, and shall meet the following requirements at 25% (or at the boiler's lowest firing rate, whichever is higher) to 100% of burner input capacity when in a nonresidential building, except buildings with Group R occupancies: 1. Process boilers with burners that that use a premixed air-fuel mixture, with combustion occurring at a fine mesh surface which acts as a flame arrestor to stabilize and maintain the flame, shall maintain stack-gas oxygen concentrations at less than or equal to 8.0% by volume on a dry basis.	This change would maintain the proposed applicability for process boilers with capacities equal to 5 MMBtu/h, which aligns with the applicable structure of the other proposed process boiler requirements. Additionally, the change corrects two minor typos.	No	No	No
26	Process Boilers	Stack Oxygen Concentration (Comment Letter)	NA7.22.1.1	Emma Conroy	Haile Bucaneg	NA7.22.1.1 Functional Testing A field technician~~.~~ shall verify and document the following for newly installed process boilers with an input capacity greater than or equal to 5 MMBtu/h:	This change aligns the acceptance-test threshold with the proposed language for Section 904.1.3 so boilers rated exactly 5 MMBtu/h are included and removes an unnecessary comma. The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
27	Compressed Air Dryers	Compressed Air Dryers	905.4	Joe Vukovich	Haile Bucaneg	See Appendix for language markup.	The current Express Terms language does not resolve whether replacing an individual compressed-air component, including an air dryer, is an alteration, or replacing one component brings unaltered components into scope. The proposed recommendations are explicit: component-level replacements are covered, and the compliance obligations for an alteration apply to the components being altered. This gives project teams and Authorities Having Jurisdiction a clearer rule and avoids requiring functional, unaltered components to be replaced early solely because another component is altered. Existing compressed-air language provides textual support for treating compressor replacements as alterations. Exceptions to the trim-compressor and storage requirements are based on the horsepower or type of compressors added or replaced. The Statewide CASE Team's interpretation is that the proposed language would make explicit that alterations to compressed air dryers (including replacements) are required to pull permits because they fall under the definition of an alteration under Part 6, and they do not have an exception in Title 24 Part 2 Section 105. Title 24 NRCC-PRC-E form data show that partial-system projects appear in compliance submissions. Of 291 unique projects with Section J completed from July 2021 through May 2026, 75 involved compressed-air alterations; 46 of those 75 claimed an exception indicating that only part of the system was being altered. These are project counts, not facility counts. The permit data may not capture all alterations at large industrial facilities. Based on CASE Team members' experience working in industrial facilities and interviewing AHJs, large industrial facilities typically have Inspectors of Record who document alterations and submit compliance information to the local Authority Having Jurisdiction periodically rather than pulling a permit for each alteration.	Yes	No	No
28	Controlled Environment Horticulture	Space Conditioning Systems	908.1.3	Amy Droitcour	Thao Chau	908.1.3 [Section 120.6(h)3] Indoor growing and c~~C~~onditioned greenhouses, building envelope. 908.1.3.1 Indoor growing spaces shall meet the requirements of Sections 300.1 [Section 110.6], 300.2 [Section 110.7], 300.3 [Section 110.8], and 301.2 [Section 120.7]. 908.1.3.2 *Conditioned greenhouses* shall meet the following requirements: ...	Because the definition of Process Space was changed to include CEH Spaces, indoor growing no longer needs to comply with nonresidential requirements unless explicitly referenced. Thie edit would explicitly include NR mandatory envelope requirements.	Yes	No	Yes
29	Controlled Environment Horticulture	Space Conditioning Systems	JA 19.2.1.3	Amy Droitcour	Thao Chau	JA19.2.1.3. 73F / ~~56~~0% RH; 0.00 in. W.C	The 73F / 50% RH condition has been vetted with stakeholders and is the value that the CIEF value was based on.	Yes	No	Yes
30	Controlled Environment Horticulture	Space Conditioning Systems	908.1.1	Amy Droitcour	Thao Chau	908.1.1 [Section 120.6(h)1] Indoor growing, dehumidification. Dehumidification equipment in Indoor Growing spaces in buildings with less than 5,000 square feet of total plant canopy area or served by horticultural lighting with lighting power density less than 30 Watts per square foot of plant canopy area shall be one of the following:	This change avoids an applicability gap for facilities that have either <5000 canopy sf or <30W/sf, but not both. With this change, all facilities will need to comply with either 908.1.1 or 908.1.6.	Yes	No	Yes
31	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.2.2	Amy Droitcour	Thao Chau	2.2.2. A coordinated decoupled HVAC/D system meeting the requirements of Section 2.2.2.1 and ~~either~~ Section 2.2.2.2 ~~or Section 2.2.2.3~~. 2.2.2.1. Commercial dehumidifiers that comply with Reference Joint Appendix JA19 and are certified in accordance with Reference Joint Appendix JA19. 2.2.2.2. Cooling equipment meeting one of the following: 2.2.2.2.1 Commercial unitary air-conditioning, or heat pump equipment with a minimum of two stages of cooling capacity and at least two stages of fan control, tested in accordance with AHRI 1340 and meeting minimum IVEC ~~and/or IVHE~~ requirements ~~effective 1/1/2029~~: 2.2.2.2.1.1 65,000 to < 135,000 Btu/h: IVEC 14.3 ~~13.8 (AC) or 13.4 (HP).~~ 2.2.2.2.1.2. 135,000 to < 240,000 Btu/h: IVEC 13.8 ~~(AC).~~ 2.2.2.2.1.3. 240,000 to < 760,000 Btu/h: IVEC 12.9 ~~Specific efficiency requirements mandated by 10 CFR Part 431 Subpart F~~ 2.2.2.2.2 ~~3.~~ Variable refrigerant flow systems tested in accordance with AHRI 1230 and meeting minimum IEER requirements: 2.2.2.2.2.3.1. ~~Up~~ 65,000 to < 135,000 Btu/h: 15.5 IEER (Heat Pumps without heat recovery: 14.6 IEER, 3.3 COP). 2.2.2.2.2.3.2. ~~Up~~ 135,000 to < 240,000 Btu/h: 14.9 IEER (Heat Pumps without heat recovery: ~~14.4~~ 13.9 IEER, 3.2~~3~~ COP). 2.2.2.2.2.3.~~3~~. ~~Up~~ 240,000 to < 760,000 Btu/h: 13.9 IEER (Heat Pumps without heat recovery: 12.7 IEER, 3.2 COP). 2.2.2.2.3 Equipment that meets requirements in Table 400.5(1), 400.5(2), 400.5(3), 400.5(4), 400.5(5), 400.5(6), 400.5(7), 400.5(8), 400.5(9), 400.5(10), 400.5(11), or 400.5(12).	This edit fixes overlapping VRF size tiers and removes references to IVHE values that were not included. In response to docketed comment 271531 from Ian Atkins, the CASE Team docketed comment 272957 with a recommendation adding references to the tables rather than listing efficiency requirements in 908.1.6.2.2. Subsequently, CASE Team and CEC discussions indicated a preference to keep requirements for the most common systems in 908.1.6.2.2, and to allow additional system types via cross-reference to the Tables 400.5(*).	No	No	Yes
32	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.3	Amy Droitcour	Thao Chau	2.3 Heat recovery. ~~Dehumidifiers~~ Space conditioning systems shall be capable of meeting a recovered ~~re~~heat capacity ratio of at least 0.9 as demonstrated through manufacturer data or engineering calculations.	Docketed comment 271501 indicated a loophole in existing code that can be closed with this language change. This loophole would allow systems that dehumidify by overcooling with air conditioning systems without heat recovery, resulting in significant electric reheat to maintain room temperature. This becomes a greater concern should 908.1.6.2.2 be updated to reference many system types via cross-reference.	No	No	Yes

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
33	Controlled Environment Horticulture	Space Conditioning Systems	908.4.1	Amy Droitcour	Thao Chau	908.4.1 [Section 141.1(c)1] **Indoor Growing, Space-Conditioning Systems and Dehumidification.** 908.4.1.1 All newly ~~The following additions or alterations~~ installed heating, ventilation, air conditioning systems or dehumidification systems in buildings with indoor growing shall meet the applicable requirements of Section 908.1.1 [Section 120.6(h)1], and Section 908.1.2 [Section 120.6(h)2]. 908.4.1.2 The following additions or alterations shall meet the applicable requirements of ~~and~~ Section 908.1.6 [Section 120.6(h)6]:. 1.Additions or alterations that increase plant canopy area by at least 5,000 square feet. 2.All alterations that replace greater than 50 percent of the total installed capacity of heating, cooling, and dehumidification systems serving at least 5,000 square feet of plant canopy area in buildings with indoor growing, or ~~and~~ 3. All alterations in buildings with indoor growing that increase lighting power density to greater than or equal to 30 Watts per square foot of canopy. Alterations that replace indoor growing space-conditioning system equipment shall comply with applicable requirements in Section 401.5 [Section 141.0(b)].	These edits maintain alterations requirements from 2025 code and improve the clarity of new alterations requirements.	Yes	No	Yes
34	Nonresidential HVAC Fault Detection and Diagnostics	Space Conditioning Systems	NA7.5.12	Chris Battisti	Hab Tewelde	See Appendix for language markup.	The CASE Team recommends including the inspection and functional testing requirements to verify the FDD capabilities was installed properly. If not included, there will be inconsistent implementation which will limit the benefits of the measure.	Yes	Yes	Yes
35	Data Centers Efficiency Improvements	Computer Room Economizer	910 & 401.3.7	Ben Lalor	Hab Tewelde	Exception to §910.1: ...requirements in Sections 910.1.1, 910.1.2, 910.1.3, ~~910.2.1,~~ 910.2.2, 910.2.3, 910.3, and 910.4 and ~~910.4.1~~ do not apply to computer rooms. Exception 1 to §910.2.1: ~~computer rooms~~ Data centers and individual computer rooms with an ITE design load under 5 tons (18 kW) in a building that does not have any economizers. Exception 1 to §910.4: Individual ~~computer rooms~~data centers and computer rooms with an ITE design load under 5 tons… §401.3.7 Exception 5 (p. 4-112): Fan systems primarily serving computer rooms data centers and computer rooms with a power density greater than 20 W/ft².	The express terms drop economizer requirements for any room at 10 kW or less, even above 20 W/ft², which §140.9(a) covers today. Rooms over 10 kW at 20 W/ft² or less also lose §401.3.7 coverage through Exception 5. The edits keep economizers required for every room over 20 W/ft², as the CASE team's letter (TN 271536) asked.	Yes	No	No
36	Indoor Lighting Controls	Reduce Occupant Sensing Control Delay Time	401.2.1.2.5	Lucy Albin	Sahar Daemi	401.2.1 [Section 120.1] Ventilation and Indoor Air Quality 401.2.1.2.5 [Section 120.1(d)5] Occupied standby zone controls. .. 401.2.1.2.5.1 [Section 120.1(d)5B] Control functionality. Occupied-standby zone controls shall comply with the following: 1.Occupant sensors shall have suitable coverage and placement to detect occupants in the entire space. In ~~—~~20~~1~~5 minutes or less after no occupancy is detected by any sensors covering the room, occupant sensing controls shall indicate a room is vacant. Exception to Section 401.2.1.2.5.1.1: Occupant sensors in hotel/motel buildings and nonresidential buildings with Group R occupancies shall indicate a room is vacant in 20 minutes or less after no occupancy is detected by any sensors covering the room. ;	These changes are needed to apply the measure to occupied standby, to provide consistent delay time for both lighting occupancy control and HVAC occupied standby. Specifier stakeholders also expressed a preference for consistent delay time requirements. The changes were adopted in the Express Terms for lab exhaust delay time, but not for occupied standby.	Yes	No	Yes
37	Indoor Lighting Controls	Reduce Occupant Sensing Control Delay Time	NA7.5.17.2	Lucy Albin	Sahar Daemi	NA7.5.17.2 Functional Testing … Step 7: For space conditioning systems that also provide ventilation to the zone, confirm that within 5 minutes of occupant sensing controls indicating that the zone is unoccupied the setpoint is setup or setback and the zone is within the occupied standby deadband. Occupant Sensing controls may have a time delay of up to ~~2~~0~~1~~5 minutes before indicating the space is unoccupied and occupant sensing zone controls may allow up to an additional 5 minute time delay after occupant sensing controls have indicated all rooms served by the zone are unoccupied before resetting zone temperature setpoints and shutting off zone ventilation air).	These changes are needed to update existing functional testing to be consistent with proposed changes in the Standards language in remark #37.	Yes	Yes	Yes
38	Indoor Lighting Controls	Parking Garage Adaptation Zone	NA7.6.1.6	Lucy Albin	Sahar Daemi	NA7.6.1.6 Photocontrol Based Lighting ~~Switching or Dimming~~ Control Systems Functional Testing for Parking Garage Daylight Adaptation Zones. Switching or dimming control systems for daylight adaptation zone controls are required to manage the adaptation zone lighting in a manner that turns OFF the added lighting power in the adaptation zone but is not required to impact the general lighting system if it is separate, or is permitted to maintain an output that is consistent with the general lighting illuminance in the parking garage if the systems are combined for the adaptation zone. ~~a.Reference location. The reference location for the adaptation zone lighting system is a location near the photocontrol that will control the adaptation lighting zone lighting equipment.~~ ~~b.Reference illuminance. A reference illuminance of 10 footcandles shall be used for testing the function of the adaptation lighting zone system unless another value is specified by the design engineer in the lighting controls documents. Note that this illuminance value is at the photocontrol and in the orientation of the photocontrol sensor and is not an illuminance on the garage deck.~~ a.No daylight test. Simulate or provide conditions without daylight ~~, where the illuminance at the reference location is below 50 percent of the reference illuminance~~. Verify and document ~~the following: If the adaptation zone lighting is a separate system:~~ Document that the adaptation zone lighting system is turned OFF or are dimmed to the general lighting levels of the rest of the parking garage. ~~If the adaptation zone lighting is part of a combined dimming system with the general lighting system: Using current measurements of illuminance measurements, document that the combined lighting control system is dimmed to 10 percent of the reference illuminance.~~ Verify and document that the light output is stable with no visible flicker. b.Full daylight test. Simulate or provide ~~bright~~ daylight conditions ~~where the illuminance at the reference location is greater than 150 percent of the reference illumin~~ance. Verify and docu~~ment the following~~: that the adaptation zone lighting system is turned ON and that it is operating at full ~~light~~ing output.	These edits are intended to simplify the language and for consistency between reference appendix sections.	No	No	No

