

## DOCKETED

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## CALIFORNIA ENERGY COMMISSION

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## ***Staff Supplement to CASE Report #2019-RES-IAQ-F***

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**Subject:** Residential Indoor Air Quality  
Measure Number: 2019-RES-IAQ-F

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### DESCRIPTION OF PROPOSED REGULATORY CHANGES

CASE report #2019-RES-IAQ-F, titled Residential Indoor Air Quality, proposes to make the following changes to the Standards:

1. Adoption of the 2016 version of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings including addenda k, l, q, s to 62.2-2016.

- Staff does not agree with all of the proposed changes to Section 100.1 and have instead proposed to make the following changes to Section 100.1 in the Express Terms:

Adopt 2016 version of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings including Addenda b, d, l, q, and s to ANSI/ASHRAE 62.2-2016 published in the 2017 supplement.

Staff has proposed to reference all addenda published in the 2017 supplement except for addendum k which allows for reduced dwelling unit ventilation airflow when central fans with increased MERV-rated filters are operated during periods when comfort cooling is not required, thus addendum k does not provide equal protection for non-particulate contaminants, and uses excessive energy to filter air as compared to other means for air filtration.

2. Adoption of the new ASHRAE 62.2-2016, scope for high-rise residential dwelling units that was moved from ASHRAE 62.1 into ASHRAE 62.2, which results in high-rise multifamily (HRMF) building ventilation rates that are decreased by approximately 30 percent, depending on unit configuration.

- Staff agrees with the proposed change in scope to ASHRAE 62.2, and have incorporated substantively similar changes into the proposed Express Terms.

Amendments to ASHRAE 62.2:

3. Default Ventilation Airflow Rate. For single family dwellings, specify use of a default envelope leakage value of 2 ACH 50 (instead of a blower door measurement) for calculation of the required IAQ ventilation airflow rate in section 4.1 of ASHRAE 62.2,

which increases single family residential ventilation rates by an average of 51% for the 2,100 square foot prototype and 41% for the 2,700 square foot prototype.

- Staff agrees with the proposed amendment to ASHRAE 62.2, and have incorporated substantively similar changes into the proposed Express Terms.
4. Air filter efficiency - MERV 13. For single family and multifamily dwelling units, specify increased filter efficiency in Section 6.7 of ASHRAE 62.2- 2016 from MERV 6 to MERV 13.
    - Staff agrees with the proposed amendment to ASHRAE 62.2, and have incorporated substantively similar changes into the proposed Express Terms.
  5. Multifamily dwelling unit enclosure leakage. For multifamily dwelling units, require sealing of the dwelling unit enclosures and enforce a maximum allowable leakage rate of 0.3 cfm/ft<sup>2</sup> of enclosure area as verified by a HERS Rater.
    - Staff does not agree with the proposed amendment to ASHRAE 62.2, and have instead proposed to make the following changes to Section(s)150.0 in the Express Terms.

Staff has proposed maximum allowable leakage rate of 0.3 CFM<sub>50</sub> per ft<sup>2</sup> of multifamily dwelling enclosure area as verified by a HERS Rater only as a prerequisite to allowing use of a continuously operating supply ventilation system, or a continuously operating exhaust ventilation system. This approach allows an alternative compliance path which does not require dwelling envelope leakage verification when a balanced ventilation system type is used.

6. Particulate Matter (PM2.5). For HRMF dwellings, specify MERV 13 filtration of mechanically supplied outside air in locations with high levels of fine particulate matter (PM2.5) concentrations near busy roadways, and for the remainder of the state specify MERV 8.
  - Staff does not agree with the proposed amendment to ASHRAE 62.2, and have instead proposed to make the following changes to Section 150.0 in the Express Terms.

