CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Indoor Air Quality

Draft Code Language

Last Updated: [3/2/2017]

1. INTRODUCTION

The California Statewide Utility Codes and Standards Team actively supports the California Energy Commission in developing revisions to the 2019 California Building Energy Efficiency Standards (Title 24, Part 6). Our joint intent is to achieve significant energy savings through the development of reasonable, responsible, and cost-effective code change proposals for the 2019 Title 24 code change cycle.

The Statewide Utility Team is proposing code changes regarding Indoor Air Quality (IAQ) to eliminate code conflicts and improve clarity. This will require modifications to Title 24 Parts 2 and 4, in addition to the Standards, Reference Appendices, and both the Residential and Nonresidential ACM Manuals.

The Statewide Utility Team is requesting feedback on the draft code language presented in this document. Input we receive will inform the code change proposal that the Statewide Utility Team will be proposing to the California Energy Commission in April 2017.

To provide feedback, please email us at info@title24stakeholders.com or contact the measure lead at:

David Springer, dspringer@davisenergy.com

For more information about the California Statewide Utility Codes and Standards Team's 2019 Title 24, Part 6 advocacy efforts, and the latest information on this code change proposal please visit: www.title24stakeholders.com.

2. DRAFT CODE LANGUAGE

The proposed changes to Title 24 Part 2, Title 24 Part 4, the Standards, Reference Appendices, and the ACM Reference Manuals are provided below. Changes to the 2016 documents are marked with underlining (new language) and ~~strikethroughs~~ (deletions).

2.1 Title 24 Part 2

SECTION 1203 – INTERIOR ENVIRONMENT

The proposed regulations will modify Section 1203 as described below:

1203.1: Buildings shall be provided with natural ventilation in accordance with Section 1203.4, or mechanical ventilation in accordance with the California Mechanical Code. All Group R-3 occupancies and non-transient high-rise multifamily residential (Group R-2) occupancies shall meet the ventilation requirements of Title 24 Part 6.

2.2 Title 24 Part 4

SECTION 402 – VENTILATION AIR

The proposed regulations will modify Section 402 as described below:

402.1.2 Dwelling. Requirements for ventilation air rate for single-family and multi-family dwellings, including high-rise, shall be in accordance with ~~this chapter or~~ the version of ASHRAE 62.2 that is referenced by Title 24 Part 6. Other provisions of Chapter 4 do not apply to these occupancy types.

2.3 Title 24 Part 6

SECTION 120.1 – REQUIREMENTS FOR VENTILATION

The proposed regulations will modify Section 120.1 as described below:

120.1: Nonresidential, high-rise residential, and hotel/motel buildings shall comply with the requirements of ~~Section 120.1(a) through 120.1(e)~~ this section and the California Building Code.

EXCEPTION 1 to Section 120.1(a)1: Refrigerated warehouses and other spaces or buildings that are not normally used for human occupancy and work.

EXCEPTION 2 to Section 120.1(a)1: Mechanical ventilation for all residential buildings, including R-3 occupancies and non-transient high-rise hotel/motel buildings, will be provided as specified by Section 150.0(o).

~~**EXCEPTION to Section 120.1(b)1A:** Naturally ventilated spaces in high-rise residential dwelling units and hotel/motel guest rooms shall be open to and within 25 feet of operable wall or roof openings to the outdoors.~~

120.1(b)3: Central ventilation shafts and ducts. Central ventilation shafts and ducts in high-rise multifamily buildings shall meet the following requirements, which shall be confirmed by field verification:

A. Shaft and/or ducts and branches shall be sealed to 6% of the measured fan airflow of the roof ventilator.

B. Airflow to individual units shall be balanced to within 10% of design airflow using either constant air regulation devices, manual dampers, or orifice plates.

