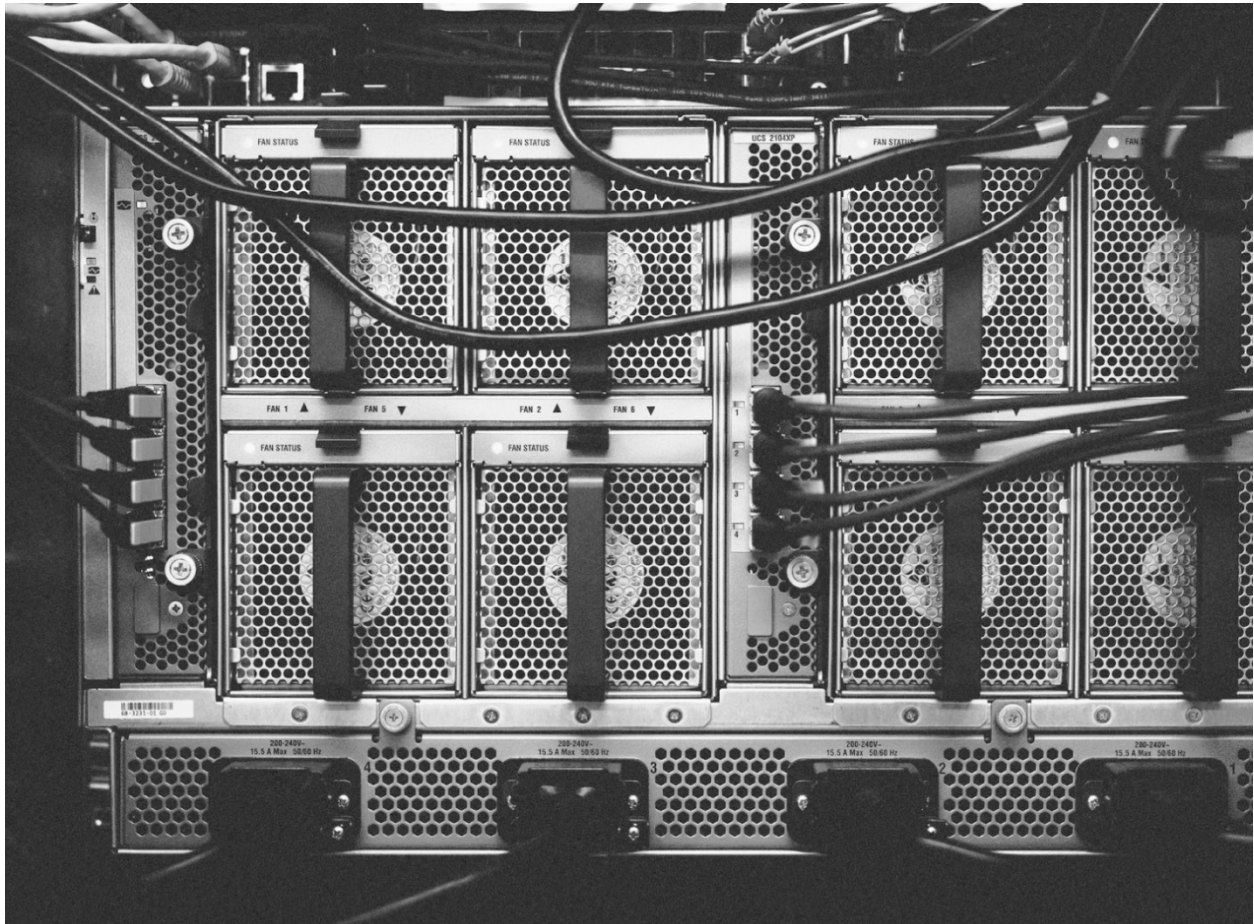
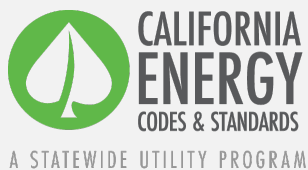