Remark #	CASE Report	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the change affect energy saving, cost, or cost effectiveness?	Does the change affect HERS or ATT procedure?	Was this presented during a CEC-hosted pre-rulemaking workshop?
39	Indoor Lighting Controls	Parking Garage Adaptation Zone	NA7.6.2.7	Lucy Albin	Sahar Daemi	NA7.6.2.7 Automatic Astronomic Time Switch Based Lighting Control~~s~~ Systems Functional Testing for Parking Garage Daylight Adaptation Zones Switching or dimming control systems for daylight adaptation zone controls are required to manage the adaptation zone lighting in a manner that turns OFF the added lighting power in the adaptation zone but is not required to impact the general lighting system if it is separate, or is permitted to maintain an output that is consistent with the general lighting illuminance in the parking garage if the systems are combined for the adaptation zone. a.No daylight test. Simulate a nighttime period ~~condition~~ in the controlled parking garage daylight adaptation zone. Verify and document that the automatic time switch control ~~turns~~ is turned OFF or ~~dims the controlled lighting~~ dimmed to 10 percent of the full light output if a combined general lighting and adaptation zone lighting system is used. Verify and document that the light output is stable with no visible flicker. b.Full daylight test. Simulate a daytime period ~~condition~~ in the parking garage adaptation zone. Verify and document that the automatic time switch cont~~rol turns~~ is turned ~~ON controlled lighting~~ and that it is operating at full light output.	These edits are intended to simplify the language and for consistency between reference appendix sections.	No	No	No
40	Recommendation to Simplify Daylight Responsive Control Acceptance Testing	Partial Daylight Test	NA7.6.1.4 (d) and (e)	Jon McHugh	Daniel Wong	See Appendix for marked up NA7.6.1.4 (d) and (e)	Revised test keeps the standard partial daylight test and the alternate daylight test but the Partial Daylight Combined Illuminance Maximum (PDCImax) is calculated for both versions of the partial daylight tests as this reflects an LED being fully dimmed to 10% of light output when the daylight contribution to the space is 150% of the design illuminance. This updated test matches the pre-existing requirement for dimming to 10% of power at 150% of design illuminance. The old test allowed the high limit to be combined daylight and electric light value to be 150% of reference illuminance. Over the range that the partial daylight test can be conducted (interior daylight between 60% and 95% of reference illuminance) power savings are between 12% to 26% for systems minimally complying with the partial daylight test. The text was also reorganized into more discrete steps that align well with the needed data to collect, calculate and evaluate for compliance.	No	Yes	No
41	Healthcare Enhancements	Healthcare Enhancements	301.5.2.2.7	Sean Steffensen	Haile Bucaneg	Exception to Section 301.5.2.2.7: Alterations to Healthcare facilities.	This edit is intended to add an exemption for exterior doors in alterations from the U-factor requirements of Section 301.3.6. It is not the CASE Team's intent for HCAI facilities to comply with this requirement.	Yes	No	No
42	Healthcare Enhancements	Healthcare Enhancements	401.5.2.1.1	Sean Steffensen	Haile Bucaneg	Exception 2 to Section 401.5.2.1.1: Alterations to Healthcare facilities other than HCAI facilities.	This edit is intended to add an exemption for altered components from the mandatory requirements in Section 401.5.2.1. The CASE Report markups attempted to solely require FEI for altered HVAC systems in HCAI facilities, not cause the entire set of code requirements to apply to HCAI facilities.	Yes	No	No
43	Healthcare Enhancements	Healthcare Enhancements	601.5.2.2.4 Table 601.5-(1)	Sean Steffensen	Haile Bucaneg	Required[a]	In Table 601.5(1), for the row labeled "Daylight Response Controls" for code section 601.2.2.4, strike the superscript "a" so that HCAI Facilities would be included in the scope.	Yes	No	No
44	Nonresidential Water Heating	Circulator Pump Controls	501.3.1.2	Joe Singer	Danny Tam	A service water-heating system that meets the applicable requirements of Sections 101.3 [Section 110.1], 500.3 [Section 110.3], 501.2.1 [Section 120.3], ~~and~~ Section 501.3.3 [Section 140.5(c)], and Section 501.3.4 [Section 140.5(d)].	The proposed redlines incorporate Section 501.3.4, as recommended in the CASE Report. Without these revisions, Section 501.3.4 would not apply, defeating the purpose of the new requirement.	Yes	No	Yes
45	Nonresidential Water Heating	Circulator Pump Controls	501.5.2.2.1	Joe Singer	Danny Tam	Service water-heating systems shall meet the requirements of Section 501.3.1.2 [Section 140.5(a)2], ~~and~~ Section 501.3.2 [Section 140.5(b)], and Section 501.3.4 [New Section], except for the solar water heating requirements.	The proposed redlines incorporate Section 501.3.4, as recommended in the CASE Report. Without these revisions, Section 501.3.4 would not apply, defeating the purpose of the new requirement.	Yes	No	Yes

Table 2: Non-substantive Recommendations – Pre-Rulemaking Express Terms Review

Remark #	CASE Report / Comment Letter	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the language change affect energy saving cost or cost effectiveness?	Does the change to language affect HERS or ATT procedure?	Was this presented during a CEC-hosted workshop?
1	Nonresidential HPWH Ventilation Clean-up	NR HPWH Ventilation Clean-up	500.3.3.7.3.2.3	Ryan Fidler	Danny Tam	The center of the HPWH outlet port of all unducted HPWHs shall be directed at an angle of 90 to 270 degrees ~~or more~~ away from all ventless surfaces and permanently installed equipment if the outlet is closer than the manufacturer specified minimum distance. If the manufacturer does not specify a minimum distance, then the minimum distance between the ventless surfaces and the center of the HPWH outlet port shall be 24 inches.	Adding an upper bound to the angle away from ventless surfaces ensures that the exhaust air is not blowing directly at a ventless surface. If the exhaust air is blown at a ventless surface, then the ventless surface temperature can decrease and lead to condensation risk. When applying the original code language an installer could claim that the exhaust was directed at an angle of 360 degrees away from the ventless surface which would be 0 degrees away or directly at the unvented surface.	No	No	No
2	Nonresidential HPWH Ventilation Clean-up	NR HPWH Ventilation Clean-up	500.3.3.7.3.2.4	Ryan Fidler	Danny Tam	HPWH exhaust and intake air shall be directed at an ~~minimum~~ angle of 90 to 270 degrees away from each other or be separated by a minimum of 24 inches	Adding an upper bound to the angle ensures that intake and exhaust air are not parallel to each other. If the intake and exhaust air paths are parallel, then air can mix and lead to reduced intake air temperatures and HPWH efficiency. When applying the original code language an installer could claim that the intake and exhaust were directed at an angle of 360 degrees away from each other which would be 0 degrees away or parallel.	No	No	No
3	Nonresidential HVAC Fault Detection and Diagnostics	Nonresidential HVAC Fault Detection and Diagnostics	Table 401.2(6)	Joe Singer	Hab Tewelde	See appendix for marked up table language.	The table in the Express Terms omitted the "or larger" section rendering the use of that to exactly 100,000 square feet, which is unintended.	No	No	Yes
4	Nonresidential HVAC Fault Detection and Diagnostics	Nonresidential HVAC Fault Detection and Diagnostics	401.2.2.10	Joe Singer	Hab Tewelde	A stand-alone or integrated FDD system shall be provided as specified by Table 401.2 (~~65~~)[New table]. The provided FDD system shall perform all of the functions below:	The reference to the new table for FDD is numbered incorrectly. The Express Terms Use table 401.2(5) when it should be (6). A similar incorrect reference stems from this mis-alignment for section 401.2.2.11 (Table 401.2(6) should be (7)).	No	No	Yes
5	Nonresidential HVAC Fault Detection and	Nonresidential HVAC Fault Detection and	401.2.2.11	Joe Singer	Hab Tewelde	*Direct Digital Controls* to the zone shall be provided as specified by Table 401.2 ~~D~~(~~76~~54) [Table 120.2-A]. The provided DDC system shall meet the control logic requirements of Section 401.2.1.2 and Section 400.6 [Sections 120.1(d), 110.12(a) and 110.12(b)], and be capable	The reference to the new table for DDC is numbered incorrectly. The Express Terms Use table 401.2(6) when it should be (7).	No	No	Yes
6	N/A	Editorial Suggestion	201	Maureen Guttman	Payam Bozorgchami	~~GROUND-WATER~~ GROUNDWATER HEAT PUMP WATER-SOURCE HEAT PUMP is a ..., but are not limited to: 1. WATER-LOOP HEAT PUMP (see "water-loop heat pump") 2. ~~GROUND-WATER~~ GROUNDWATER HEAT PUMP (see "~~ground-water~~ groundwater heat pump") 3. GROUND-LOOP HEAT PUMP ("see ground-loop heat pump")	Suggest changing "GROUND-WATER HEAT PUMP" to "GROUNDWATER HEAT PUMP". Eliminating the hyphen makes clear that this equipment is using groundwater, not transferring energy from the ground to water.	No	No	No
7	N/A	Editorial Suggestion	301.2.5	Maureen Guttman	Payam Bozorgchami	"...shall include an enclosed vestibule ~~meeting~~ that meets..."	The edit corrects a typo.	No	No	No
8	Nonresidential Fenestration	Vertical Fenestration - Alterations	301.5.2.2.2	Maureen Guttman	Payam Bozorgchami	**301.5.2.2.2.1** Vertical fenestration alteration replacing one hundred percent of any single fenestration type ~~(fixed,operable windows, storefront, curtainwall, glazed doors)~~ shall ... **301.5.2.2.2.2 All other Fenestration Alterations** ~~All other v~~Vertical fenestration alterations replacing less than one hundred percent of any single fenestration type shall meet the requirements in Table 301.5(2).	The definition of "vertical fenestration" provides enough details so terms in parentheses are not needed.	No	No	No
9	Nonresidential Water Heating	Require Return to Primary Configuration	201	Yiyi Chu	Danny Tam	3. HEAT PUMP WATER HEATER (HPWH) is a water heater that transfers thermal energy from one temperature level to another temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function. 3.1. INTEGRATED HEAT PUMP WATER HEATER is a HPWH which has all components, including fans, storage tanks, pumps, or controls necessary for the device to perform its function contained in a single factory-made assembly. 3.2. SPLIT HEAT PUMP WATER HEATING SYSTEMS are water heating systems where the HPWH is configured in one of the following arrangements: 3.2.1 SPLIT-REFRIGERANT HEAT PUMP WATER HEATER is a HPWH which has a single outdoor section and one or more indoor sections connected to the outdoor section via a refrigerant circuit. 3.2.2 SPLIT-HYDRONIC HEAT PUMP WATER HEATER is a HPWH that consists of multiple separate sections. One section houses all the refrigerant components, while one or more additional sections are designated for water storage. These sections are interconnected through a hydronic circuit.	The general definition for split heat pump water heating systems is missing.	No	No	No
10	Nonresidential Water Heating	Require Return to Primary Configuration	201	Yiyi Chu	Danny Tam	5. PRIMARY HEAT PUMP STORAGE TANK is a tank that is primarily heated by a separate detached heat pump unit(s). The primary heat pump storage tank in the Return to Primary configuration ~~can~~ also ~~be used to~~ serves as the temperature maintenance heater to reheat the recirculation water returning to the primary heat pump storage tank. ~~maintain the temperature in the recirculation loop in Return to Primary configuration.~~	Added clarification.	No	No	No
11	Nonresidential Water Heating	Require Return to Primary Configuration	201	Yiyi Chu	Danny Tam	8. TEMPERATURE MAINTENANCE HEATER IN PARALLEL CONFIGURATION is a configuration where a secondary water heater is in parallel with the primary heat pump generation and storage system. The secondary heater is designed to independently meet the temperature maintenance load.	Added clarification.	No	No	No
12	Nonresidential Water Heating	Require Return to Primary Configuration	201	Yiyi Chu	Danny Tam	9. TEMPERATURE MAINTENANCE HEATER IN SERIES CONFIGURATION is a configuration where a secondary water heater is in series and downstream from the primary heat pump generation and storage system. The secondary heater is designed to primarily meet the temperature maintenance load.	Added clarification.	No	No	No
13	Nonresidential Water Heating	Require Return to Primary Configuration	501.3.5	Yiyi Chu	Danny Tam	See appendix for marked up table language.	501.3.5.1. 501.3.5.2, and 501.3.5.3 share similar requirements Move Exception to the end of the 501.3.5.3 Removed same requirements share by 501.3.5.1, 501.3.5.2, and 501.3.5.3. "Parallel storage tanks" should be "parallel primary storage tanks" Added reference to the balancing requirement. Removed redundant language. #2 should be primary heat pump temperature setpoint. "Temperature maintenance tank" should be "temperature maintenance heater" Exception for R occupancies	No	No	No

