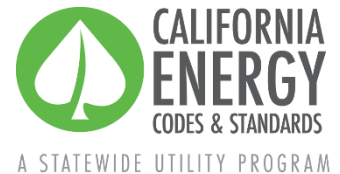


Proposal Summary



2022 California Energy Code (Title 24, Part 6)

Multifamily Indoor Air Quality - Central Ventilation Duct Sealing

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Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on March 25, 2020. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com.

Measure Description

This proposal considers “central ventilation ductwork” as ductwork that serves multiple dwelling units and provides dwelling unit supply or exhaust air. 2019 Title 24, Part 6 standards include a requirement that central ventilation systems be balanced, to ensure that each dwelling unit receives the required ventilation rate. The proposed measure builds on this requirement by requiring that project teams seal central ventilation ducts. The proposed measure requires field verification of duct leakage using a fan pressurization test to ensure that leakage does not exceed 10 percent of the rooftop fan airflow rate at 50 Pascals (Pa), (0.2 inch water column), which is equivalent to 6 percent at 25 Pa (0.1 inch water column) which aligns with current requirements in Section 140.4(l). Central ventilation duct sealing primarily provides energy savings from reduced fan energy and reduced loss of conditioned air. It also provides IAQ benefits by improving the reliability of supply and exhaust rates.

Draft Code Language

The Energy Commission plans to create a multifamily chapter for inclusion in 2022 Title 24, Part 6. The multifamily chapter will draw from the appropriate sections of the 2019 residential and nonresidential Standards. The Statewide CASE Team uses the language and section numbering from residential and nonresidential Standards and Reference Appendices to show the proposed changes below. Changes to the 2019 documents are marked with red underlining (new language) and ~~striketroughs~~ (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in **yellow**.

Draft high-rise multifamily building requirements

Section 120.5. Required Nonresidential Mechanical System Acceptance



Nonresidential, high-rise residential, and hotel/motel buildings shall comply with the applicable requirements of

Sections 120.5(a) and 120.5(b).

- (a) Before an occupancy permit is granted the following equipment and systems shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified by the Reference Nonresidential Appendix NA7. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements:

...

3. Duct systems shall be tested in accordance with NA7.5.3 where either:

- A. They are new duct systems that meet the criteria of Sections 140.4(l)1, 140.4(l)2, ~~or and~~ 140.4(l)3; or
- B. They are part of a system that meets the criteria of Section 141.0(b)2D.

Section 140.4(l). Air Distribution System Duct Leakage Sealing. Duct systems shall be sealed in accordance with ~~1, or~~ 2, or 3 below:

1. Systems serving high-rise residential buildings, hotel/motel buildings and nonresidential buildings other than healthcare facilities, the duct system shall be sealed to a leakage rate not to exceed 6 percent of the nominal air handler airflow rate as confirmed through field verification and diagnostic testing, in accordance with the applicable procedures in Reference Nonresidential Appendices NA1 and NA2 if the criteria in Subsections A, B and C below are met:

A. The duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system; and

B. The space conditioning system serves less than 5,000 square feet of conditioned floor area; and

C. The combined surface area of the ducts located in the following spaces is more than 25 percent of the total surface area of the entire duct system:

i. Outdoors; or

ii. In a space directly under a roof that

a. Has a U-factor greater than the U-factor of the ceiling, or if the roof does not meet the requirements of Section 140.3(a)1B, or

b. Has fixed vents or openings to the outside or unconditioned spaces; or

iii. In an unconditioned crawlspace; or

iv. In other unconditioned spaces.

2. Duct systems serving healthcare facilities shall be sealed in accordance with the California Mechanical Code.

3. Ventilation ducts in multifamily buildings shall meet duct sealing requirements in the California Mechanical Code Section 603.10 and confirmed by HERS rater verification that leakage is no greater than 10 percent of the rooftop or central fan design airflow rate if all

criteria in Subsections A, B, and C are met. The leakage test shall be conducted using ASTM Standard E1554 at a test pressure of 50 Pa (0.2 inches) and measure the leakage of all ductwork between the rooftop fan and the connection point to the in-unit grille or fan.

A. The ventilation ducts serve multiple dwelling units.

B. The ventilation ducts provide continuous airflows or airflows to provide balanced ventilation to meet 120.1(b)2Aivb.

Sampling procedures

NA1.6.3 HERS Procedures -- Group Sample Field Verification and Diagnostic Testing

After the initial field verification and diagnostic testing is completed, the builder or the HERS Rater shall identify a group of up to seven individual systems or dwelling units in the building from which a sample will be selected and identify the names and license numbers of the subcontractors responsible for the installations requiring field verification and diagnostic testing. **For the leakage requirements in Section 140.4(l)3, a HERS Rater shall use a sampling group in which all ventilation duct systems carry the same type of airflow (either supply or exhaust air) and use the same central fan make and model.** The date the first system or dwelling unit in the group is identified shall establish the start date for the new opened sample group. The HERS Provider shall recorded and track the start date for each sample group.

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NA1.9.1 Duct Leakage Field Verification by the Acceptance Test Technician

Under this alternative procedure, when the Certificate of Compliance indicates that field verification and diagnostic testing of duct leakage is required as a condition for compliance with Title 24, Part 6, a certified ATT may perform the duct leakage verification to satisfy the condition of compliance, at the discretion of the enforcement agency. Systems verified under this procedure are not eligible for sampling **with the exception of requirements in Section 140.4(l)3.**

...