Nonresidential Computer Room Efficiency – Results Report



Measure ID: 2022-NR-HVAC1-F
Nonresidential HVAC

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1. Introduction

The Codes and Standards Enhancement (CASE) Initiative presents recommendations to support the California Energy Commission's (CEC) efforts to update the California Energy Code (Title 24, Part 6) to include new requirements or to upgrade existing requirements for various technologies. Three California Investor Owned Utilities (IOUs) – Pacific Gas and Electric Company, San Diego Gas and Electric, and Southern California Edison – and two Publicly Owned Utilities – Los Angeles Department of Water and Power, and Sacramento Municipal Utility District (herein referred to as the Statewide CASE Team when including the CASE Author) – sponsored this effort. The program goal is to prepare and submit proposals that will result in cost-effective enhancements to improve energy efficiency and energy performance in California buildings to the CEC, the state agency that has authority to adopt revisions to Title 24, Part 6. The CEC evaluates proposals submitted by the Statewide CASE Team and other stakeholders and may revise or reject proposals.

In March 2021, the Statewide CASE Team submitted the updated Final CASE Report that is presented in Attachment 1 to recommend code changes related to nonresidential computer room efficiency. This document explains the revisions that occurred to the proposed code changes between the submittal of the Final CASE Report to the CEC and the CEC's adoption of the 2022 Title 24, Part 6 Standards on August 11, 2021. The document begins with a concise description of the adopted code language, followed by the estimated energy savings of the adopted requirements, with the remainder of the document outlining the evolution of the code changes and the final adopted language.

2. Measure Description

2.1 Summary of Adopted Requirements

The nonresidential computer room efficiency CASE Report included multiple sub-measures that were adopted or partially adopted. Below is a summary of each sub-measure's adopted requirements.

2.1.1 Increased Temperature Threshold for Economizers

Increased economizer temperature thresholds were adopted for new construction air and water economizers. The full economizing temperature threshold for air economizers was increased from 55°F dry-bulb/50°F wet-bulb to 65°F dry-bulb/50°F wet-bulb outside air, and the full economizing temperature threshold for water economizers was increased from 40°F dry-bulb/35°F wet-bulb to 50°F dry-bulb/45°F wet-bulb outside air.

This sub-measure also reduces the computer room information technology equipment (ITE) design threshold for when air containment is required from 175 kW to 10 kW.

2.1.2 Uninterruptible Power Supply (UPS) Efficiency

Minimum UPS efficiency requirements complying with ENERGY STAR v2.0 were adopted for new construction and existing computer rooms.

2.1.3 Move Reheat, Humidification, and Fan Control to Mandatory Requirements

Computer room reheat, humidification, and fan control requirements were changed from prescriptive to mandatory.

2.1.4 Remove Healthcare Exception

The exception for computer rooms located in healthcare facilities being subject to Section 140.9(a) requirements was removed.

Table 1 identifies sections of the standards and Reference Appendices that were modified as a result of advocacy activities. The table also identifies if the compliance software will be updated.

Table 1: Scope of Adopted Code Change

Measure Name	Type of Requirement	Modified Section(s) of Title 24, Part 6	Modified Title 24, Part 6 Appendices	Will Compliance Software Be Modified
Increased Temperature Threshold for Economizers	Prescriptive	140.9(a), 141.1(b) (new)	No	Yes
UPS Efficiency	Prescriptive	140.9(a)	No	Yes
Move Reheat, Humidification, and Fan Control to Mandatory Requirements	Mandatory	120.6(j)	No	No
Remove Healthcare Exception	Prescriptive	140.9(a)	No	No

2.2 Summary of Proposed Requirements That Were Not Adopted

The nonresidential computer room efficiency CASE Report included multiple sub-measures that were not adopted or were partially adopted. Below is a summary of each sub-measure’s non-adopted requirements.

2.2.1 Increased Temperature Threshold for Economizers

The Final CASE Report proposed changing the full economizing outside air temperature thresholds for all new construction economizer types to 65°F dry-bulb and 50°F wet-bulb. These requirements were adopted for air economizers, but for water economizers the adopted temperature thresholds were 50°F dry-bulb and 45°F wet-bulb.

2.2.2 Computer Room Heat Recovery

This measure was not adopted due to CEC concerns with difficulty of compliance enforcement and complexity of compliance simulation requirements.

2.2.3 Power Usage Effectiveness (PUE) Monitoring

This measure was not adopted due to CEC concerns with performance monitoring not transferring directly to energy savings.