Table 120.1-A: Minimum Ventilation Rates:

TYPE OF USE	CFM PER SQUARE FOOT OF CONDITIONED FLOOR AREA
Auto Repair Workshops	1.50
Barber Shops	0.40
Bars, cocktail lounges, and casinos	0.20
Beauty shops	0.40
Coin-operated dry cleaning	0.30
Commercial dry cleaning	0.45
High-rise residential	Ventilation Rates Specified by ~~the CBC~~Section 150.0(o)
Hotel guest rooms (less than 500 ft²)	30 cfm/guest room
Hotel guest rooms (500 ft² or greater)	0.15
Retail stores	0.20
All others	0.15

SECTION 120.4 – REQUIREMENTS FOR AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS

The proposed regulations will modify Section 120.4 by adding an exception to 120.4(a), as described below:

EXCEPTION to 120.4: Central ventilation shafts in high-rise multifamily buildings shall comply with the applicable requirements of Section 120.4, except that they may use drywall ducts to convey ventilation air if the shaft and branches are sealed to 6% leakage of total ventilation air when pressurized to 25 Pa.

SECTION 120.5 – REQUIRED NONRESIDENTIAL MECHANICAL SYSTEM ACCEPTANCE

The proposed regulations will modify Section 120.5 by adding a new item to the list in 120.5(a), as described below:

120.5(a): 18. Filters for high-rise multifamily mechanical systems shall meet the requirements of 150.0(m)12B.

SECTION 150.0 – MANDATORY FEATURES AND DEVICES

The proposed regulations will modify Section 150.0 as described below. These changes include updating air filter requirements, specifying the version of ASHRAE Standard 62.2 being referenced, adding an exception to 150.0(m)12B for air filter media labeling on certain types of heat pumps, addition of 150.0(o)1B (which requires verification of kitchen hoods to meet the requirements of ASHRAE Standard 62.2), and exceptions to 150.0(o) clarifying air filter media requirements and infiltration assumptions.

150.0(m)12B: Air Filter Media Efficiency. The system shall be provided with air filter media having a designated efficiency equal to or greater than MERV ~~6~~ 13 when tested in accordance with ASHRAE Standard 52.2, or a particle size efficiency rating equal to or greater than 50 percent in the ~~3.0-10~~ 1.0-3.0 μm range when tested in accordance with AHRI Standard 680. Installed air filter media shall be labelled with the efficiency and static pressure ratings by the manufacturer, which shall be confirmed by field verification.

EXCEPTION to 150.0(m)12B: Air filter media labeling is not required for mini-split heat pumps or ducted variable speed heat pumps with less than 10 feet of connected duct.

150.0(o): Ventilation for Indoor Air Quality. All dwelling units shall meet the requirements of the currently referenced version of ASHRAE Standard 62.2~~, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings~~.

150.0(o)1A: Ventilation Air Rates: In meeting the dwelling unit ventilation rate, Qtotal = 0.03 x A + 7.5 x (number of bedrooms + 1), where A = conditioned floor area (ft^2), for all multifamily units (except horizontally attached), infiltration cannot be used to meet Qtotal, and units must use follow Section (a) or (b) for meeting the whole dwelling ventilation rate. High-rise multifamily units within 500 feet of a freeway and in nonattainment areas for the U.S. EPA NAAQS 24-hour PM 2.5 standard must follow Section (b):

a. Passively provided supply air.

i. For units following this pathway, the total mechanical ventilation rate equals the total ventilation rate: Qfan = Qtotal.

ii. High-rise multifamily units must meet the following additional requirements:

a. Supply air must be delivered through a dedicated inlet and coupled with mechanical exhaust - such as continuous or scheduled intermittent exhaust.

Units following this pathway must meet prescriptive compartmentalization requirements

OR

b. Provide mechanically provided, filtered supply air.

i. The total mechanical ventilation rate must be at least 85% of the total ventilation rate: Qfan = 0.85 x Qtotal.

ii. Supply air shall be passed through a filter with a minimum of:

a. MERV 6 rating for low-rise multifamily units, and high-rise multifamily units in areas of PM 2.5 attainment with U.S. Environmental Protection Agency National Ambient Air Quality Standards (EPA NAAQS) or more than 500 feet of a freeway.
b. MERV 13 for high-rise multifamily units in areas of PM 2.5 nonattainment and within 500 feet of a freeway.