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14	Nonresidential Water Heating	Require Return to Primary Configuration	JA14.3.2	Yiyi Chu	Danny Tam	The following performance specifications shall be submitted to the Energy Commission or refer to the Product Assessment Datasheet (PADS) included in NEEA Advanced Water Heater Specification: a) Water heater input power; b) Water heater output capacity; and c) Water heater COP.	Added option.	No	No	No
15	Nonresidential Water Heating	Require Return to Primary Configuration	JA14.5	Yiyi Chu	Danny Tam	JA14.5 ~~Nonresidential use designation documentation requirements~~ Design, installation and start up documentation requirements for nonresidential buildings	Use detailed title	No	No	No
16	Nonresidential Water Heating	Require Return to Primary Configuration	JA14.5.1	Yiyi Chu	Danny Tam	Designers shall provide construction documentation with the following information for heat pump water heaters: 1. System piping diagram, including side view of heating plant schematic, and details for all check valves, balancing valves, mixing valves, isolation valves, and service water heating system *domestic hot water* appurtenances 2. Mixing valve outlet temperature and return water temperature 3. Heat pump ON and OFF temperature setpoint (if applicable) 4. Heat pump ~~OFF~~ temperature setpoint and deadbands (if applicable) 5. Series temperature maintenance ~~tank~~ heater temperature setpoint 6. Sequence of staging of temperature maintenance heater if there are multiple temperature maintenance heaters in parallel. 7. Back up water heater temperature setpoint ~~8. Back up water heater staging~~ ~~9. Sequence of operation if there are multiple HPWHs~~ ~~10.~~8. Defrost derate factors for calculating output capacity on design day	update "appurtenances" to be "domestic hot water appurtenances" to align with existing definition; Added clarifications; removed requirements around staging since it requires additional research	No	No	No
17	Nonresidential Water Heating	Require Return to Primary Configuration	JA14.5.2	Yiyi Chu	Danny Tam	Installers shall follow the startup process in Steps 1 through 4 after the HPWH installation: Primary HPWH Control Step 1: Record the heat pump ~~ON~~ temperature setpoint(s) and/or deadband. If multiple heat pumps exist, confirm the setpoint(s) and/or deadband is the same for all units if there are no staging control. Confirm the setpoint(s) and/or deadband is in accordance with per approved construction documents. Step 2: ~~Record the heat pump OFF temperature setpoint. If multiple heat pumps exist, confirm the setpoint is the same for all units. Confirm the setpoint is in accordance with approved construction documents.~~ ~~Step 2:~~ If a master mixing valve is installed, record the mixing setpoint temperature. Confirm setpoint is in accordance with per approved construction documents. Step 3: Simulate a condition where the water temperature drops and activates ~~at~~ the heat pump~~ON sensor is below the ON setpoint and activates the heat pump~~.	Added clarification.	No	No	No
18	Nonresidential Water Heating	Require Return to Primary Configuration	JA14.5.3	Yiyi Chu	Danny Tam	Series temperature maintenance tank heater control (if applicable) Step 1: Record the series temperature maintenance ~~tank~~ heater ~~ON~~ temperature setpoint. If series temperature maintenance ~~tank~~ heater has multiple thermostats ~~stages~~, record ~~ON~~ setpoint(s) for each thermostat ~~stage~~. Confirm setpoint is in accordance with approved construction documents. ~~Step 2: Record the series temperature maintenance tank OFF temperature setpoint. If series temperature maintenance tank has multiple stages, record OFF setpoint(s) for each stage. Confirm setpoint is in accordance with approved construction documents.~~ ~~Step 3: Record the series temperature maintenance tank temperature setpoint.~~ Step 2 ~~4~~: Record the primary heat pump ~~supply water~~ temperature setpoint. If multiple heat pumps exist, confirm setpoint is the same for both units. Confirm setpoint is in accordance with approved construction documents. Step 3 ~~5~~: Simulate a condition where the water temperature at the series temperature maintenance heater ~~tank ON sensor~~ is below the ~~ON~~ activation setpoint. (a)Verify and document that the series temperature maintenance ~~tank~~ heater energizes. (b)If there are multiple ~~stages~~ thermostats installed, repeat steps 3(a) ~~5(A)~~ for each thermostat ~~the other stages and confirm unit staging is per the approved sequence of operation~~. Step 4 ~~6~~: Simulate a condition where the water temperature at the series temperature maintenance ~~tank~~ heater OFF sensor is above the deactivation ~~OFF~~ setpoint.	"temperature maintenance tank" should be "temperature maintenance heater" Added clarification.	No	No	No
19	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	NA7.21.1.4.2.1	Amy Droitcour	Thao Chau	NA7.21.1.4.2.1 Full Off Test. Using the lighting control system, set the lighting system to full off.	The edit corrects a typo of the word "off".	No	No	Yes
20	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	NA7.21.1.4.8	Amy Droitcour	Thao Chau	Restore Normal Operation. ~~Record the lighting illuminance level at the crop canopy reference plane or measure the power draw of the controlled lighting for the lighting control zone. Alternatively, total electrical current for the lighting control zone may be measured.~~ Restore PAR sensors to normal operation and return dimming to normal scheduled operation.	After the acceptance test is complete, this section should instruct the tester to return the system to normal scheduled operation.	No	No	Yes
21	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	NA7.21.1.5.5.1.2	Amy Droitcour	Thao Chau	5.1.2. ~~The lighting control zone being tested.~~ The PPFD setpoint for the lighting control zone.	NA7.21.1.5.5.1.1 text was repeated in NA7.21.1.5.5.1.2. The PPFD setpoint for the lighting control zone should be recorded.	No	No	Yes
22	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	NA7.21.1.5.5.2.1	Amy Droitcour	Thao Chau	5.2.1 Record the lighting ~~luminaire~~ illuminance level at the crop canopy reference plane or measure the power draw of the controlled lighting for the lighting control zone. Alternatively, total electrical current for the lighting control zone may be measured.	The edit corrects a typo.	No	No	Yes
23	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.2.1.3.5	Amy Droitcour	Thao Chau	2.2.1.3.5. The integrated space conditioning system shall be controlled in accordance with Section ~~908.1.6.2.4~~ 908.1.6.2.5.	Cross-reference was to incorrect section of code.	No	No	Yes
24	Controlled Environment Horticulture	Space Conditioning Systems	NA7.21.2.2.3	Amy Droitcour	Thao Chau	~~2.3. Capacity is shown on plan documents.~~	This duplicates the step in NA7.21.2.2.1, and therefore is not needed.	No	No	Yes
25	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.1	Amy Droitcour	Thao Chau	Indoor Growing space-conditioning systems ~~spaces~~ shall comply with the applicable requirements of Sections 400.5.1 [Section 110.2(a)], 400.5.~~32~~ [Section 110.2(b)], 400.5.5 [Section 110.2(e)], 401.2.1.4 [Section 120.1(f)], 401.2.1.5 [Section 120.1(g)], 401.2.2.1 [Section 120.2(a)], 401.2.2.~~34~~ [Section 120.2(d)], 401.2.2.6 [Section 120.2(f)], 401.2.2.7 [Section 120.2(g)], 401.2.2.9 [Section 120.2(i)], 401.2.2.10, 401.2.2.11 [Section 120.2(j)], 401.2.2.1~~3~~ [Section 120.2(l)], 401.2.4 [Section 120.4], and 501.2.2 [Section 120.9].	Some section numbers changed in the code and this list should be updated accordingly to ensure designers, plan checkers, and inspectors are referencing the correct requirements.. The CASE Team recommends also referencing the new section 401.2.2.10 HVAC Fault Detection and Diagnostics (FDD).	No	No	Yes
26	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.2	Amy Droitcour	Thao Chau	System characteristics. The indoor growing space conditioning system shall meet all requirements of one of the systems in Section 2.2.1 ~~and~~ or 2.2.2.	For clarity, one of the systems should be an "or"	No	No	Yes
27	Controlled Environment Horticulture	Space Conditioning Systems	NA7.21.3.3.1.2.1	Amy Droitcour	Thao Chau	3.1.2.1. Canopy square footage calculated as described in ~~NA9.2~~ NA7.21.3.2 Canopy Square Footage.	Incorrect cross-reference	No	No	Yes
28	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.7	Amy Droitcour	Thao Chau	Field verification. Field verification of specified control function tests shall demonstrate the correct installation and operation of components, systems and system-to-system interfaces in accordance with the test requirements in Reference Nonresidential Appendix NA7.21.2 and be documented on the applicable Certificate of Acceptance. ~~The installer shall certify that diagnostic testing was performed in accordance with the applicable procedures outlined in Section 401.2.7 [Section 120.5].~~	This cross reference is not necessary for compliance with the CEH field testing requirements. Removing this cross-reference will reduce confusion.	No	No	Yes

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30	Data Centers Efficiency Improvements	Computer Room Economizers	201	Aniruddh Roy	Hab Tewelde	Section 201, Definitions, ~~ECONOMIZER, PUMPED REFRIGERANT is a system by which the supply air of a cooling system is cooled directly by refrigerant pumped between indoor and outdoor units during cooler ambient temperatures in order to reduce or eliminate the need for mechanical cooling.~~	This definition is not referenced in Title 24, Part 6. Removing the unused definition keeps the definitions aligned with the terms used in the code.	No	No	No
31	Data Centers Efficiency Improvements	Computer Room Economizers	1001.2.11.1.2-1	Hillary Weitze	Hab Tewelde	1001.2.11.1.2-1: Economizers: All economizers are designed to meet economizer temperature thresholds in Section 910.2.1 at *design conditions* , and all economizers are designed to meet the Data Center ~~Room~~ Economizer definition in Section ~~200.3~~ 201.	"Room" appears to be a leftover from the former "computer room" terminology. Updating the term improves clarity. The Section 200.3 to 201 reference points to the intended applicable code section.	No	No	No
32	Data Centers Efficiency Improvements	Computer Room Economizers	1001.2.11.1.1	Hillary Weitze	Hab Tewelde	1001.2.11.1.1 - Data centers shall comply with sections 1001.2.1 through ~~1001.2.5~~ 1001.2.7 for the following systems. The 10,000 sq. ft. trigger in Part 1 Section 10-103 shall not apply: 1. Cooling 2. Ventilation 3. Heat recovery 4. Humidification 5. Pumps 6. Fans All mechanical systems serving data centers shall be considered Complex Mechanical Systems and Design Reviewer requirements for complex mechanical systems shall apply.	Incorrect cross reference. Added a sentence to clarify the Design Reviewer requirements for data centers.	No	No	No
33	Controlled Environment Horticulture	Space Conditioning Systems	4.1.2.1.1.3 Table 401.2(1)	Amy Droitcour	Thao Chau	See appendix for marked up Table 401.2(1) [Table 120.1-A].	The CEH with CO2 Enrichment row (0 ventilation) cites Note "I," which does not exist. The correct citation is to Note G (CFC 5307.4 CO2 monitoring and purge ventilation). Without the note, an inspector may accept zero outdoor air with no pointer to the Fire Code CO2 safety requirements.	No	No	Yes
33	Data Centers Efficiency Improvements	Computer Room Economizers	1001.2.11.2.1	Hillary Weitze	Hab Tewelde	1001.2.11.2.1 - The following systems serving data centers shall comply with Sections ~~1001.2.6~~ 1001.2.8 and ~~1001.2.8~~ 1001.2.10: 1. Cooling 2. Ventilation 3. Heat recovery 4. Humidification 5. Pumps 6. Fans	Incorrect cross reference. These updates align the references to match the revised commissioning section numbering and direct code users to the intended requirements.	No	No	No
34	Indoor Lighting Controls	Update Multilevel Lighting Controls Requirements	600.4.2	Yao-Jung Wen	Sahar Daemi	**600.4.2** *[Section 110.12(c)]* **Demand responsive lighting controls.** **600.4.2.1 Nonresidential buildings excluding Group R occupancies.** *Buildings* with *nonresidential lighting* systems having a total installed *lighting* power of 4,000 watts or greater that are subject to the requirements of Section 601.2.2.1.4 *[New section]* shall be equipped with controls capable of automatically reducing *lighting* power in response to a *demand response signal* . For compliance testing, during a *Demand Response* (DR) event, the *lighting control system s* shall reduce *lighting output* by a minimum of 15 percent of full rated power, and no more than 50 percent of full rated power as specified in NA7.6.3. If the *lighting* output is already below the *demand response* target level at the time the signal is initiated, the system shall not increase *lighting* output above the pre-event *lighting* output. In *buildings* where *demand responsive controls* are required, *demand responsive controls* shall control the *general lighting* in the spaces required to meet Section 601.2.2.1.4 [New section]. *General lighting* power shall be reduced by continuous dimming. **600.4.2.2 Buildings with nonresidential lighting systems.** ~~Buildings~~ *Group R occupancies* with nonresidential *lighting* systems having a total installed *lighting* power of 4,000 watts or greater that are subject to the requirements of Section 601.2.2.2 *[Section 130.1(b)*] or *Section 160.5(b)4B]* shall install controls that are capable of automatically reducing *lighting* power in response to a *demand response signal* . For compliance testing, the *lighting* controls shall demonstrate a 15-percent or greater reduction in *lighting* power as described in NA7.6.3. The controls may provide additional demand responsive functions or abilities. For *buildings* where *demand response* controls are required, *demand responsive controls* shall control the *general lighting* in the spaces required to meet Section 601.2.2.2 *[Section 130.1(b)*] *or Section 160.5(b)4B]* . *General lighting* shall be reduced in a manner consistent with the requirements of Section 601.2.2.2 *[Section 130.1(b)*] *or Section 160.5(b)4B]* . **Exception to Section 600.4.2.~~2~~2:** Spaces where a health or life safety statute, ordinance, or regulation does not permit the *general lighting* to be reduced are not required to install *demand responsive controls* and do not count toward the 4,000-watt threshold.	The exception should be applicable to both 600.4.2.1 and 600.4.2.2 as it covers legitimate conditions for exempting from demand responsive lighting controls. There are also redundant closing square brackets.	No	No	Yes
35	N/A	Parking Garage Daylight Responsive Controls	601.2.2.4.3-4	Yao-Jung Wen	Sahar Daemi	4. ~~For parking garages, ensure that when daylight illuminance levels measured at the farthest edge of the secondary sidelit zone away from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting when no daylight is available, the controlled lighting power in the combined primary and secondary sidelit daylit zones shall be reduced by 100 percent; and Reduce controlled lighting power in the combined primary and secondary sidelit daylit zones by 100 percent when no daylight is available and daylight illuminance measured at the farthest edge of the secondary sidelit zone from the glazing or opening are greater than 150 percent of the illuminance provided by the controlled lighting; and~~ For parking garages, the controlled lighting power in the combined primary and secondary sidelit daylit zones shall be reduced by 100 percent when the following requirements are met as determined in accordance with 4.1 through 4.3: 4.1. Measurement Location Daylight illuminance is measured at the point of the secondary sidelit zone farthest from the glazing or opening; and 4.2. Baseline Baseline illuminance is the illuminance provided by the controlled lighting with no daylight; and 4.3. Operating Criterion The measured daylight illuminance exceeds 150 percent of the baseline illuminance.	The Express Terms language could easily be interpreted inappropriately, rendering the requirement unenforceable. Recommending alternative language that is clearer and is less likely to be interpreted incorrectly.	No	No	No
36	Process Boilers	Stack Economizer	904.1.4	Emma Conroy	Haile Bucaneg	Newly installed process steam boilers with an input capacity greater than or equal to 10 MMBtu/h shall have a boiler stack economizer, which is a heat exchanger that recovers heat from boiler flue gas and transfers it to boiler feedwater, make-up water, or ~~both a combination of boiler feedwater and make-up water.~~ The boiler stack economizer shall:	Though rare, some boilers use 100% make up water, so we recommend leaving that as an option.	No	No	No
37	Process Boilers	Stack Economizer	904.1.4, Exception 4	Emma Conroy	Haile Bucaneg	Exception 4 to Section 904.1.4: Indoor replacement steam boilers at existing facilities with roof clearance, which is the distance from the boiler stack outlet to the ceiling or the distance ~~to~~ from the outlet of the selective catalytic reduction system to the ceiling, less than 88 inches for steam boilers with an input capacity of 25 MMBtu/h or less and less than 116 inches for steam boilers with an input capacity greater than 25 MMBtu/h.	Corrects the typographical error "distance to from" to "distance from" in the roof-clearance definition.	No	No	No