3. Statewide Energy Impacts of Adopted Requirements

Table 2 shows the estimated energy savings of the adopted requirements over the first twelve months they are in effect. The first-year savings have changed since submitting the Final CASE Report. Changes to the savings include the following:

- Removal of statewide savings for the non-adopted heat recovery sub-measure.
- Removal of statewide savings for the non-adopted PUE monitoring sub-measure.

Table 2: Estimated Statewide First Year^a Energy and Water Savings

Measure	First Year Electricity Savings (GWh/yr)	First Year Peak Electrical Demand Reduction (MW)	First Year Water Savings (million gallons/yr)	First Year Natural Gas Savings (million therms/yr)
Increased Temperature Threshold for Economizers (Total)	6.3	0.8	(3.6)	0
New Construction & Additions	6.3	0.8	(3.6)	0
Alterations	0	0	0	0
UPS Efficiency (Total)	2.2	0.1	0	0
New Construction & Additions	0.7	0.0	0	0
Alterations	1.5	0.1	0	0

- a. First year savings from all buildings completed statewide in 2023.

4. Compliance and Enforcement

There were no changes to the compliance or enforcement recommendations between the time the Statewide CASE Team submitted the Final CASE Report and the CEC adopted requirements. Compliance and enforcement is discussed in Sections 2.1.3, 3.1.3, 4.1.3, 5.1.3 and Appendix E of the Final CASE Report, which is provided in Attachment 2: Final CASE Report.

5. Interactions with Existing Regulations

For relevant measures, Section 1.3.3.3 of the Final CASE Report describes how the proposed code changes interact with existing regulations. Since CEC adopted the requirements, the information in the Final CASE Report remains an accurate description of how the adopted requirements interact with existing regulations. See the Final CASE Report in Attachment 2: Final CASE Report.

6. Evolution of Code Requirements

The Statewide CASE Team submitted the updated Final CASE Report to the CEC during March 2021. The updated Final CASE Report addresses input that was received during utility-sponsored stakeholder meetings held on October 15, 2019 and March 12, 2020 and during the CEC's pre-rulemaking workshop that was held on May 24, 2021. This section describes how the code change proposal evolved between the time Final CASE Report was submitted to the CEC and the time the standards were adopted.

6.1 Updates to Statewide Savings Estimates in Updated Final CASE Report

Because computer room energy savings is determined by computer room information technology equipment (ITE) load rather than floor area and computer rooms are a space type, standard methodologies to extrapolate statewide energy savings based on building construction forecast by sector and square footage cannot be used for computer rooms. The Final CASE Report submitted in September 2020 included statewide savings estimates that were developed based on the methodology originally used in the last computer room efficiency code change proposal submitted in 2013. After more detailed review by the Statewide CASE Team, it was determined that those statewide savings estimates were too high and more reliable sources of computer room energy use and savings potential should be used. Therefore, the statewide savings estimates were revised to the lower savings estimates presented in the updated Final

CASE Report submitted in March 2021¹. A detailed description of the updated statewide savings methodology is described in that report.

6.2 Technology-Specific Economizing Temperature Thresholds

In the Final CASE Report, the Statewide CASE Team proposed a single set of outdoor dry-bulb and wet-bulb temperatures as the threshold for full economizing for all economizer types. The intent of this recommendation was to achieve a high level of energy savings for all computer rooms and allow design teams and owners flexibility to choose the system that best meets their needs. This proposal was a deviation from the 2019 code language that included separate dry-bulb and wet-bulb economizer temperature thresholds for air and water economizers. In September 2020, a third-party manufacturer submitted a code change proposal for the 2022 code cycle that listed pumped refrigerant economizers as a third computer room economizer type with its own dry-bulb economizer threshold². After additional analysis and discussions among the Statewide CASE Team, CEC, and third-party manufacturer in June through August 2021, ultimately the CEC decided to preserve the code language structure of having separate economizing temperature thresholds for different economizer technologies for computer rooms, which was adopted into code.

The Statewide CASE Team originally proposed a minimum supply air temperature of 64.4°F to match ASHRAE Thermal Guidelines for Data Processing Environments in section 140.9(a)1 and 141.1(b)1. However, AHRI pointed out this was inconsistent with the proposed 65°F outdoor air temperature threshold for air economizers, so the Statewide CASE Team recommended the supply air temperature language be changed to 65°F, which was adopted.