150.0(o)1~~A~~B: Airflow Performance: The Whole-Building Ventilation airflow required by Section 4 of ASHRAE Standard 62.2 shall be confirmed through field verification and diagnostic testing in accordance with the applicable procedures specified in Reference Residential Appendix RA3.7

150.0(o)1C: Kitchen Exhaust Ventilation. An HVI-Certified kitchen hood or fan with a valid HVI label shall be installed in each kitchen to provide local mechanical exhaust ventilation to meet the requirements of Sections 5 and 7 of ASHRAE Standard 62.2 and shall directly exhaust to the exterior of the building, which shall be confirmed by field verification.

EXCEPTION 1 to 150.0(o): Air filter media shall meet the requirements of Section 150.0(m)12B.

EXCEPTION 2 to 150.0(o): If no blower door measurement is available, the ASHRAE Standard 62.2 calculation of the mechanical ventilation system air flow rate shall be based on an infiltration rate equivalent to 2 ACH50.

2.4 Reference Appendices

JOINT APPENDIX 1 – GLOSSARY

The proposed regulations will update the definition of ASHRAE Standard 62.2 in JA1 to reference the current version and adds definitions necessary to require visual verification of the HVI label on kitchen hood fans.

ASHRAE STANDARD 62.2 is the ~~American Society of Heating, Refrigerating and Air-Conditioning Engineers~~ ASHRAE document titled "Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings," 201~~0~~6 ('ANSI/'ASHRAE Standard 62.2-201~~0~~6 ~~including 'ANSI/'ASHRAE Addenda b, c, e, g, h, i and l to 'ANSI/'ASHRAE 62.2-2010 published in the 2011 supplement, and 'ANSI/'ASHRAE Addendum j to 'ANSI/'ASHRAE Standard 62.2-2010 published in March, 2012, and 'ANSI/'ASHRAE Addendum n to 'ANSI/'ASHRAE Standard 62.2-2010 published in February, 2012~~).

HVI is the Home Ventilating Institute.

HVI-Certified product is a home ventilation product which has been tested and certified by HVI in accordance with HVI Publication 920, is labelled in accordance with HVI Publication 925, and is listed in HVI Publication 911.

HVI Publication 911 is the HVI document titled "Certified Home Ventilating Products Directory", which is a directory of residential ventilation products updated monthly by HVI. All models listed in HVI Publication 911 have been tested according to HVI procedures and have been found to qualify based on the requirements of HVI Publication 920.

HVI Publication 920 is the HVI document titled "Product Performance Certification Procedure Including Verification and Challenge," which provides product testing, certification, and challenge procedures and the use of labels for HCI-Certified home ventilating products.

HVI Publication 925 is the HVI document titled "Label and Logo Requirements," which identifies labels and specifies appropriate uses and placements of labels for HVI-Certified home ventilating products.

RESIDENTIAL APPENDIX 2 – RESIDENTIAL HERS VERIFICATION, TESTING, AND DOCUMENTATION PROCEDURES

The proposed regulations will modify RA3 by adding kitchen hood ventilation as a verification measure. This change will require adding the measure to Table RA2-1 under Mechanical Ventilation Measures and adding high-rise buildings to the documentation registration requirements in section RA2.3.1.2.