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38	Process Boilers	Automatic Blowdown submeasure	904.1.5	Emma Conroy	Haile Bucaneg	904.1.5 [New Section] Automatic blowdown. Newly installed process steam boilers with an input capacity greater than or equal to 10 MMBtu/h shall have an automatic boiler surface blowdown control~~ler~~ system, which is an automated system that optimizes surface-blowdown rates by regulating the volume of water discharged from the boiler in relation to the concentration of dissolved solids present, that is programmed to be controlled by conductivity. Field verification. Before an occupancy permit is granted, the installer shall demonstrate the correct installation and operation of an automatic boiler surface blowdown control system in accordance with the test requirements in Reference Nonresidential Appendix NA7.22.2 as documented on the applicable Certificate of Acceptance. Exception 1 to Section 904.1.5: Steam boilers with returned condensate composed of more than 90 percent boiler feedwater flow. Exception 2 to Section 904.1.5: Steam boilers with make-up water treated by a reverse osmosis system. Exception 3 to Section 904.1.5: Steam boilers with a heat exchanger that recovers energy from the blowdown to heat make-up water or another process steam, with or without a flash tank. Exception 4 to 904.1.5: Process steam in buildings with Group R occupancies.	Clarification that a whole system is required (valve/probe/controller), as for the controller to achieve the desired savings, it needs all system components. Adds reference to field verification in the requirement language.	No	No	No
39	Process Boilers	Automatic Blowdown submeasure	904.1.5, Exception 3	Emma Conroy	Haile Bucaneg	Exception 3 to Section 904.1.5: Steam boilers with a heat exchanger that recovers energy from the blowdown to heat make-up water or another process ~~steam~~ stream, with or without a flash tank.	Corrects the typographical error “process steam” to “process stream” in the description of blowdown heat recovery.	No	No	No
40	Process Boilers	Deaerator Pressure submeasure	904.1.6	Emma Conroy	Haile Bucaneg	~~904.1.6 [New Section] Steam supply deaerator line regulator pressure control.~~ 904.1.6 [New Section] Deaerator steam supply line pressure regulator control. Newly installed process steam boilers with an input capacity greater than or equal to 10 MMBtu/h that use the boiler steam header to pressurize the deaerator, which is a system used to remove oxygen and other dissolved gases from boiler feedwater, shall meet the following requirements. 1. The pressure regulator serving the deaerator shall be set at or under 5 psig. 2. The pressure regulator serving the deaerator shall be set within 2 to 5 psig for boilers with tubes that are not rated for oxidizing conditions. 3. A pressure gauge shall be installed on the deaerator. Field verification. Before an occupancy permit is granted, the installer shall demonstrate the correct installation and operation of deaerator steam supply line pressure regulator control in accordance with the test requirements in Reference Nonresidential Appendix NA7.22.3 as documented on the applicable Certificate of Acceptance. Exception 1 to Section 904.1.6: Steam boilers with swings in make-up water flow to feedwater of 20 percent or more of the feedwater flow with description in design documents. Exception 2 to 904.1.6: Process steam in buildings with Group R occupancies.	Clarifies that the section addresses the deaerator steam supply line pressure regulator in line with typical industry language for the equipment. Adds reference to field verification in the requirement language.	No	No	No
41	Process Steam	Condensate Return	909.1.2.1	Emma Conroy	Haile Bucaneg	909.1.2.1 Condensate return. All process steam loads that do not qualify based on the criteria in Table 909.1-(1) shall include the linear distance (sum of horizontal and vertical) from the steam trap serving the load to the nearest condensate return tank or the deaerator serving the steam boiler, whichever is closer, in the steam system construction documents.	Adds the word “the” before “linear distance” to improve grammatical clarity.	No	No	No
42	Process Boilers	Stack Oxygen Concentration (Comment Letter)	904.1.3	Emma Conroy	Haile Bucaneg	904.1.3 [Section 120.6(d)3] Stack-gas oxygen. Newly installed process boilers with an input capacity greater than 5 MMBtu/h (5,000,000 Btu/h) shall ~~M~~maintain stack-gas oxygen concentrations at less than or equal to 3.0 percent by volume on a dry basis over firing rates of 20 to 100 percent when in a nonresidential building with Group R occupancies, and shall meet the following requirements at 25% (or at the boiler's lowest firing rate, whichever is higher) to 100% of burner input capacity when in a nonresidential building, except buildings with Group R occupancies: 1. Process boilers with burners that ~~that~~ use a premixed air-fuel mixture, with combustion occurring at a fine mesh surface which ~~act~~ acts as a flame arrestor to stabilize and maintain the flame, shall maintain stack-gas oxygen concentrations at less than or equal to 8.0% by volume on a dry basis. 2. Process boilers equipped with a selective catalytic reduction system, which is a boiler emissions control system that injects ammonia or urea into the flue gas over a catalyst to reduce NOx emissions, shall maintain stack-gas oxygen concentrations at less than or equal to 4.0% by volume on a dry basis. 3. All other process boilers shall maintain stack-gas oxygen concentrations at less than or equal to 6.0% by volume on a dry basis. Combustion air volume shall be controlled with respect to measured flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited. Field verification. Before an occupancy permit is granted, the installer shall demonstrate compliant stack oxygen concentrations in accordance with the test requirements in Reference Nonresidential Appendix NA7.22.1 as documented on the applicable Certificate of Acceptance. Exception to Section 904.1.3: Boilers with steady state full-load combustion efficiency, inclusive of all economizers, 90 percent or higher.	Corrects grammar errors. Changing “act” to “acts” to agree with the singular “mesh surface” and removes the duplicated word “that.” Corrects capitalization of maintain given changes to sentence structure. Adds reference to field verification in the requirement language.	No	No	No
43	Process Boilers	Stack Oxygen Concentration (Comment Letter)	NA7.22.1	Emma Conroy	Haile Bucaneg	NA7.22.1.1 Oxygen Concentration Functional Testing A field technician- shall complete ~~verify and document~~ the following steps for newly installed process boilers with an input capacity greater than or equal to 5 MMBtu/h: Step 1: Installation Verification 1. Confirm the type of burner installed in the boiler: 1.1. Standard manifold burner. 1.2. Mesh burner. 2. Confirm if the boiler exhaust is equipped with a selective catalytic reduction system. Step 2: Stack-gas Oxygen Concentration 1. Document through measurement or through existing stack-gas monitoring equipment the stack-gas oxygen concentration at the following process boiler firing rates: 1.1. 25% firing rate, or the boiler's lowest firing rate, whichever is higher, 1.2. 100% firing rate, 1.3. Midpoint between 1.1 and 1.2, calculated as (1.1+1.2)/2 Step 3: Compare to Maximum Allowable Stack-gas Oxygen Concentration 1. Boilers equipped with mesh burners: 8% oxygen concentration by volume on a drybasis. 2. Boilers equipped with a selective catalytic reduction system: 4% oxygen concentration by volume on a dry basis. 3. All other boilers: 6% oxygen concentration by volume on a dry basis.	Updating wording for clarity: the original proposed language included "verify and document the following:" with a description of the requirement. The requirement description was removed so the proposed language implies that the steps must be verified and documented rather than completed. Additionally, we recommend keeping in “by volume” for all three max allowable concentrations for clarity, as stack oxygen concentrations can be measured in different ways. The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No

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44	Process Boilers	Automatic Blowdown submeasure	NA7.22.2.2	Emma Conroy	Haile Bucaneg	A field technician~~.~~ shall verify and document the following for newly installed process boilers with an input capacity greater than 10 MMBtu/h: Step 1: Installation Verification 1. Confirm that ~~a boiler blowdown~~ control valve~~, and valve controller,~~ and conductivity probe are installed in the surface blowdown line and wired to an automatic blowdown controller. Step 2: Setpoint Verification 1. Document the current conductivity setpoint configured on the controller. Step 3: Blowdown Functional Test 1. Observe the controller as it completes one full cycle~~. The controller should~~ and sample~~s~~ the boiler water conductivity. Document the conductivity reading on the controller and ~~perform~~observe the following:	Clarified language to differentiate from other valves in the blowdown line and make it explicit that the controller may not be in the blowdown line. Clarified that the field technician should observe the steps rather than the controller performing the steps. The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No
45	Process Boilers		NA7.22.2.3	Emma Conroy	Haile Bucaneg	NA7.22.3.2 Functional Testing A field technician~~.~~ shall complete ~~verify and document~~ the following steps for newly installed process boilers with an input capacity greater than or equal to 10 MMBtu/h: Step 1: Boiler Pressure 1. Ensure the boiler is at design condition operating pressure. 2. Document if boiler tubes are rated for oxidizing conditions. Step 2: Deaerator Pressure Verification 1. Confirm that pressure gauge on deaerator reads 5 psig or under if the boiler tubes are rated for oxidizing conditions, or between 2 psig and 5 psig if the boiler tubes ar~~e~~ not rated for oxidizing conditions. 2. If the deaerator pressure is above 5 psig, take one of the following steps: 2.1. Confirm that the pressure of the returning condensate matches the pressure at the deaerator. If the condensate return pressure is lower than the deaerator pressure, reduce the supply line pressure regulator setpoint. 2.2. Confirm that the temperature of the returning condensate matches the temperature at the deaerator. If the condensate return temperature is lower than the deaerator temperature, reduce the supply line pressure regular setpoint. 2.3. Confirm that the condensate return system does not utilize a flash vessel.	Updating wording for clarity: the original proposed language included "verify and document the following:" with a description of the requirement. The requirement description was removed so the proposed language implies that the steps must be verified and documented rather than completed. Also includes a correction for the typo "ar" instead of "are" and the formatting typo where the third sub step of step 2 was missing a bulleted "2.3." The docketed Pre-Rulemaking Draft Regulatory Text for the 2028 Reference Appendices did not include Nonresidential Reference Appendix NA7.22 Process Boilers Installation and Acceptance Tests. Comments reflect the version of this appendix provided to the CASE team by CEC.	No	No	No
46	Covered Process Refrigeration	Definition	201	Joe Vukovich	Haile Bucaneg	**CONDENSER SPECIFIC EFFICIENCY** is the full load condenser Total Heat of Rejection (THR) capacity at standardized conditions divided by all electrical input power including ~~by the~~ power of all fans ~~input electric power (including but not limited to spray pump electric input power for evaporative condensers)~~ at 100 percent rated fan speed, and power of spray pumps for evaporative condensers.	Word was accidentally omitted in Express Terms	No	No	Yes
47	Covered Process Refrigeration	Air-cooled Gas Coolers	901.1.8.1, 902.1.5.1	Joe Vukovich	Haile Bucaneg	**901.1.8.1 [Section 120.6(a)8A] Air-cooled gas cooler prohibition.** Air-cooled gas coolers are prohibited in Climate Zone~~s 9 through~~ 15. **902.1.5.1 [Section 120.6(b)5A] Air-cooled gas cooler prohibition.** Air-cooled gas coolers are prohibited in Climate Zone~~s 10 through~~ 15.	As docketed separately, modeling supports the energy equivalence of allowing the use of air-cooled gas coolers, compared to adiabatic gas coolers, in all Climate Zones except CZ 15, Palm Springs. This increases flexibility and also can allow users in appropriate CZs to reduce system costs without reducing efficiency.	No	No	Yes
48	Covered Process Refrigeration	Evaporator Specific Efficiency	901.1.5.5	Joe Vukovich	Haile Bucaneg	**901.1.5.5 Specific efficiency.** Fan-powered evaporators utilizing volatile refrigerants shall meet the applicable efficiency requirements listed in Table 901.1-(2) [Table 120.6-A-2]. Evaporator specific efficiency is defined as the gross total refrigeration capacity (Btu/h) divided by the electrical input power at 100 percent fan speed at rating conditions listed in Table 901.1-(2) [Table 120.6-A-2]. ~~following the test procedure listed in Table 901.1-(2) [Table 120.6-A-2).~~ Except as defined in Table 901.1-B [Table 120.6-A-2], all conditions and evaporator coil construction shall be as documented and furnished for the project.	Requiring the equipment to be configured for its intended application greatly reduces the ability to circumvent the efficiency requirement.	No	No	Yes
49	Covered Process Refrigeration	Evaporator Specific Efficiency	901.1.5.5	Joe Vukovich	Haile Bucaneg	**EXCEPTION 2 to Section 901.1.5.5 [Section 120.6(a)3D]:** Coolers or freezers within refrigerated warehouses for which a licensed engineer has certified that the application has airflow or static pressure requirements that make compliance infeasible.	There are certain applications, such as the pharmaceutical industry, that require airflows that cannot meet the evaporator specific efficiency requirement. Regulatory temperature uniformity standards may require two or more times normal airflow.	No	No	Yes
50	Covered Process Refrigeration	Evaporator Specific Efficiency	Table 901.1-(2)	Joe Vukovich	Haile Bucaneg	f. Entering dry-bulb temperature is the dry-bulb temperature at the evaporator air coil inlet.	Adding this word improves the clarity of footnote f. By specifying which coil inlet there is no chance for confusion.	No	No	Yes
51	Covered Process Refrigeration	Refrigerated Warehouse Condensers	Table 901.1-(3)	Joe Vukovich	Haile Bucaneg	TABLE 901.1-(3) [TABLE 120.6-B] FAN-POWERED CONDENSERS – MINIMUM EFFICIENCY REQUIREMENTS CONDENSER TYPE | REFRIGERANT TYPE | MINIMUM ~~EFFICIENCY~~ *CONDENSER SPECIFIC EFFICIENCY* | RATING CONDITION	Stakeholders have been confused about this table. In lieu of a footnote that repeats information stated elsewhere, we are proposing changing the column title to match an existing definition. The italicized term will convey to readers that there is a relevant definition and minimize confusion.	No	No	Yes
52	Covered Process Refrigeration	Compressor Volume Ratio Control	901.1.7.4	Joe Vukovich	Haile Bucaneg	**901.1.7.4 [Section 120.6(a)5D] Compressor volume ratio control.** New screw compressors ~~with nominal electric motor power greater than 150 HP nominal electric motor power greater than 150 HP in nonresidential buildings with Group R occupancies and compressor displacement of 450 cfm or greater in nonresidential buildings except buildings with Group R occupancies,~~ shall include the ability to automatically vary the compressor volume ratio (Vi) in response to operating pressures~~.~~ if: 1)The screw compressor has a nominal electric motor power greater than 150 HP and is in a nonresidential building with Group R occupancies; or 2)The screw compressor has a displacement of 450 cfm or greater and is in a nonresidential building, except for buildings with Group R occupancies.	The CASE Team has already heard from one stakeholder that the language in the Express Terms is confusing. This language may be easier to understand while preserving the intent of the language in the Express Terms.	No	No	Yes
53	Covered Process Refrigeration	Air-cooled Gas Coolers	901.1.8, 901.1.8.1	Joe Vukovich	Haile Bucaneg	**Exception to Section 901.1.8.~~4~~:** In non-residential buildings, except buildings with Group R occupancies, Aair-cooled gas coolers on systems with a total heat rejection of 20 tons (240,000 Btu/h) or less for systems serving freezers, or 40 tons (480,000 Btu/h) or less for systems serving coolers.	Numbering error. The exception for small transcritical CO2 systems should be an exception to all gas cooler requirements. The original analysis for gas cooler requirements included systems greater than 100 tons and did not consider CO2 systems. Small CO2 units cannot meet requirements such as condensing temperature reset controls below the critical point. CO2 condensing units, like other packaged condensing units, do not have manufacturer-provided approach temperatures or manufacturer-disclosed internal components, making it impossible for these systems to meet TD requirements.	No	No	Yes
54	Covered Process Refrigeration	Air-cooled Gas Coolers	901.1.8.1	Joe Vukovich	Haile Bucaneg	**Exception 2 to Section 901.1.8.1**: The requirement of Section 901.1.8.1 does not apply to transcritical CO_2 refrigeration systems in Climate Zones 9 through 15 that achieve at least equal energy savings through alternative means approved by the Executive Director.	The CASE Team recommends reproposing this exception for 901.1.8.1 to make it easier to use additional emerging technologies such as parallel compression and ejectors. This would be easier and more straightforward than the general pathway in T24 which very few people know about.	No	No	Yes
55	Covered Process Refrigeration	Air-cooled Gas Coolers	902.1.5.1	Joe Vukovich	Haile Bucaneg	**Exception 2 to Section 902.1.5.1**: The requirement of Section 902.1.5.1 does not apply to transcritical CO_2 refrigeration systems in Climate Zones 10 through 15 that achieve at least equal energy savings through alternative means approved by the Executive Director.	The CASE Team recommends reproposing this exception for 902.1.5.1 to make it easier to use additional emerging technologies such as parallel compression and ejectors. This would be easier and more straightforward than the general pathway in T24 which very few people know about.	No	No	Yes
56	Covered Process Refrigeration	Acceptance Testing	NA7.10.3.3.2	Joe Vukovich	Haile Bucaneg	Step 1: Verify mechanical controls and other strategies will not affect tests. (a) Verify condenser pressure low-limit holdback and/or bypass regulating valves, if any, are set below the minimum SCT setpoint. Condenser pressure controls valves will cause fans to operate at 100% speed if they are not set below the minimum SCT value. ~~In warm weather, this may require setting out of range, and deferring valve settings until cold weather allows valves to be adjusted.~~	The CASE Team recommends removing this sentence in line with other changes to remove the dependence on weather conditions.	No	No	Yes