6.3 Economizer Exception Clarifications

In June 2021, the Statewide CASE Team docketed a comment letter in response to the 45-Day Language regarding economizer exception language and provided the following recommendations³. The CEC asked us to docket these recommended clarifications.

¹ Source: *Nonresidential Computer Room Efficiency Updated Final CASE Report*. March 2021, https://title24stakeholders.com/wp-content/uploads/2021/03/NR-Computer-Room-Efficiency-Final-CASE-Report_Statewide-CASE-Team_updated.pdf

² Source: *Vertiv Comments -Vertiv -Updated Integrated Pumped Refrigerant Economizer*. November 2020, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=235638&DocumentContentId=68581>.

³ Source: *Statewide Utility Codes and Standards Enhancement Team Comments - on Computer Room Economizer Exceptions Language Clean Up*. June 2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238288&DocumentContentId=71583>

The following sections of Exception 2 to 140.9(a)1 (formerly Exception 4 to 140.9(a)1) were adopted.

- Exception 2i: The Statewide CASE Team recommended this language be clarified rather than deleted. The intent of Exception 2 is to allow buildings with economizers on their space conditioning system to serve computer rooms as long as the space cooling economizer can meet the computer room economizer temperature thresholds in 140.9(a)1A. This gives designers flexibility to use space air conditioning serving the other spaces in the building to meet 140.9(a)1 computer room economizer requirements. This exception was easier to understand than the newly proposed Exception 2ii.
- Exception 2ii: based on conversations with stakeholders with concerns about clarity and enforcement, the Statewide CASE Team recommended deleting this newly proposed exception and updating Exception 2i.

Additionally, the Statewide CASE Team recommended deleting newly proposed Exception 3 to 140.9(a)1, which would allow computer rooms in jurisdictions where cooling towers are prohibited to comply with less strict economizing temperature requirements (i.e., maintain 2019 economizer temperature requirements). This Exception was introduced in conjunction with the more stringent economizer requirements in the Final CASE Report. However, when the CEC indicated they planned to keep economizing threshold temperatures separate based on economizer technology and that the adopted temperature thresholds for water economizers would be less stringent than proposed in the Final CASE Report in September 2020, the Statewide CASE Team recommended that the newly proposed Exception 3 to 140.9(a)1 be removed. Since the more stringent water economizer thresholds were not adopted, it was less important to provide an exception for water economizer systems because the adopted requirements were easier to meet than the requirements proposed in the Final CASE Report.

The Statewide CASE Team also recommended that the newly proposed Exception 4 to 141.1(b)1 be deleted. This exception was originally written to match 140.9(a)1 Exception 2ii, which was recommended to be deleted as mentioned above. After discussions with the CEC, the Statewide CASE Team also recommended deleting Exception 4 to 141.1(b)1 because Exceptions 2 and 3 to 141.1(b)1 already covered the scenarios addressed by Exception 4.

7. Adopted Code Language

The adopted code language for the standards and Reference Appendices are presented in the following sections. Additions to the 2019 Title 24, Part 6 code language are underlined and deletions are ~~struck~~.

7.1 California Energy Code, Title 24, Part 6

7.1.1 Section 100.1 – Definitions and Rules of Construction

ALTERNATING CURRENT-OUTPUT UNINTERRUPTIBLE POWER SUPPLY (AC-OUTPUT UPS) is a combination of convertors, switches, and energy storage devices, such as batteries, constituting a power system for maintaining continuity of load power in case of input power failure. Input power failure occurs when voltage and frequency are outside rated steady- state and transient tolerance bands or when distortion or interruptions are outside the limits specified for the uninterruptible power supply. An AC-output UPS is an uninterruptible power supply that supplies power with a continuous flow of electric charge that periodically reverses direction.

ANSI/NEMA WD 6 is the National Electrical Manufacturers Association Document titled, “American National Standard for Wiring Devices – Dimensional Specification,” 2016 (ANSI/NEMA WD 6-2016).

COMPUTER ROOM is a room within a building whose primary function is to house electronic equipment and that has a design information technology equipment (ITE) equipment power density exceeding 20 watts/ft² (215 watts/m²) of conditioned floor area.

INFORMATION TECHNOLOGY EQUIPMENT (ITE) includes computers, data storage, servers, and network/communication equipment located in a computer room.

ITE DESIGN LOAD is the combined power of all the ITE loads for which the ITE cooling system is designed.