Table RA2-1 - Summary of Measures Requiring Field Verification and Diagnostic Testing

Measure Title	Description	Procedure(s)
Continuous Whole-Building Mechanical Ventilation Airflow	Measurement of whole-building mechanical ventilation is mandatory for newly constructed buildings.	RA3.7.4.1
Intermittent Whole-Building Mechanical Ventilation Airflow	Measurement of whole-building mechanical ventilation is mandatory for newly constructed buildings.	RA3.7.4.2

Measure Title	Description	Procedure(s)
Kitchen Exhaust Verification	Verifying compliance of kitchen exhaust hoods and fans with the local exhaust requirements of ASHRAE Standard 62.2.	RA3.7.4.3

RA2.3.1.2 Documentation Registration: For all low-rise and high-rise residential buildings for which compliance requires HERS field verification, all compliance documentation (Certificate of Compliance, Certificate of Installation, and Certificate of Verification) required for the dwelling unit shall be submitted for registration and retention to a HERS Provider data registry.

RESIDENTIAL APPENDIX 3 – RESIDENTIAL HERS VERIFICATION, TESTING, AND DOCUMENTATION PROCEDURES

The proposed regulations add kitchen hood ventilation as a verification measure. Section RA3.7.4.3 is added to include this protocol. This is also added to the list of verification and diagnostic procedures in Table RA3.7-1. The changes to Table RA3.7-1 also include corrections to the section references for the other procedures in the table.

Table RA3.7-1 - Summary of Verification and Diagnostic Procedures

Diagnostic	Description	Procedure
Whole-Building Mechanical Ventilation Airflow – Continuous Operation	Verify that whole-building ventilation system complies with the airflow rate required by ASHRAE Standard 62.2.	RA3.7.4.1 ~~Continuous Operation~~
Whole-Building Mechanical Ventilation Airflow – Intermittent Operation	Verify that whole-building ventilation system complies with the airflow rate required by ASHRAE Standard 62.2.	RA3.7.4.2.~~Intermittent Operation~~
Kitchen Exhaust Verification	Verify that kitchen exhaust complies with the requirements of ASHRAE Standard 62.2.	RA3.7.4.3

RA3.7.4.3 Kitchen Exhaust Verification:

Visual inspection of the kitchen exhaust hood or fan used to meet the local exhaust requirements in Section 5 of ASHRAE Standard 62.2 shall verify the presence of a label on the exhaust hood or fan indicating that it is an HVI-Certified product. The manufacturer name and model number from the label will be used to look up the unit in HVI Publication 911. Data from this listing will be used to determine whether the fan or hood meets the minimum airflow rate and maximum sound level requirements in Sections 5 and 7, respectively, of ASHRAE Standard 62.2. If the listed airflow rate is equal to or greater than the value required by Section 5 of ASHRAE Standard 62.2, the kitchen exhaust ventilation complies with the requirement for kitchen exhaust ventilation airflow. If the listed airflow is less than required, the kitchen exhaust does not comply, and corrective action shall be taken. If the listed noise level rate is equal to or less than the value required by Section 7 of ASHRAE Standard 62.2, the kitchen

exhaust ventilation complies with the requirement for kitchen exhaust ventilation airflow. If the listed noise level is greater than required, the kitchen exhaust does not comply, and corrective action shall be taken.

NONRESIDENTIAL APPENDIX 7

The proposed regulations will require updates to the acceptance test protocols in the nonresidential appendices to accommodate the following measures for high-rise residential buildings:

1. Ventilation make-up air
2. Central ventilation shafts:
    a. Sealing
    b. Airflow
    c. Balanced airflow
3. Air filter media efficiency label
4. Kitchen hood HVI label, ventilation rates, and Sone values.

2.5 Residential ACM Reference Manual

SECTION 2 – THE PROPOSED DESIGN AND STANDARD DESIGN

Subsection 2.4.9: The proposed regulations will substantially change the algorithms applied for calculation requirement minimum ventilation airflow rates. This section will be revised to include the calculation method for Qtotal, Qinf, and Qfan.

2.6 Nonresidential ACM Reference Manual

The proposed regulations will substantially change the algorithms applied for calculation requirement minimum ventilation airflow rates for high-rise multifamily buildings. This section will be revised to include the calculation method for Qtotal, Qinf, and Qfan.