Remark #	CASE Report / Comment Letter	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the language change affect energy saving cost or cost effectiveness?	Does the change to language affect HERS or ATT procedure?	Was this presented during a CEC-hosted workshop?
57	Covered Process Refrigeration	Acceptance Testing	NA7.20.1.1.1	Joe Vukovich	Haile Bucaneg	(d) Verify the discharge pressure sensor (or gas cooler pressure if used) has been factory or field calibrated ~~reads accurately, using a NIST traceable reference pressure gauge or meter, and with pressure checked for at least two pressures within the typical operating range. Calibrate if needed. Replace if outside manufacturers recommended calibration range.~~	The CASE Team recommends removing these sentences for consistency with other sections.	No	No	Yes
58	Compressed Air Dryers	Mandatory Requirements	905.1	Joe Vukovich	Haile Bucaneg	**905.1 [Section 120.6(e)] Mandatory requirements (Newly Constructed, Additions, Alterations).** All new compressed air systems where the total combined horsepower (hp) of the compressor(s) is 25 hp or more shall meet the requirements of Sections 905.1.1 through 905.1.~~6~~7.	Numbering error. With the addition of a section, this needs to be edited to 901.1.7.	No	No	No
59	Nonresidential Water Heating	Requirements for Unitary HP/ER Hybrid Heaters	500.3.4	Bill Healy	Danny Tam	Section 500.3.4, #2: "If multiple unitary commercial HPWH are installed in a space, …"	Fix editorial error.	No	No	No
60	Nonresidential Water Heating	Requirements for Unitary HP/ER Hybrid Heaters	JA14.6.2	Bill Healy	Danny Tam	For central systems with recirculation with multiple unitary HP/ER water heaters in a parallel arrangement the installer shall ~~setup with~~ set up the system based on the following conditions:	Fix editorial error.	No	No	No
61	Controlled Environment Horticulture	Horticultural Lighting Efficacy	201	Amy Droitcour	Thao Chau	PHOTOSYNTHETIC PHOTON EFFICACY (PPE) is photosynthetic photon flux emitted by a luminaire between 400 and 700 nanometers, divided by input electric power in units of micromoles per second per Wwatt, or micromoles per μjoule as defined by ANSI/ASABE S640. Luminaire is inclusive of both integrated ~~lamps~~ light sources and luminaires with removable, serviceable lamps.	The intent is better explained by "light sources" because many of these integrated luminaires do not include anything that would be described as a "lamp."	No	No	Yes
62	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.3.5	Amy Droitcour	Thao Chau	3.5 All lighting control zones shall be shown on the plans.	The acceptance test for Indoor Growing Lighting Control Construction Inspection requires that lighting control zones be shown on plan documents (NA7.21.1.1.1), and designers may not read acceptance tests before design. This prevents acceptance test failures due to an oversight.	No	No	Yes
63	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.4.1.4	Amy Droitcour	Thao Chau	4.1.4 All lighting control zones shall be shown on the plans.	The acceptance test for Greenhouse Lighting Control Construction Inspection (NA7.21.1.3) requires that all PAR/daylight sensors and lighting control zones be shown on plans, and designers may not read acceptance tests before design. This prevents acceptance test failures due to an oversight.	No	No	Yes
64	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.4.2.5	Amy Droitcour	Thao Chau	4.2.5 All PAR sensor locations and associated lighting control zones shall be shown on the plans.	The acceptance test for Greenhouse Lighting Control Construction Inspection (NA7.21.1.3) requires that all PAR/daylight sensors and lighting control zones be shown on plans, and designers may not read acceptance tests before design. This prevents acceptance test failures due to an oversight.	No	No	Yes
65	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.4.3.5	Amy Droitcour	Thao Chau	4.3.5 All daylight sensor locations and associated lighting control zones shall be shown on the plans.	The acceptance test for Greenhouse Lighting Control Construction Inspection (NA7.21.1.3) requires that all PAR/daylight sensors and lighting control zones be shown on plans, and designers may not read acceptance tests before design. This prevents acceptance test failures due to an oversight.	No	No	Yes
66	Controlled Environment Horticulture	Space Conditioning Systems	NA7.21.3	Amy Droitcour	Thao Chau	~~NA7.21.3~~ NA10-Indoor Growing Space- Conditioning System Sizing	NA7 is the installation and acceptance appendix (after installation); sizing is a design-phase check. Designers and plan checkers need one consistent location for the procedure and its documentation.	No	No	Yes
67	CEH Greenhouse Envelope Comment Letter	CEH Greenhouse Envelope	NA7.21.4.1	Amy Droitcour	Thao Chau	1. Purpose and Scope This test verifies that internal greenhouse curtain systems installed as part of the compliance pathway in Section 908.1.3[120.6(h)(3)] are capable of automatic operation and respond appropriately to control inputs. This test applies to all internal greenhouse curtain systems used to comply with Section 908.1.3.2 [120.6(h)(3)B(ii)].	Incorrect cross references. Updating to restructured code references	No	No	No
68	Updates to Nonresidential Hydronic Heat Pump Requirements	Alignment with Boiler and Chiller Requirements	401.3.13.2.3	Bob Hendron	Hab Tewelde	(end of Section 401.3.13.2.3) Exception to 401.3.13.2.53: Group R occupancies.	Fix cross reference / numbering error.	No	No	No
69	Updates to Nonresidential Hydronic Heat Pump Requirements	Alignment with Boiler and Chiller Requirements	401.3.13.4	Bob Hendron	Hab Tewelde	**401.3.13.43** *[Section 140.4(k)4]* Chilled and hot water temperature reset controls. Systems with a design capacity exceeding 500,000 Btu/hr supplying chilled or heated water shall include controls that automatically reset supply water temperatures as a function of representative building loads or outside air temperature. Exception 1 to Section 401.3.13.43: Hydronic systems that use variable flow to reduce pumping energy in accordance with Section 401.3.13.1 [Section 140.4(k)1]. Exception 2 to Section 401.3.13.43: Systems serving healthcare facilities. **401.3.13.4** *[New Section]* Reserved **401.3.13.5** *[Section 140.4(k)5]* Water-cooled air conditioner and hydronic heat pump systems.	In the CASE Report, it was recommended this section 401.3.13.3 be changed to "Reserved" to avoid renumbering subsequent sections. In the Express Terms, first subsequent section was renumbered, but not the sections after that, and it appears 401.3.13.4 is omitted. The simplest fix would be making 401.3.13.4 "Reserved", or alternatively reverting the modified 401.3.13.3 back to 401.3.13.4 and making 401.3.13.3 "Reserved", or renumbering 401.3.13.5 through 401.3.13.8.	No	No	No
70	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.2	Amy Droitcour	Thao Chau	908.1.2 [Section 120.6(h)2] Indoor growing and ~~conditioned~~ greenhouse, electrical power distribution systems. Electrical power distribution systems serving CEH spaces shall ~~be designed so that a measurement device is capable of monitoring the electrical energy usage of aggregate horticultural lighting load.~~ comply with Section 601.2.6 [Section 130.5] and shall be designed so that horticultural lighting loads are separately circuited from other loads. ~~This separation enables measurement devices to monitor horticultural lighting energy use if desired.~~	Electrical power distribution should apply to all greenhouses, not just conditioned greenhouses. The "if desired" language may be inconsistently interpreted: some may interpret it as a requirement, while others may see it as a note.	No	No	Yes
71	Controlled Environment Horticulture	Space Conditioning Systems	908.1	Amy Droitcour	Thao Chau	Controlled Environment Horticulture (CEH) spaces shall comply with the applicable requirements of Sections 908.1 through 908.6 and requirements of Section 913.1. Service water-heating systems serving Indoor Growing spaces shall comply with Section 500 [Section 110.3]	Because the definition of process space was changed to include CEH Space, CEH Spaces are not automatically covered by nonresidential requirements, and those that are applicable need to be listed explicitly.	No	No	Yes
72	Controlled Environment Horticulture	Space Conditioning Systems	201	Amy Droitcour	Thao Chau	RECOVERED HEAT CAPACITY RATIO is the fraction of reheat capacity provided by recovered heat, calculated as *recovered heat capacity* divided by total *reheat capacity* . Reheat capacity can include sensible heating as well as regeneration of desiccant mediums.	The Recovered Heat Capacity Ratio definition should be added to clarify 908.1.2.	No	No	Yes
73	CEH Greenhouse Envelope Comment Letter	CEH Greenhouse Envelope	908.1.3.2.2.6	Amy Droitcour	Thao Chau	2.2.6 Field verification. Before an occupancy permit is granted for a greenhouse using the single layer glass and internal curtain system compliance pathway, the installer shall demonstrate correct installation and operation of the equipment and systems ~~shall be certified as meeting the Acceptance Requirement for Code Compliance, as specified by~~ with the test requirements in the Reference Nonresidential Appendix NA7.21.4. A and document the results on the applicable Certificate of Acceptance ~~shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements specified in NA7.21.4.~~	Proposed edits make it clear that this acceptance test is performed by a member of the instruction team and not a certified ATT.	No	No	No
74	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.3.6	Amy Droitcour	Thao Chau	3.6 Field Verification. Before an occupancy permit is granted for an indoor growing space, the installer shall demonstrate the correct installation and operation of the equipment and systems with the construction inspection in the Reference Nonresidential Appendix NA7.21.1.1 and the test requirements in the Reference Nonresidential Appendix NA7.21.1.2, and document results on the applicable Certificate of Acceptance.	While acceptance test requirements were included in the Nonresidential Appendix, they were not referenced in the code.	No	No	Yes
75	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.5.4.4	Amy Droitcour	Thao Chau	4.4 Field Verification. Before an occupancy permit is granted for a greenhouse, the installer shall demonstrate the correct installation and operation of the equipment and systems with the construction inspection in the Reference Nonresidential Appendix NA7.21.1.3 and the applicable test requirements in the Reference Nonresidential Appendix NA7.21.1.4, NA 7.21.1.5, and 7.21.1.6, and document results on the applicable Certificate of Acceptance.	While acceptance test requirements were included in the Nonresidential Appendix, they were not referenced in the code.	No	No	Yes
76	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.7	Amy Droitcour	Thao Chau	Field verification. Before an occupancy permit is granted, the installer ~~Field verification of specified control function tests~~ shall demonstrate the correct installation and operation of components, systems and system-to-system interfaces in accordance with the test requirements in Reference Nonresidential Appendix NA7.21.2 and be documented on the applicable Certificate of Acceptance. ~~The installer shall certify that diagnostic testing was performed in accordance with the applicable procedures outlined in Section 401.2.7 [Section 120.5].~~	Proposed edits make it clear that this acceptance test is performed by a member of the instruction team and not a certified ATT. The reference to 401.2.7 was indicating a certified ATT is required, which is not the intent of the measure.	No	No	No