7.1.2 Section 120.6 – Mandatory Requirements for Covered Processes

(j) Mandatory Requirements for Computer Rooms. Space conditioning systems serving a computer room shall meet the following requirements:

1. **Reheat.** Each computer room 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.

2. Humidification. Humidification shall be adiabatic. Nonadiabatic humidification, including but not limited to steam and infrared, is prohibited.

3. Fan Control. Each unitary air conditioner with mechanical cooling capacity exceeding 60,000 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.

7.1.3 Section 140.9 – Prescriptive Requirements for Covered Processes

(a) **Prescriptive Requirements for Computer Rooms.** ~~Space conditioning systems serving a e~~Computer rooms with a power density greater than 20 W/ft² shall comply with this section ~~by being designed with and having constructed and installed a cooling system that meets the requirements of Subsections 1 through 6.~~

1. **Economizers.** Each individual cooling system primarily serving computer rooms shall include either:

A. An integrated air economizer capable of providing partial cooling even when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load as calculated in accordance with a method approved by the Commission, at 65°F to 80.6°F supply air temperature at outside air temperatures of ~~55~~65°F dry-bulb and below or /50°F wet-bulb and below, and be equipped with a fault detection and diagnostic system that complies with Section 120.2(i); or

B. An integrated water economizer capable of providing partial cooling even when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load as calculated in accordance with a method approved by the Commission, at 65°F to 80.6°F supply air temperature at outside air temperatures of ~~40~~50°F dry-bulb and below or /345°F wet-bulb and below.

C. An integrated pumped refrigerant economizer with a net sensible COP meeting or exceeding the values in Table 140.9-A, capable of providing partial cooling even when additional mechanical cooling is required, and capable of providing 100 percent of the expected system cooling load at 65°F to 80.6°F supply air temperature at outside air temperatures of 50°F dry-bulb and below.

Table 140.9-A Minimum Pumped Refrigerant Economizer CRAC Net Sensible COP by Climate Zone

<u>Climate Zone</u>	<u>Net Sensible COP</u>
<u>Climate Zone 1</u>	<u>5.5</u>
<u>Climate Zone 2</u>	<u>4.5</u>
<u>Climate Zone 3</u>	<u>4.2</u>

<u>Climate Zone 4</u>	<u>3.8</u>
<u>Climate Zone 5</u>	<u>4.3</u>
<u>Climate Zone 6</u>	<u>2.7</u>
<u>Climate Zone 7</u>	<u>2.3</u>
<u>Climate Zone 8</u>	<u>2.8</u>
<u>Climate Zone 9</u>	<u>3.3</u>
<u>Climate Zone 10</u>	<u>3.4</u>
<u>Climate Zone 11</u>	<u>3.9</u>
<u>Climate Zone 12</u>	<u>4.0</u>
<u>Climate Zone 13</u>	<u>3.7</u>
<u>Climate Zone 14</u>	<u>3.7</u>
<u>Climate Zone 15</u>	<u>3.6</u>
<u>Climate Zone 16</u>	<u>3.0</u>

EXCEPTION 1 to Section 140.9(a)1: Individual computer rooms with an ITE design load under 5 tons (18 kW) in a building that does not have any economizers.

~~**EXCEPTION 2 to Section 140.9(a)1:** New cooling systems serving an existing computer room in an existing building up to a total of 50 tons of new cooling equipment per building.~~

~~**EXCEPTION 3 to Section 140.9(a)1:** New cooling systems serving a new computer room in an existing building up to a total of 20 tons of new cooling equipment per building.~~

EXCEPTION 4~~2~~ to Section 140.9(a)1: A computer room with an ITE design load less than 20 tons (70 kW) may be served by a second fan system without an economizer if it is also served by a fan system with an economizer that also serves other spaces within the building, provided that all of the following are met:

- i. The economizer system is sized to meet the design cooling load of the computer room when the other spaces within the building are at 50 percent of their design load at outside air temperatures of 65°F dry-bulb and below or 50°F wet-bulb and below; and
- ii. The economizer system has the ability to serve only the computer rooms connected to it, e.g., shut off flow to other spaces within the building when unoccupied. ~~;~~ and

~~iii. The noneconomizer system does not operate when the outside air drybulb temperatures is below 60°F and, the cooling load of other spaces within the building served by the economizer system is less than 50 percent of design load.~~