Additions would need to follow proposed language for new construction.

Alterations to the duct system or space conditioning system would follow the requirement currently specified for 140.4(l)1.

Section 141.0(b)2, for Alterations, Prescriptive Approach

- A. Altered Duct Systems.** When new or replacement space-conditioning system ducts are installed to serve an existing building, the new ducts shall meet the requirements of Section 120.4. If the space conditioning system meets the criteria of Section 140.4(l)1 **or Section 140.4(l)3**, the duct system shall be sealed as confirmed through field verification and diagnostic testing in accordance with the procedures for duct sealing of an existing duct system as specified in Reference Nonresidential Appendix NA2...

Draft low-rise multifamily requirements

Section 150.0(m)11

11. Duct System Sealing and Leakage Testing.

- A. When space conditioning systems utilize forced air duct systems to supply conditioned air to an occupiable space, the ducts shall be sealed, as confirmed through field verification and diagnostic testing, in accordance with all applicable procedures specified in Reference Residential Appendix RA3.1, and the leakage compliance criteria specified in Reference Residential Appendix TABLE RA3.1-2, and conforming to one of the following Subsections A, B, or C as applicable:
- Ai. For single family dwellings and townhouses with the air-handling unit installed and the ducts connected directly to the air handler, the total leakage of the duct system shall not exceed 5 percent of the nominal system air handler airflow as determined utilizing the procedures in Reference Residential Appendix Section RA3.1.4.3.1.
 - Bii. For single family dwellings and townhouses at the rough-in stage of construction prior to installation of the dwelling's interior finishing:
 - ia. **Air-handling unit installed.** If the air-handling unit is installed and the ducts are connected directly to the air handler, the total leakage of the duct system shall not exceed 5 percent of the nominal system air handler airflow as determined utilizing the procedures in Reference Residential Appendix Sections RA3.1.4.3.2, RA3.1.4.3.2.1 and RA3.1.4.3.3.
 - ib. **Air-handling unit not yet installed.** If the air-handling unit is not yet installed, the total leakage of the duct system shall not exceed 4 percent of the nominal system air handler airflow as determined utilizing the procedures in Reference Residential Appendix Sections RA3.1.4.3.2, RA3.1.4.3.2.2 and RA3.1.4.3.3.
 - Ciii. For multifamily dwellings with the air-handling unit installed and the ducts connected directly to the air handler, regardless of duct system location:
 - ia. The total leakage of the duct system shall not exceed 12 percent of the nominal system air handler airflow as determined utilizing the procedures in Reference Residential Appendix Section RA3.1.4.3.1; or
 - ib. The duct system leakage to outside shall not exceed 6 percent of the nominal system air handler airflow as determined utilizing the procedures in Reference Residential Appendix Section RA3.1.4.3.4.

B. Ventilation ducts in multifamily buildings shall be sealed and confirmed by HERS rater verification that leakage is no greater than 10 percent of the rooftop or central fan design airflow rate if all criteria in Subsections i, ii, and iii are met. The leakage test shall be conducted using ASTM Standard E1554 at a test pressure of 50 Pa (0.2 inches) and measure the leakage of all ductwork between the rooftop fan and the connection point to the in-unit exhaust grille or fan.

i. The ventilation ducts serve multiple dwelling units.

ii. The ventilation ducts provide continuous airflows or airflows to provide balanced ventilation to meet 120.1(b)2Aivb.

Additions would need to follow proposed language for new construction. No changes are needed to the language in Section 150.2, since Sections 150.0(a) through (q) are already required.

Alterations would be triggered as is currently done for duct sealing in alterations, so no new language is required.

Sampling procedures

RA2.6.2 HERS Procedures - Initial Model Field Verification and Diagnostic Testing

The HERS Rater shall diagnostically test and field verify the first dwelling unit of each model within a subdivision or multifamily housing development when the builder elects to demonstrate HERS verification compliance utilizing group sampling. To be considered the same model, dwelling units shall have the same basic floor plan layout, energy design, and compliance features as shown on the Certificate of Compliance. Variations in the basic floor plan layout, energy design, compliance features, zone floor area, or zone volume, that do not change the HERS features to be tested, the heating or cooling capacity of the HVAC unit(s), or the number of HVAC units specified for the dwelling units, shall not cause dwelling units to be considered a different model.

For multifamily buildings, variations in exterior surface areas caused by location of dwelling units within the building shall not cause dwelling units to be considered a different model. For multifamily buildings meeting Section 150.0(m)11B, each ventilation duct system that meets the criteria of 150.0(m)11B shall be treated as a “dwelling unit” for the sampling procedures specified in this section, and a HERS Rater shall use a sampling group in which all ventilation duct systems carry the same type of airflow (either supply or exhaust air) and use the same central fan make and model.

RA3.1.4.3.1 Diagnostic Duct Leakage from Fan Pressurization of Ducts

The objective of this procedure is for an installer to determine or a rater to verify the total leakage of a new or altered duct system. The total duct leakage shall be determined by pressurizing the entire duct system to a positive pressure of 25 Pa (0.1 inches water) with respect to outside except for Section 150.0(m)11B, for which the system shall be positively pressurized for supply ducts or negatively pressurized for exhaust ducts to 50 Pa (0.2 inches water) with respect to outside.