Remark #	CASE Report / Comment Letter	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the language change affect energy saving cost or cost effectiveness?	Does the change to language affect HERS or ATT procedure?	Was this presented during a CEC-hosted workshop?
77	CEH Greenhouse Envelope Comment Letter	CEH Greenhouse Envelope	908.1.3.2.2.1	Amy Droitcour	Thao Chau	2.2.1. The internal greenhouse curtain system material shall have an air permeability not exceeding 50 L/m²·s when determined in accordance with ASTM D737 or ISO 9237 at a pressure differential of 125 Pascal. The manufacturer's ASTM D737 / ISO 9237 test report shall be shown on the construction documents. Compliance shall be demonstrated using either:	This addition clarifies how to demonstrate compliance.	No	No	No
78	CEH Greenhouse Envelope Comment Letter	CEH Greenhouse Envelope	908.1.3.2.2.2	Amy Droitcour	Thao Chau	2.2.2. The internal greenhouse curtain system shall be designed and installed to cover the primary overhead glazing area and shall be capable of deploying to cover the primary ~~overhead~~ roof glazing area serving the conditioned growing space.	Revision to improve clarity.	No	No	No
79	Controlled Environment Horticulture	Daylight Responsive Controls for Greenhouses	908.1.3.2.2.4	Amy Droitcour	Thao Chau	2.2.4. The controller shall be configured such that, following a *manual* override, the system automatically returns to *automatic* operation after no greater than 24 hours ~~a programmed time period~~.	A maximum time period or cap (as the lighting controls typically have) would make this something an acceptance test can check.	No	No	Yes
80	Controlled Environment Horticulture	Space Conditioning Systems	908.1.6.2.1	Amy Droitcour	Thao Chau	2.1. Sizing. Indoor growing space-conditioning system(s) shall be sized to meet the design heating, cooling, and dehumidification loads calculated according to Reference Nonresidential Appendix NA~~9~~7.21.3 and documented in construction documents.	Correcting cross-reference. Note that if appendix number is updated as suggested in remark 66, the cross reference will need to be updated accordingly.	No	No	Yes
81	Controlled Environment Horticulture	Space Conditioning Systems	908.4.2	Amy Droitcour	Thao Chau	**908.4.2** [Section 141.1(c)2] **Indoor Growing and Greenhouses, Building Envelope and Space-Conditioning Systems.** A greenhouse being converted to a conditioned greenhouse or additions to a conditioned greenhouse shall meet the requirements of Section 908.1.3 [Section 120.6(h)3] and Section 908.1.4 [Section 120.6(h)4]. Alterations to the envelope or to the internal greenhouse curtain system shall comply with the applicable sections of 908.1.3.	Indoor growing was added to this section, and the edit includes alterations to indoor growing and greenhouses other than converting to a conditioned greenhouse.	No	No	No
82	Energy Recovery for Traction Elevators	Traction Elevators (Additions and Alterations)	201	Sean Steffensen	Stephen Becker	Section 201 L ~~Landing. Elevator is the portion of a floor, balcony, or platform used to receive and discharge passengers or freight.~~	The land, elevator definition is not used in the current proposal. It had been proposed and not adopted in the previous Title 24 code cycle in 2025.	No	No	Yes
83	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1 Exception 4	Sean Steffensen	Danny Tam	Exception 4 to Section 801.5.2.1.1: Heating systems which are used exclusively for permanent spa applications where there is inadequate SARA as specified in Section ~~701.3.1.1~~ 701.3.2 for a solar pool heating system to be installed.	Incorrect cross reference. Update reference to Solar Area Roof Access from previous location to location shown in most recent express terms.	No	No	Yes
84	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1	Sean Steffensen	Danny Tam	Section 801.5.2.1.1 4. High efficiency gas or propane pool heater. A pool heating system with ~~a minimal~~ minimum thermal efficiency of 90 percent. Systems with multiple units can meet this requirement with an input capacity-weighted average thermal efficiency of at least 90 percent; or	"Minimal thermal efficiency of 90 percent" should be "minimum."	No	No	Yes
85	Swimming Pool and Spa Heating	Swimming Pool and Spa Heating	801.5.2.1.1	Sean Steffensen	Danny Tam	Section 801.5.2.1.1 1. Solar pool heating system. A solar pool heating system with a solar collector surface area that is equivalent to 40 percent or greater ~~than~~ of the pool and/or spa surface area as the primary heating system. The supplemental heater can be of any energy source; or	Align phrasing with 801.5.2.1.1 item 1 ("equivalent to 40 percent or greater than the pool" vs. "65 percent or greater of").	No	No	Yes
86	Data Centers Efficiency Improvements	Data Center Cx	1001.2.11.1.2	Ben Lalor	Hab Tewelde	~~1001.2.11.1.2 In addition to the requirements in Section 1001.2.3, the design review shall confirm the following:~~ ~~1. Economizers: All economizers are designed to meet economizer temperature thresholds in Section 910.2.1 at design conditions, and all economizers are designed to meet the Data Center Room Economizer definition in Section 200.3.~~ ~~2. Variable airflow control: System is designed to maintain at least 20°F airside temperature difference (delta T) at 25-100% part loads in accordance with Section 910.2.1.~~ ~~4. Variable water flow control: System is designed to maintain at least 15°F waterside temperature difference (delta T) at 25-100% part loads in accordance with Section 910.2.1.~~ ~~5. Heat recovery: System is designed to meet Data Center Heat Recovery requirements specified in Section 910.1.4. If project is utilizing Exception 3 to Section 910.2.1, system shall be designed to meet the requirements of Exception 3 to Section 910.2.1.~~	The list only restates Section 910 requirements. The design review under 1001.2.3 already has to confirm code compliance. No other measure has its own design review checklist in the commissioning section. Codifying one invites every future CASE topic to add its own.	No	No	No
87	Controlled Environment Horticulture	Horticultural Lighting Efficacy	908.1.5.1	Amy Droitcour	Thao Chau	**1. Luminaire PPE and Dimmability.** The horticultural lighting systems shall have a luminaire photosynthetic photon efficacy (PPE) of at least 2.5 µmol/J when tested at the manufacturer-designed state with the highest power consumption. Horticultural lighting shall be capable of continuous dimming between 100% and 10% of full power in response to a line voltage, low voltage, or wireless signal. ~~rated in accordance with ANSI/ASABE S640 for wavelengths from 400 to 700 nanometers and meet one of the following requirements:~~ ~~1.1. Integrated, non-serviceable luminaires shall have a rated PPE of at least 2.3 micromoles per joule; or~~ ~~1.2. Luminaires with removable or serviceable lamps shall have lamps with a rated PPE of at least 2.3 micromoles per joule.~~	Editorial: Strikethrough was left out of this section	No	No	Yes
88	N/A	Electric vehicle charging	201	Jon McHugh	Sahar Daemi	**ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)** is equipment for plug-in charging, ~~the conductors,~~ including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (*CBC*, Title 24, Part 3 ~~11~~).	Matches language in California Electric Code (Title 24, part 3) and the National Electrical Code (NFPA 70). The main subject of the EVSE definition is not the "conductors" but the "equipment" which includes the conductors and plugs but also contains all the controls that ensure power is safely transferred and is matching the desired voltage for charging the battery ensuring the correct voltage, current, and power levels are delivered. It negotiates with the vehicle to determine safe charging parameters, preventing overloads or damage to the battery and wiring and protects the user. Clarity is increased and it aligns with the definition in the primary code regulating electric vehicle charging.	No	No	No
89	Healthcare Exceptions	Shut-off and Reset Controls	Table 401.2(5)	Sean Steffensen	Haile Bucaneg	Cesarean delivery room; Delivery room; Labor/delivery/recovery (LDR) room; Labor/delivery/recovery/postpartum (LDRP) room; Lactation room; Operating room; Cystoscopy room; Patient room; Patient bedroom, behavioral room; Pediatric playroom; Post-anesthesia care unit (PACU) and recovery; Procedure room; Recreation/activity room; Seclusion room; ~~Seclusion room~~; Sterile processing room; Treatment room.	Remove duplicated word.	No	No	Yes
90	N/A	Editorial Suggestion	401.3.1	Sean Steffensen	Haile Bucaneg	2.1 Mechanical heating and mechanical cooling equipment serving hotel/motel ~~buildings~~ or ~~and~~ nonresidential use designations, ~~buildings other than~~ not including healthcare facilities shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the ~~building~~ zone, as calculated according to Section 401.3.4 [Section 140.4(b)].	Correct numbering error and mark an unmarked change.	No	No	Yes
91	N/A	Editorial Suggestion	401.3.1	Sean Steffensen	Haile Bucaneg	A use designation~~s building~~ complies with this section by being designed with and having constructed and installed a space-conditioning system that meets the applicable prescriptive requirements of Section 401.3.1 through 401.3.20.	Correct grammar error.	No	No	Yes
92	Controlled Environment Horticulture	Space Conditioning Systems	201	Amy Droitcour	Thao Chau	**INTEGRATED SPACE-CONDITIONING SYSTEM** is an HVAC and dehumidification system designed to handle both sensible and latent heat removal. These systems can use, but are not limited to, one or more heat or moisture exchange mediums, including refrigerant, chilled water, and ~~liquid~~ desiccants, to dehumidify and cool air. Integrated space-conditioning systems use recovered heat to reheat air to meet supply air setpoints and/or regenerate desiccant media.	In response to docketed comment 271531 from Ian Atkins, the CASE Team docketed comment 272957 with a recommendation to strike "liquid" from the definition to Integrated Space Conditioning System to clarify that any type of desiccant system could be used.	No	No	Yes
93	Healthcare Exceptions	Shut-off and Reset Controls	401.2.2.5.5	Sean Steffensen	Haile Bucaneg	HCAI facility spaces included in Table 401.2 (5) or Section ~~401.2.1.2.4.4 [Section 120.1(d)5]~~ 401.2.1.2.3.4 [New Section] shall have controls to turn down airflow where permitted. Space-conditioning and ventilation systems shall have controls that:	Cross reference is to a type R occupancy.	No	No	Yes
94	Healthcare Exceptions	Shut-off and Reset Controls	401.2.2.5.5.1	Sean Steffensen	Haile Bucaneg	Reset zone or terminal supply airflow to no less than the minimum allowed for that space as stated in Table 4-A of the California Mechanical Code or Section ~~401.2.1.2.4.4 [Section 120.1(d)5]~~ 401.2.1.2.3.4 [New Section], based on occupied and unoccupied status. Where a zone or system serves multiple spaces, airflow shall not be reduced below the largest applicable minimum airflow rate allowed for any space served.	Cross reference is to a type R occupancy.	No	No	Yes

Remark #	CASE Report / Comment Letter	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the language change affect energy saving cost or cost effectiveness?	Does the change to language affect HERS or ATT procedure?	Was this presented during a CEC-hosted workshop?
95	Indoor Lighting Power Density	Indoor Lighting Power Density	Table 601.3-(3)	Jon McHugh	Sahar Daemi	See appendix for marked up Table 601.3-(3) and accompanying footnotes.	Cross reference error; superscripted letters by primary function areas or additional qualified lighting systems do not correspond to letters in footnotes to table 601.3-(3). A paragraph mark was missing before *"c. Lighting power controlled by astronomical timeclock.."* and that reset all the following letters in the lettered list. After inserting item c most footnotes would correctly correspond. Because the table is completely new (and underlined) no need to have stricken prior footnote letters. These were removed so it is easier to see which footnote is proposed. For the few incorrect footnotes, these are shown with strikeouts and replaced with underlined footnote in red font.	No	No	Yes
96	Controlled Environment Horticulture	Space Conditioning Systems	400.5.1 Table 400.5(1)	Amy Droitcour	Haile Bucaneg	See appendix for marked up Table 400.5(1) [Table 110.2(A)].	Tables need to be updated to reflect DOE updates.	No	No	No
97	Controlled Environment Horticulture	Space Conditioning Systems	400.5.1 Table 400.5(2)	Amy Droitcour	Haile Bucaneg	See appendix for marked up Table 400.5(2) [Table 110.2(B)].	Tables need to be updated to reflect DOE updates.	No	No	No
98	N/A	Editorial Suggestion	401.3.1	Sean Steffensen	Haile Bucaneg	~~3.~~2.Mechanical heating and mechanical cooling equipment serving healthcare facilities shall be sized to meet the design heating and cooling loads as calculated according to Section 401.3.4 [Section 140.4(b)].	Correct number error.	No	No	Yes
99	Controlled Environment Horticulture	Space Conditioning Systems	NA7.21.3.4	Amy Droitcour	Thao Chau	5. Reheat and Heat Recovery 5.1 ~~4.6.~~ Reheat Capacity is the rate of energy required to reheat the supply airstream following dehumidification to maintain the desired room air conditions at the four specified operating conditions.. 5.2 ~~4.7.~~ Recovered Heat Capacity is the rate of energy recovered from the system using any of a variety of means to be utilized for reheat of the supply (load side) air stream. ~~and Integrated systems must use recovered heat to meet at least 90% of the reheat load.~~ 5.3 The recovered heat capacity ratio is calculated as the total recovered heat capacity of all equipment in the system divided by the total reheat capacity. 5.4 All systems must have a recoverd heat capacity ratio of at least 0.9.	The recommended change to 908.1.6.2.3, due to stakeholder input, requires this update to the load calculation and sizing appendix.	No	No	Yes
100	Controlled Environment Horticulture	Space Conditioning Systems	201	Amy Droitcour	Thao Chau	REHEAT CAPACITY is the amount of energy introduced into the airstream, downstream of the cooling and dehumidification equipment ~~coil~~, for the purposes of meeting the required air supply temperature setpoints.	This definition is changed to be inclusive of systems that do not use a coil for dehumidification.	No	No	Yes
101	Controlled Environment Horticulture	Space Conditioning Systems	201	Amy Droitcour	Haile Bucaneg	AHRI 1340 is the Air-Conditioning, Heating, and Refrigeration Institute document titled "Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment," 2024 (AHRI Standard 1340-(I-P)-2024). AHRI 1365 is the Air-Conditioning, Heating, and Refrigeration Institute document titled " Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Condensing Units," 2024 (AHRI Standard 1365 (I-P)-2024). COEFFICIENT OF PERFORMANCE (COP and COP2), HEATING is the ratio of the rate of net heat output to the rate of total energy input, calculated under designated operating conditions and expressed in consistent units, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 400.5 [Section 110.2]. ENERGY EFFICIENCY RATIO (EER and EER2) is the ratio of net cooling capacity (in Btu/hr) to total rate of electrical energy input (in watts), of a cooling system under designated operating conditions, as determined using the applicable test method in the Appliance Efficiency Regulations or Section 400.5 [Section 110.2]. Integrated Ventilation, Economizing, and Cooling Efficiency (IVEC) is the total annual cooling capacity divided by total annual energy including mechanical cooling, economizer, cooling mode ventilation fan energy and off mode control energy and crankcase heat energy for an average building and average climate zone and expressed in Btu/Wh (W/W). Integrated Ventilation and Heating Efficiency (IVHE) is the Total annual heating capacity for a heat pump including vapor compression heating capacity and auxiliary heating capacity divided by total heating model energy including mechanical vapor compression heating, auxiliary heat energy, heating mode ventilation fan energy and heating mode control power, and crankcase heat power and expressed in Btu/Wh (W/W).	Updates to Table 400.5(1) and 400.5(2) require these updates to definitions.	No	No	No
102	Ceiling Fans Comment Letter	Large Diameter Ceiling Fans	400.5.7	John Bade	Haile Bucaneg	400.5.7 [New Section] Large-diameter ceiling fans manufactured on or after January 21, 2020, shall be tested to Appendix U to 10 CFR Part 430, and shall have a Ceiling Fan Energy Index (CFEI) greater than or equal to: 1. 1.00 at high speed; and 2. 1.31 at 40 percent speed or the nearest speed that is not less than 40 percent speed. Exception 1 to 400.5.7 : Hotel/motel buildings and nonresidential buildings with Group R occupancies. Exception 2 to 400.5.7: Non-horizontal ceiling fans, centrifugal ceiling fans, belt-driven ceiling fans, oscillating ceiling fans, and highly-decorative ceiling fans.	Although ceiling fans are federally regulated, the federal government has not been enforcing the rules. There are many ceiling fans on the market that do not meet federal minimums or do not even claim an efficiency. California generally does not list federal efficiencies, but the Statewide CASE Team recommends adding them and requiring the efficiency to be reported on compliance forms. This recommendation was included in the Large Diameter Ceiling Fans Comment Letter in docketed comment 271539.	No	No	No
103	Ceiling Fans Comment Letter	Large Diameter Ceiling Fans	201	John Bade	Haile Bucaneg	BELT-DRIVEN CEILING FAN is a ceiling fan with a series of one or more fan heads, each driven by a belt connected to one or more motors that are located outside of the fan head. CEILING FAN ENERGY INDEX (CFEI) is the ratio of the electric input power of a reference ceiling fan to the electric input power of the actual ceiling fan as calculated per AMCA 208 with the following modifications to the calculations for the reference fan: using an airflow constant (Q0) of 26,500 cfm, a pressure constant (P0) of 0.002700 in. of water, and a fan efficiency constant (n0) of 42%. CENTRIFUGAL CEILING FAN is a ceiling fan for which the primary airflow direction is in the same plane as the rotation of the fan blades. HIGHLY-DECORATIVE CEILING FAN is a ceiling fan with a maximum represented value of blade revolutions per minute (RPM) of 90 RPM, and a represented value of airflow at high speed of less than 1,840 CFM. LARGE-DIAMETER CEILING FAN is a ceiling fan that is not a highly-decorative ceiling fan or belt-driven ceiling fan and has a represented value of blade span, greater than seven feet. NON-HORIZONTAL CEILING FAN is a ceiling fan where the plane of rotation of the ceiling fan's blades is not less than or equal to 45 degrees from horizontal, or cannot be adjusted based on the manufacturer's specifications to be less than or equal to 45 degrees from horizontal; OSCILLATING CEILING FAN is a ceiling fan containing one or more fan heads for which the axis of rotation of the fan blades cannot remain in a fixed position relative to the ceiling. Such fans have no inherent means by which to disable the oscillating function separate from the fan blade rotation.	These definitions are required for the recommended added language in 400.5.7.	No	No	No