~~2. **Reheat.** Each computer room 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.~~

~~3. **Humidification.** Nonadiabatic humidification (e.g. steam, infrared) is prohibited. Only adiabatic humidification (e.g. direct evaporative, ultrasonic) is permitted.~~

~~24. **Power Consumption of Fans.** The total fan power at design conditions of each fan system shall not exceed 27 W/kBtu·h of net sensible cooling capacity.~~

~~5. **Fan Control.** Each unitary air conditioner with mechanical cooling capacity exceeding 60,000 Btu/hr and each chilled water fan system shall be designed to vary the airflow rate as a function of actual load and shall have controls and/or devices (such as two-speed or variable speed control) that will result in fan motor demand of no more than 50 percent of design wattage at 66 percent of design fan speed.~~

~~36. **Air Containment.** Computer rooms with air-cooled computers in racks and with a ITE design load exceeding 47510 kW/ (2.8 tons) per room shall include air barriers such that there is no significant air path for computer discharge air to recirculate back to computer inlets without passing through a cooling system.~~

~~**EXCEPTION 1 to Section 140.9(a)36:** Expansions of existing computer rooms.~~

~~**EXCEPTION 2 to Section 140.9(a)36:** Computer racks with a design load less than 1 kW (0.28 tons) per rack.~~

~~**EXCEPTION 3 to Section 140.9(a)36:** Equivalent energy performance based on computational fluid dynamics or other analysis.~~

~~**4. Alternating Current-Output Uninterruptible Power Supplies (UPS).** Alternating current-output UPS systems serving a computer room shall meet or exceed minimum average efficiencies in Table 140.9-B. Minimum average efficiency for alternating current-output UPS shall meet or exceed calculation and testing requirements identified in ENERGY STAR Program Requirements for Uninterruptible Power Supplies (UPSs) – Eligibility Criteria Version 2.0.~~

Where:

P is the rated output power in watts (W).

E_{MOD} is an allowance of 0.004 for modular UPSs applicable in commercial 1,500-10,000 W range.

ln is the natural logarithm.

The requirement shall be rounded to the third decimal place for certification and reporting.

EXCEPTION to 140.9(a)4: Alternating current-output UPS that utilizes standardized NEMA 1-15P or NEMA 5-15P input plug, as specified in ANSI/NEMA WD-6-2016.

Table 140.9-B Alternating Current-Output Uninterruptible Power Supply Minimum Average Efficiency

	<u>Voltage and Frequency Dependent</u>	<u>Voltage Independent</u>	<u>Voltage and Frequency Independent</u>
<u>P<350 W</u>	<u>$5.71 \times 10^{-5} \times P + 0.962$</u>	<u>$5.71 \times 10^{-5} \times P + 0.964$</u>	<u>$0.011 \times \ln(P) + 0.824$</u>
<u>350 W<P<1,500 W</u>	<u>0.982</u>	<u>0.984</u>	
<u>1,500 W<P<10,000 W</u>	<u>$0.981 - E_{MOD}$</u>	<u>$0.980 - E_{MOD}$</u>	<u>$0.0145 \times \ln(P) + 0.800 - E_{MOD}$</u>
<u>P>10,000 W</u>	<u>0.970</u>	<u>0.940</u>	<u>$0.0058 \times \ln(P) + 0.886$</u>

EXCEPTION to Section 140.9(a): Computer rooms located in healthcare facilities.

7.1.4 Section 141.1 – Prescriptive Requirements for Covered Processes in Additions and Alterations

(b) Computer Rooms. All newly installed computer room cooling systems and uninterruptible power supply systems in additions/alterations shall meet the requirements of Sections 120.6(j), 140.9(a)2, and 140.9(a)4 and comply with item 1 below.

1. Economizers. Each individual cooling system primarily serving computer rooms in an existing building shall include either:

A. An integrated air economizer capable of partial cooling when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load up to 80°F room supply air temperature at outside air temperatures of 55°F dry-bulb and below or 50°F wet-bulb and below, and be equipped with a fault detection and diagnostic system as specified by section 120.2(i); or

B. An integrated water economizer capable of partial cooling when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load up to 80°F room supply air temperature at outside air temperatures of 40°F dry-bulb and below or 35°F wet-bulb and below.

C. An integrated refrigerant economizer with a Net Sensible COP meeting or exceeding the values in Table 141.1-A and capable of partial cooling when additional

mechanical cooling is required and capable of providing 100 percent of the expected system cooling load up to 80°F room supply air temperature at outside air temperatures of 40°F dry-bulb and below or 35°F wet-bulb and below.

Table 141.1-A: Net Sensible COP by Climate Zone for Alterations

<u>Climate Zone</u>	<u>Net Sensible COP</u>
<u>Climate Zone 1</u>	<u>2.9</u>
<u>Climate Zone 2</u>	<u>2.8</u>
<u>Climate Zone 3</u>	<u>2.5</u>
<u>Climate Zone 4</u>	<u>2.6</u>
<u>Climate Zone 5</u>	<u>2.6</u>
<u>Climate Zone 6</u>	<u>2.1</u>
<u>Climate Zone 7</u>	<u>1.7</u>
<u>Climate Zone 8</u>	<u>2.1</u>
<u>Climate Zone 9</u>	<u>2.3</u>
<u>Climate Zone 10</u>	<u>2.5</u>
<u>Climate Zone 11</u>	<u>2.8</u>
<u>Climate Zone 12</u>	<u>2.7</u>
<u>Climate Zone 13</u>	<u>2.7</u>
<u>Climate Zone 14</u>	<u>2.7</u>
<u>Climate Zone 15</u>	<u>2.7</u>
<u>Climate Zone 16</u>	<u>2.3</u>

EXCEPTION 1 to Section 141.1(b)1: Individual computer rooms with an ITE design load under 5 tons (18 kW) in a building that does not have any economizers.

EXCEPTION 2 to Section 141.1.(b)1: New cooling systems serving an existing computer room in an existing building with an ITE design load up to a total of 50 tons (176 kW).

EXCEPTION 3 to Section 141.1(b)1: New cooling systems serving a new computer room in an existing building with an ITE design load up to a total of 20 tons (70 kW).

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Attachment 1: Public Comments Submitted by the Statewide CASE Team

Attachment 1 presents comments that the Statewide CASE Team submitted to the Energy Commission's docket that are relevant to this measure.

- Statewide CASE Team, Docket #21-BSTD-01 TN# 238233, "Statewide CASE Team -Comment on Integrated Pump Refrigerant Economizer Energy Efficiency Review", 6/16/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238233&DocumentContentId=71509>
- Statewide CASE Team, Docket #21-BSTD-01 TN# 238288 "Statewide Utility Codes and Standards Enhancement Team Comments -on Computer Room Economizer Exceptions Language Clean Up", 6/18/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238288&DocumentContentId=71583>
- Statewide CASE Team, Docket #21-BSTD-01 TN#238404 "Statewide Utility Codes and Standards Enhancement Team Comments on 45-Day Express Terms_Part 1", 6/21/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238404&DocumentContentId=71705>
- Statewide CASE Team, Docket #21-BSTD-01 TN#238406, "Statewide Utility Codes and Standards Enhancement Team Comments -Comments on 45-Day Express Terms_Part 2", 6/21/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238406&DocumentContentId=71707>
- Statewide CASE Team, Docket #21-BSTD-01 TN#238409 "Statewide Utility Codes and Standards Enhancement Team Comments on 45-Day Express Terms_Part 3", 6/21/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=238409&DocumentContentId=71710>
- Statewide CASE Team, Docket #21-BSTD-01 TN#239075 "Statewide Utility Codes and Standards Enhancement Team Comments - Statewide CASE Team Support for Adoption of 15-Day Express Terms Part 1", 7/29/2021, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=239075&DocumentContentId=72509>
- Statewide CASE Team, Docket #21-BSTD-01 TN#239074 "Statewide Utility Codes and Standards Enhancement Team Comments - Statewide CASE Team

Support for Adoption of 15-Day Express Terms Part 2”, 7/29/2021,
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=239074&DocumentContentId=72510>

- Statewide CASE Team, Docket #21-BSTD-01 TN# 239071 “Statewide Utility Codes and Standards Enhancement Team Comments - Response to Comments on Computer Room Pumped Refrigerant Econo”, 7/29/2021,
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=239071&DocumentContentId=72504>

Attachment 2: Final CASE Report

The final version of the CASE Report is provided in full in Attachment 2 to this report.