Remark #	CASE Report / Comment Letter	CASE Measure	Section(s) of Code	Person Making Recommendation	CEC Staff Lead	Language Markup (deletions marked with red ~~strikethroughs~~; additions marked with red underlining)	Justification	Does the language change affect energy saving cost or cost effectiveness?	Does the change to language affect HERS or ATT procedure?	Was this presented during a CEC-hosted workshop?
104	Healthcare Exceptions	Space Conditioning Zone Controls	201	Bryan Boyce	Haile Bucaneg	Zone, Mixed Requirement, is a group of two or more spaces within a building with sufficiently similar comfort requirements but refer to different ventilation codes or standards	The intent of the "Zone, Mixed Requirement" defined term was to clearly delineate the spaces governed by the California Mechanical Code versus spaces governed by Title 24, Part 6 when aggregated into a single zone. This arrangement, an exam room and an office for example served by a single VAV box, is very commonly found in healthcare. Designers have indicated it is challenging to properly account for serving these spaces that have differing requirements when it comes to setbacks and shutoff. The intent is to ensure that the more stringent of the clinical or non-clinical space requirements are maintained. For example, if the office is expected to shutoff air flow when unoccupied while the exam room must maintain a minimum flow when unoccupied, then the office flow cannot be shutoff. The code language needs to make this clear. The modification proposed by CEC may still achieve this intent, however it is potentially less clear in what is an often-confusing design task. The Statewide CASE Team understands CEC's preference to avoid defining a term and then using it only once in the code, but if there is another way to make sure this nuance is clearly communicated in the code, we would appreciate that. Perhaps this can be dealt with in the compliance manual as a backup option.	No	No	No
105	Indoor Lighting Power Density	Indoor Lighting Power Density	Table 601.3-(3) Footnotes	Jon McHugh	Sahar Daemi	Footnotes to TABLE 601.3-(3) [TABLE 140.6-C] are listed below: … c. Lighting power controlled by astronomical time clock or other control to shut off lighting at night. For aging eye/low vision lobbies: additional allowance only applies to area within 30 feet of an exit and not applicable to lighting in daylit zones.. … ~~g~~ h. Parking Garage *Daylight Adaptation Zones* shall be no longer than 66 feet from the entrance to the parking garage. For parking garages: additional allowance for Transition lighting OFF at night only applicable to *Daylight Adaptation Zones* with lighting power controlled by astronomical time clock or other control to shut off lighting at night in accordance with Section 601.2.2.7 for Parking Garage *Daylight Adaptation Zone* lighting controls.	Deleted paragraph mark inadvertently removed item "c" and renumbered following paragraph letters. For parking garage daylight adaptation zones, highlighted that the additional lighting power allowance was for "Transition Lighting OFF at night" and additionally highlighted the link to the controls requirement for this lighting system in Section 601.2.2.7. The additional lighting power allowance is contingent on installing the additional controls	No	No	Yes
106	N/A	Editorial Suggestion	201	Randall Higa	Payam Bozorgchami	ASHRAE HANDBOOK, FUNDAMENTALS VOLUME is the American Society of Heating, Refrigerating and Air-Conditioning Engineers document titled "ASHRAE Handbook: Fundamentals" (I-P) (2021~~17~~).	The definitions should reference a more recent version of the ASHRAE Handbook. This mark-up suggests updating to the 2021 version to be cautious about what is allowed per AB 130, but there is a 2025 version of the handbook available.	No	No	No
107	N/A	Editorial Suggestion	401.3.3.	Randall Higa	Payam Bozorgchami	1.1. Outdoor design conditions shall be selected from Reference Joint Appendix JA2, which is based on data from the ASHRAE Climatic Data for Region X ~~or the ASHRAE Handbook, Fundamentals Volume~~. 1.2. Heating design temperatures shall be no lower than the ~~99.0 percent Heating Dry-Bulb or the~~ Heating Winter Median of Extremes values.	Section 401.3.4.3 Outdoor design conditions, paragraph 1.1 should delete references to the ASHRAE Handbook of Fundamentals and paragraph 1.2 should delete the reference to 99.0 percent heating dry bulb values.	No	No	No

Appendix: Additional Markup Language

Substantive Recommendations

Remark #21

910.4.2 *[New Section]* **Computer Room or Data Center Economizers – All other nonresidential buildings.**

Each individual cooling system primarily serving *computer rooms* with ITE load greater than 20 W/ft^2 or *data centers* in an existing building shall meet the requirements of Section 910.2.2.

EXCEPTION 1 to Section 910.4.2: Individual *computer rooms* or *data centers* with an ITE design load under 10 tons (35 kW) in a building that does not have any economizers or modulating DOAS.

EXCEPTION 2 to Section 910.4.2: New cooling systems serving an existing data center where:

1. Total capacity of the new cooling system is less than 500 tons and less than 50% of the total data center cooling system capacity, and

2. The new cooling system includes an integrated data center economizer capable of providing 100 percent of the design cooling load at 75°F supply air temperature at the following outside air conditions:

TABLE 910.4-(1) Exception 2 Data Center Economizer Outdoor Thresholds

Original Permit Date of Existing Computer Room	Outdoor Dry-Bulb	Outdoor Wet-Bulb
1/1/2014 – 12/31/2022	55°F	35°F
1/1/2023 – 12/31/2028	65F	45F

Remark #27

905.4 – Additions and alterations to existing ~~buildings~~ compressed air systems and compressed air system components.
All additions or alterations of compressed air systems including replacement of compressed air system components where the total combined horsepower (hp) of the compressor(s) is 25 hp or more in existing buildings that will be nonresidential, hotel/motel, or multifamily occupancies shall comply with the applicable requirements of Section 905.1.

Alterations to compressed air systems in existing buildings shall comply with the requirements of Sections 905.4.1 through 905.4.4, as determined by the scope of the alteration.

905.4.1 [New section] Alterations to air compressors. For alterations to existing compressor systems where air compressors are added or replaced, all added or replaced compressors shall meet the requirements of Section 905.1.1, Section 905.1.2, and Section 905.1.3.

…

EXCEPTION 4 to Section 905.4.1: Alterations that have been approved by the Energy Commission Executive Director as having demonstrated that the system serves loads for which typical air demand fluctuates less than 10 percent do not need to comply with trim compressor and storage requirements in section 905.1.1.

EXCEPTION 5 to Section 905.4.1: Alterations where all added or replaced compressors have less than a combined 100 hp in air compressor capacity do not need to comply with controls requirements in section 905.1.2, monitoring requirements in section 905.1.3, or applicable portions of NA7.13.

905.4.2 [New section] Alterations to compressed air piping. For alterations with added or replaced compressed air piping greater than 50 adjoining feet in length, all added or replaced piping shall meet the requirements of Section 905.1.4, Section 905.1.5, and applicable portions of NA7.13.

905.4.3. [New section] Alterations to compressed air dryers. For alterations with added or replaced compressed air dryers, all newly installed compressed air dryers shall meet the requirements of 905.1.6 and applicable portions of NA7.13.3.1.

Remark #34

NA 7.5.12 Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units.

NA7.5.12.1 Construction Inspection for Air Handling Units

Prior to Functional Testing, verify and document the following:

a) Verify on the submittal documents or sensor specifications that locally installed supply air, outside air, and return air (if applicable) temperature sensors have an accuracy of ±2ºF over the range of 40ºF to 80ºF.

b) Verify there is an FDD system, and document the FDD system has the capability of displaying the following:

1. HVAC system schedule

2. Zone temperature sensors

3. AHU temperature sensors

4. AHU heating and cooling valve commands

5. Building HVAC control fan motor command and status

NA7.5.12.3 Functional Testing for Air Handling Unit Schedule and Overrides

a) HVAC operating outside of schedule:

Step 1: Schedule the HVAC system to be scheduled as unoccupied

Step 2: Override the AHU to be operating at 100%

Step 3: Verify the FDD system displays the fault information and provides a recommended corrective action

Step 4: Return the system to normal operations

Step 5: FDD system indicates normal operation

Fan command override:

Step 1: Verify the FDD system indicates normal operation

Step 2: Override the fan to be operating at 100%

Step 3: Verify the FDD system displays the fault information and provides a recommended corrective action

Step 4: Return the fan command to automated through the sequence of operations

Step 6: FDD system indicates normal operation

NA7.5.12.43 Functional Testing for Air Handling Unit Valves

Testing shall be performed on each cooling “and” heating valve in the system that is monitored by the FDD.

d) Leaking or inoperable cooling coil valves:

Step 1: Verify the FDD system indicates normal operation

Step 2: Command the cooling coil valve be fully closed

Step 3: Physically lower the temperature being read by the sensor after the cooling coil by at least five degrees

Step 4: Verify the FDD system displays the fault information and provides a recommended corrective action

Step 5: Return the temperature sensor to normal operations

Step 6: FDD system indicates normal operation

e) Leaking or inoperable heating coil valves:

Step 1: Verify the FDD system indicates normal operation

Step 2: Command the heating coil valve be fully closed

Step 3: Physically raise the temperature being read by the sensor after the heating coil by at least five degrees

Step 4: Verify the FDD system displays the fault information and provides a recommended corrective action

Step 5: Return the temperature sensor to normal operations

Step 6: FDD system indicates normal operation

NA7.5.12.5~~3~~4 Functional Testing for Zone Terminal Units

Testing shall be performed on one of each type of terminal unit (VAV box) in the project. A minimum of 5 percent of the terminal boxes shall be tested.

g) Zone temperature sensor:

Step 1: Verify the FDD system indicates normal operation

Step 2: Disconnect the zone temperature sensor from the control system

Step 3: Verify the FDD system displays the fault information and provides a recommended corrective action

Step 4: Return the terminal unit controls back to automated through the sequence of operations

Step 5: FDD system indicates normal operation

Remark #40

NA7.6.1.4 Continuous Dimming Control Systems Functional Testing

(c) Full Daylight Test. Simulate or provide bright conditions where the daylight illuminance is greater than 150 percent of the reference illuminance (measured during the No Daylight Test). Alternatively, provide simulated bright conditions by shining a bright light into the daylight sensor. Verify and document the following:

1. The controlled lighting power reduction is at least 90 percent under fully dimmed conditions for non-parking garage locations. For parking garages, the controlled lighting power reduction is 100 percent under fully dimmed conditions.
2. Only luminaires in daylit zones are affected by daylight control. If the daylighting control system controls luminaires outside of the daylight zones including those behind obstructions, the control system is not compliant.
3. If a Power Adjustment Factor (PAF) is claimed for daylight continuous dimming plus off controls in accordance with Section 601.3.1.1.2(8) ~~in accordance with Section 140.6(a)2H~~; a compliant system shall automatically turn off the luminaires in order to pass the Full Daylight Test for daylight continuous dimming plus off controls. This portion of the Full Daylight Test does not apply to lighting systems that are not claiming a PAF for daylight continuous dimming plus off controls.

(d)Partial Daylight Test. ~~Simulate or provide daylight conditions where~~ Conduct test when illuminance provided only by daylight ~~only~~ at the Reference Location is between 60 and 95 percent of Reference Illuminance measured during the No Daylight Test. Interior daylight can be increased by opening blinds or conducting test when outdoor daylight incident on fenestration is greater. Interior daylight can be decreased by closing blinds or adding obstructions to fenestration or conducting test when daylight on incident on fenestration is less. Verify and document all of the following:

1. Turn off electric lighting and measure the Partial Daylight Illuminance at the Reference Location. (Turn the electric lighting back on before proceeding to next step.)
2. Calculate and document Ratio of Partial Daylight Illuminance divided by Reference Illuminance.
   - 2(a). If the calculated ratio is between 60 percent and 95 percent proceed to step 3.
   - 2(b). If the calculated ratio is outside of this range, make adjustments to transmittance of fenestration or under different daylight conditions and take new measurements. Alternatively, document compliance with the Alternate Partial Daylight Test in subsection (e).
3. With controlled lighting on measure at the Reference Location the combined illuminance of daylight and electric lighting, PDCI, (Partial Daylight Combined Illuminance). Document PDCI.

4. Calculate Partial Daylight Combined Illuminance Maximum ($PDCI_{max}$). $PDCI_{max}$ = Reference Illuminance (from the No Daylight Test) + 0.40 x Daylight Illuminance (from Step 1)
5. Verify and document that Partial Daylight Combined Illuminance Maximum (PDCI) complies with 5(a) and 5(b)
   5(a). PDCI ≥ Reference Illuminance
   5(b). PDCI ≤ $PDCI_{max}$

~~1. Measure that the combined daylight and controlled electric lighting illuminance at the Reference Location is no less than the reference illuminance measured at this location during the No Daylight Test.~~
~~2. Verify that the combined daylight and controlled electric lighting illuminance at the Reference Location is no greater than 150 percent of the reference illuminance.~~

~~3~~ 6. Light output is stable with no visible flicker.
7. Only luminaires in daylit zones are affected by daylight control.

~~(Note: only luminaires in daylit zones are affected by daylight control)~~

(e)Alternate Partial Daylight Test. ~~When~~ Conduct test when outdoor horizontal illuminance is at least 4,000 fc and where illuminance from daylight only at the Reference Location (Partial Daylight Illuminance) is no greater than 80 percent of Reference Illuminance measured at this location during the No Daylight Test. This test shall be conducted with the transmittance of daylighting system maximized by opening blinds and only reduced if ratio of partial daylight illuminance to the reference illuminance is greater than 80 percent. Measure the outdoor horizontal illuminance level and the daylight illuminance level, and do not proceed until all the ~~illuminance~~ following criteria are met.

Verify and document the following:

1. Record data and time and measure outdoor horizontal illuminance in full daylight unshaded by buildings and other objects.
   1(a). Proceed to Step 2 if measured outdoor horizontal illuminance ≥ 4,000 footcandles (fc).
   1(b). If exterior illuminance decreases during test period, retake outdoor illuminance measurements to confirm following steps are valid.

~~1~~2. ~~Measure~~ Turn off electric lighting and measure the Partial Daylight Illuminance at the Reference Location. ~~This can be measured by turning the electric lighting off~~. (Turn the electric lighting back on before proceeding to next step.)

3. Calculate and document Ratio of Partial Daylight Illuminance divided by Reference Illuminance.
   3(a). If this calculated ratio is no greater than 80 percent proceed to step 4.
   3b). If the calculated ratio is greater than 80 percent make adjustments to transmittance of fenestration or conduct the test under different but qualifying daylight conditions. Alternatively, document compliance with the Partial Daylight Test in subsection (d).

4. With controlled lighting on, measure at the Reference Location, the combined illuminance of daylight and electric lighting, PDCI, (Partial Daylight Combined Illuminance). Document PDCI.
5. Calculate Partial Daylight Combined Illuminance Maximum (PDCImax). PDCImax = Reference Illuminance (from the No Daylight Test) + 0.40 x Daylight Illuminance (from Step 2)
6. Verify and document that Partial Daylight Combined Illuminance Maximum (PDCI) complies with 6(a) and 6(b)
   6(a). PDCI ≥ Reference Illuminance
   6(b). PDCI ≤ $PDCI_{max}$

~~2. Measure the combined daylight and controlled electric lighting at the Reference Location.~~
~~3. This alternate partial daylight test is passed if the measured illuminance value (from Step 2) is no less than the Reference Illuminance measured at this location during the no daylight test and no greater than Partial Daylight Combined Illuminance Maximum (PDCIM).~~
~~In other words, the measured value must be within the following range in order to pass this test.~~
~~Reference Illuminance (from the no daylight test) ≤ measured illuminance value (from Step 2) ≤ PDCIM,~~
~~where PDCIM = Reference Illuminance (from the no daylight test) + 0.40 x Daylight Illuminance (from Step 1).~~

~~4~~ 7 . Light output is stable with no visible flicker.
~~5~~ 8. Only luminaires in daylit zones are affected by daylight control.

Non-Substantive Recommandations

Remark #3

TABLE 401.2(6~~5~~) [NEW TABLE] HVAC FDD APPLICATIONS AND QUALIFICATIONS

BUILDING STATUS	APPLICATIONS	QUALIFICATIONS
Newly constructed buildings with 100,000 ft2 of conditioned floor area or larger	Air-handling system and all zones served by the system	Individual systems supplying more than three zones with design heating or cooling capacity of 300 kBtu/h and larger
Additions or alterations in buildings with 100,000 ft2 of conditioned floor area or larger	Zone terminal unit such as a VAV box	Where existing zones served by the same air-handling systems have FDD
Additions or alterations where additions, alterations, and replacements of space conditioning system serve a total combined floor area of 100,000 ft2 or larger	New or replacement air-handling units and new zones served by the system	Individual air handling units with design heating or cooling capacity of 300 kBtu/h and larger, and supply more than three zones, and more than 75% of zones are new

Remark #13

501.3.5 [New section] Split heat pump water heating systems with recirculation.
Split heat pump water heating system with recirculation shall meet the applicable requirements below:
1. In all heat pump operating modes, the heat pump water heater compressor cut-off ambient air temperature shall be less than or equal to 23°F.
2. Manufacturer, design, installation and startup documentation shall be provided in accordance with JA14.3, JA14.4, and JA14.5.
3. It shall meet the additional requirements of 501.3.5.1, 501.3.5.2, or 501.3.5.3 below:
~~Exception to Section 501.3.5: Buildings with Group R occupancies.~~

501.3.5.1 Return to Primary Configuration
Installation shall be Return to Primary configuration following ~~follow~~ the manufacturer's design and installation requirements and:
1. The primary heat pump water heater (HPWH) shall be a single-pass HPWH.
2. ~~The recirculation system hot water return shall directly connect to the primary heat pump storage tanks.~~ For parallel primary storage tanks, the cold water inlet and recirculation system hot water return inlet shall be balanced to all tanks following JA14.7.
~~3. In all heat pump operating modes, the maximum HPWH compressor cut-off ambient air temperature shall be less than or equal to 23°F.~~
~~4. Manufacturer, design, installation and startup documentation shall be provided in accordance with Reference Joint Appendix JA14.3, JA14.4, and JA14.5.~~

501.3.5.2 Temperature maintenance heater in series configuration
Installation shall follow NEEA Advanced Water Heater Specification for commercial HPWH Tier 3 or higher, and the system shall meet the following requirements:
1. The primary heat pump ~~storage tank~~ temperature setpoint shall be at least 135°F.
2. The temperature maintenance ~~tank~~ heater temperature setpoint shall be at least 10°F lower than the primary heat pump ~~storage tank~~ temperature setpoint.
3. The fuel source for the temperature maintenance ~~tank~~ heater shall be electricity.

501.3.5.3 Temperature maintenance heater in parallel configuration
Installation shall follow NEEA Advanced Water Heater Specification for commercial HPWH Tier 3 or higher, where electric heat pump water heater shall be the heat source.
Exception to Section 501.3.5: Buildings with Group R occupancies.

Remark #33

(CONTINUED): TABLE 401.2-~~A~~(1) [TABLE 120.1-A]– MINIMUM VENTILATION RATES

~~CO~~OCCUPANCY CATEGORY *MISCELLANEOUS SPACES*	MINIMUM OCCUPANT LOAD DENSITY (PERSONS / 1000 FT^2)	AREA-BASED MINIMUM VENTILATION R_A (CFM/FT^2)	AIR CLASS	NOTES
Bank vaults/safe deposit	5	0.15	2	F

Banks or bank lobbies	5	0.15	1	F
~~Computer (not printing)~~ *Information technology equipment facilities* (occupiable)	5	0.15	1	F
Controlled Environment Horticulture spaces with *Carbon Dioxide Enrichment*	0	0	2	~~I~~ G
Controlled Environment Horticulture spaces without *Carbon Dioxide Enrichment*	5	0.15	2	-
Freezer and *refrigerated spaces* (<50°F)	0	*0*	2	E
General manufacturing (excludes heavy industrial and *process* using chemicals)	5	0.15	3	
Pharmacy (prep. Area)	5	0.15	2	-
Photo studios	5	0.15	1	-
Shipping/receiving	2	0.15	2	B
Sorting, packing, light assembly	2	0.15	2	-
Telephone closets	5	0.15	1	-
Transportation waiting	33	0.15	1	F
Warehouses	1	0.15	2	B
All others	5	0.15	2	-

Remark #95

Note: Only rows with changes have been included.

TABLE 601.3(3) [TABLE 140.6-C] AREA CATEGORY METHOD—LIGHTING POWER DENSITY VALUES (WATTS/FT²) FOR NONRESIDENTIAL USE DESIGNATIONS EXCLUDING GROUP R OCCUPANCIES

~~*TABLE 601.3(3) [TABLE 140.6-C] AREA CATEGORY METHOD—LIGHTING POWER DENSITY VALUES (WATTS/FT²) FOR NONRESIDENTIAL BUILDINGS* EXCLUDING GROUP R OCCUPANCIES~~

PRIMARY FUNCTION AREA	**BASELINE LPD ALLOWANCE (W/SF)**	**ADDITIONAL QUALIFIED *LIGHTING* SYSTEM 1**	**ADDITIONAL ALLOWANCE 1 (W/FT2 UNLESS OTHER UNITS)**	**ADDITIONAL QUALIFIED *LIGHTING* SYSTEM 2**	**ADDITIONAL ALLOWANCE 2 (W/FT2 UNLESS OTHER UNITS)**
…					
Healthcare: Nurse's Station	0.75	Detailed Task [b d]	0.20	Tunable white or dim-to-warm[b]	0.10
Retail: Fitting Room	0.50	Exterior Illuminated Mirror [i]	40 W/mirror	Internally Illuminated Mirror [~~d~~ j]	120 W/mirror
Unleased tenant area [k l]	0.40	N/A	N/A	NA	NA
…					

Footnotes to TABLE 601.3-(3) [TABLE 140.6-C] are listed below:

a. Aging Eye/Low-vision areas can be documented as being designed to comply with the light levels in ANSI/IES RP-28 and are or will be licensed by local or state authorities for either senior long-term care, adult day care, senior support, and/or people with special visual needs.

b. Tunable white luminaires capable of color change greater than or equal to 2000K CCT, or dim-to-warm luminaires capable of color change greater than or equal to 500K CCT, connected to controls that allow color changing of the luminaires. Transition lighting OFF at night.

c. Lighting power controlled by astronomical time clock or other control to shut off lighting at night. For aging eye/low vision lobbies: additional allowance only applies to area within 30 feet of an exit and not applicable to lighting in daylit zones..

~~c~~ d. Detailed task work—Lighting provides high level of visual acuity required for activities with close attention to small elements and/or extreme close-up work.

~~d~~ e Specialized task work—Lighting provides for small-scale, cognitive or fast performance visual tasks; lighting required for operating specialized equipment associated with pharmaceutical/laboratorial activities.

~~e~~ f. Precision specialized work—Lighting for work performed within a commercial or industrial environment that entails working with low contrast, finely detailed, or fast-moving objects.

~~f~~ g. White board or chalk board.—Directional lighting dedicated to a white board or chalk board.

~~g~~ h. Parking Garage *Daylight Adaptation Zones* shall be no longer than 66 feet from the entrance to the parking garage. For parking garages: additional allowance for Transition lighting OFF at night only applicable to *Daylight Adaptation Zones* with *lighting* power controlled by astronomical time clock or other control to shut off *lighting* at night in accordance with Section 601.2.2.7 for Parking Garage Daylight Adaptation Zone lighting controls.

~~h~~ i. Illuminated mirrors. — Lighting shall be dedicated to the mirror.

~~i~~ j. Portable lighting in office areas includes under shelf or furniture-mounted supplemental task lighting qualifies when controlled by a time clock or an occupancy sensor.

~~j~~ k. Class I Facility is used for competition play for 5000 or more spectators.

Class II Facility is used for competition play for up to 5000 spectators.

Class III Facility is used for competition play for up to 2000 spectators.

Class IV Facility is normally used for recreational play and there is limited or no provision for spectators.

~~k.~~ l. Unleased tenant areas in which a tenant has not been identified. See section 601.3.1.3.2.1(2).

~~l.~~ m. The additional videoconferencing lighting power shall be allowed provided the videoconferencing studio meets all the requirements of Section 601.3.1.3.3 [Section 140.6(c)2Gvii].

Remark #96

TABLE 400.5-~~A~~(1) [TABLE 110.2-A] AIR CONDITIONERS AND CONDENSING UNITS

Note to reviewers: The water-cooled rows remain unchanged and are not shown here. The ASHRAE 2025 water-source rows have been updated to reflect the use of AHRI 1340, but DOE has not made a rulemaking to update them.

EQUIPMENT TYPE	SIZE CATEGORY	EFFICIENCY[c]	TEST PROCEDURE[b]
Air Cconditioners, air cooled both *split system* and single package	≥ 65,000 Btu/h and < 135,000 Btu/h	11.2 EER[a] Federal Minimum IEER[e] before 1/1/2029 10.6 EER2[a] Federal Minimum IVEC on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Cconditioners, air cooled both *split system* and single package	≥ 135,000 Btu/h and < 240,000 Btu/h	11.0 EER[a] Federal Minimum IEER[e] before 1/1/2029 10.2 EER2[a] Federal Minimum IVEC on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air eConditioners, air cooled both *split system* and single package	≥ 240,000 Btu/h and < 760,000 Btu/h	10.0 EER[a] Federal Minimum IEER[e] before 1/1/2029 9.2 EER2[a] Federal Minimum IVEC on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Cconditioners, air cooled both *split system* and single package with no furnace or electric furnace	≥ 760,000 Btu/h	9.7 EER[e] 12.5 IE IEER[e] before 1/1/2029 8.9 EER2[a] *11.7* IVEC on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029

Air Conditioners, air cooled both *split system* and single package with all other types of heating	≥ 760,000 Btu/h	9.5 EER 12.3 IE IEER before 1/1/2029 8.7 EER2 11.0 IVEC on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Condensing Uunits, air cooled	≥ 135,000 Btu/h and <240,000 Btu/h	10.5 EER Federal Minimum IEER before 1/1/2029 10.2 EER2 Federal Minimum IVEC on or after 1/1/2029	*AHRI 365* before 1/1/2029 *AHRI 1365* on or after 1/1/2029
Condensing Units, air cooled	≥ 240,000 Btu/h and <760,000 Btu/h	10.5 EER Federal Minimum IEER before 1/1/2029 9.2 EER2 Federal Minimum IVEC on or after 1/1/2029	*AHRI 365* before 1/1/2029 *AHRI 1365* on or after 1/1/2029
Condensing Units, air cooled	≥ 760,000 Btu/h	10.5 EER Federal Minimum IEER before 1/1/2029 8.9 EER2 Federal Minimum IVEC on or after 1/1/2029	*AHRI 365* before 1/1/2029 *AHRI 1365* on or after 1/1/2029

Footnotes to Table 400.5 ~~A~~(1) *[Table 110.2-A]*:
a. Where an *EER* or *IEER* has a numeric value, rather than federal minimum, ~~D~~deduct 0.2 from the required *EERs* and *IEERs* for units with a heating section other than electric resistance heat.
b. Applicable test procedure and reference year are provided under the definitions.
c. Dates shown in the table are the date of manufacture of the equipment.

Remark #97

TABLE 400.5 ~~B~~(2) [TABLE 110.2-B] HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS

Note: The water-source rows remain unchanged and are not shown here. The ASHRAE 2025 water-source rows have been updated to reflect the use of AHRI 600, but DOE has not made a rulemaking to update them.

EQUIPMENT TYPE	SIZE CATEGORY	RATING CONDITION[c,d,e]	EFFICIENCY[a,f]	TEST PROCEDURE[b]
Air ~~Cooled Cooled~~Source (Cooling Mode), both *split system* and single package	≥ 65,000 Btu/h and < 135,000 Btu/h		11.0 *EER* Federal Minimum *IEER* before 1/1/2029 *11.3 EER2* Federal Minimum *IVEC* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Cooling Mode), both *split system* and single package	≥ 135,000 Btu/h and < 240,000 Btu/h		10.6 *EER* Federal Minimum *IEER* before 1/1/2029 *9.9 EER2* Federal Minimum *IVEC* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Cooling Mode), both *split system* and single package	≥ 240,000 Btu/h and <760,000 Btu/h		9.5 *EER* Federal Minimum *IEER* before 1/1/2029 *8.8 EER2* Federal Minimum *IVEC* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Source (cooling mode) both *split system* and single package with no furnace or electric furnace	≥ 760,000 Btu/h		9.5 EER 12.5 IEER before 1/1/2029 8.8 *EER2*[a] *11.7 IVEC* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Source (cooling mode) both *split system* and single package with all other types of heating	≥ 760,000 Btu/h		9.3 EER 10.4 IE IEER before 1/1/2029 8.6 *EER2* 11.7 *IVEC* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Heating Mode) *Split S~~s~~ystem* and ~~s~~Single P~~p~~ackage	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	47° F ~~db~~DB/43° F ~~wb~~ WB *outdoor air*	Federal Minimum *COP* before 1/1/2029 Federal Minimum *IVHE* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Heating Mode) *Split S~~s~~ystem* and	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	17° FDB ~~db~~/15° F ~~wb~~ WB *outdoor air*	2.25 *COP* before 1/1/2029 2.20 *COP2* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029

Ssingle Ppackage				
Air ~~Cooled Cooled~~Source (Heating Mode) Split Ssystem and Ssingle Ppackage	*≥ 135,000 Btu/h and < 240,000 Btu/h (cooling capacity)*	*47° F ~~db~~DB/43° F ~~wb~~ WB outdoor air*	*Federal Minimum COP* before 1/1/2029 Federal Minimum *IVHE* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Heating Mode) Split Ssystem and Ssingle Ppackage	*≥ 240,000 Btu/h and < 760,000 Btu/h*	*47° F ~~db~~DB/43° F ~~wb~~ WB outdoor air*	*Federal Minimum COP* before 1/1/2029 Federal Minimum *IVHE* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air ~~Cooled Cooled~~Source (Heating Mode) Split Ssystem and ~~s~~Single Ppackage	*≥ 135,000 Btu/h* and < 240,000 Btu/h *(cooling capacity)*	*17° F ~~db~~DB/15° F ~~wb~~ WB outdoor air*	*2.05 COP* before 1/1/2029 1.99 *COP2* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Source (Heating Mode) Split Ssystem and Ssingle Ppackage	*≥ 240,000 Btu/h and < 760,000 Btu/h*	*17° F DB/15° F WB outdoor air*	*2.05 COP* before 1/1/2029 1.98 *COP2* on or after 1/1/2029	*AHRI 340/360* before 1/1/2029 *AHRI 1340* on or after 1/1/2029
Air Source Heat pump condensing units (cooling mode)	*≥ 135,000 Btu/h* and < 240,000 Btu/h *(cooling capacity)*		No requirements before 1/1/2029 9.9 *EER2* Federal minimum *IVEC* On or after 1/1/2029	*AHRI 365 before 1/1/2029 AHRI 1365 on or after 1/1/2029*
Air Source Heat pump condensing units (cooling mode)	*≥ 240,000 Btu/h*		No requirements before 1/1/2029 8.8 *EER2* Federal minimum *IVEC* On or after 1/1/2029	*AHRI 365 before 1/1/2029 AHRI 1365 on or after 1/1/2029*
Air Source Heat pump condensing units (heating mode)	*≥ 135,000 Btu/h* and < 240,000 Btu/h *(cooling capacity)*		No requirements before 1/1/2029 1.99 $COP2_{H17}$ Federal minimum *IVHE* On or after 1/1/2029	*AHRI 365 before 1/1/2029 AHRI 1365 on or after 1/1/2029*
Air Source Heat pump condensing units (heating mode)	*≥ 240,000 Btu/h*		No requirements before 1/1/2029 1.98 $COP2_{H17}$ Federal minimum *IVHE* On or after 1/1/2029	*AHRI 365 before 1/1/2029 AHRI 1365 on or after 1/1/2029*

Footnotes to Table 400.5(2) [Table 110.2-B]:
a. Where an EER or IEER has a numeric value, rather than federal minimum, d~~D~~educt 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.
b. Applicable test procedure and reference year are provided under the definitions.
c. DB = Dry-Bulb
d. WB = Wet-Bulb
e. Rating conditions do not apply to *IVEC* or *IVHE*.
f. Dates shown in the table are the date of manufacture of the equipment.