Staff has proposed to amend ASHRAE 62.2-2016 to require minimum MERV 13 air filtration for space conditioning systems, supply ventilation systems, and the supply side of balanced ventilation systems, for all newly constructed dwellings in all locations in California. Staff contends that determination of the required air filter MERV level and enforcement of the required MERV level based on the proximity to busy roadways is not a practical procedure for an energy regulation due to the complexity of determining which roadways are “busy”, and how near each dwelling is to each roadway. MERV 13 would provide equal protection for all persons in California for both PM10 and PM2.5 which is found in areas that are not near busy roadways.

7. Balanced ventilation system airflow reduction. For multifamily dwelling units, when balanced systems are used, reduce the dwelling unit ventilation rate required by section 4.1 by 15%.

- Staff does not agree with the proposed amendment to ASHRAE 62.2, and have not included this proposed change in the Express Terms.

Staff does not agree reducing the dwelling unit ventilation rate by 15% when balanced ventilation systems are used would be a compelling benefit to designers sufficient to motivate selection of balanced systems instead of exhaust systems (e.g. a reduction from 68 cfm to 58 cfm for a 1,500 ft<sup>2</sup> 2 bedroom dwelling unit). This small reduction in ventilation airflow would not change system duct sizing or electrical requirements, thus it is not clear how this would be a benefit to the designer. This proposal adds complexity to the determination of the ventilation airflow required for the dwelling, and diminishes the protection afforded by the full dwelling unit ventilation airflow rate specified by ASHRAE 62.2-2016 section 4.1.

8. Make-up air (compensating outdoor air). For HRMF, require a dedicated make-up air source inlet for all units, but in areas of high ambient PM<sub>2.5</sub>, prohibit the use of passive vents and require a dedicated mechanical filtered makeup air source.
  - Staff does not agree with the proposed amendment to ASHRAE 62.2, and have instead proposed to make the following changes to Section 150.0 and 120.1(b)2 in the Express Terms.

Staff has not proposed use of make-up air in multifamily dwellings beyond what is specified in ASHRAE 62.2-2016. Staff has not proposed to prohibit use of passive vents, and also has not proposed to require use of passive vents. Staff has proposed an amendment to ASHRAE 62.2-2016 to require continuous operation (intermittent operation not allowed) of the ventilation systems in multifamily dwellings when supply or exhaust ventilation system types are used, intending to minimize the pressure differentials between dwellings in the multifamily building, thus minimize transfer airflow between dwelling units. Research has shown that passive vents are not an effective means to provide outdoor air unless the dwelling enclosure is very tight (i.e. < 0.1 or 0.05 CFM<sub>50</sub> per ft<sup>2</sup> dwelling enclosure surface area).

Staff contends that determination of the requirement for specific airflow requirements and specific MERV levels, and enforcement of the required airflows and MERV levels based on the proximity to busy roadways is not a practical procedure for an energy regulation due to the complexity of determining which roadways are “busy”, and how near each dwelling is to each roadway (see also comments for item 6).

9. Central fan integrated (CFI) ventilation. Allow continuous operation of CFI ventilation systems in HRMF dwellings to provide the dwelling unit ventilation airflow required by section 4 of ASHRAE 62.2-2016.
  - Staff does not agree with the proposed allowance for continuous operation of CFI ventilation system space conditioning air handlers and has not included this proposed change in the express terms.

Staff proposes to leave unchanged the existing amendment to ASHRAE 62.2 located in Section 150.0(o), and to add the same language to Section 120.1(b)2, that prohibits continuous operation. Continuous operation of CFI systems has been prohibited because of the excessive Watt/cfm of ventilation air consumed during periods when space conditioning is not called for. The CASE report has not provided evidence that CFI

central space conditioning systems operating at reduced speeds could provide the minimum ventilation airflow required by ASHRAE 62.2, and has not provided evidence of the expected Watt/cfm of ventilation air performance of the CFI system.

New Title 24 Part 6 requirements:

10. Central exhaust shaft leakage. For multifamily building central exhaust systems, require HERS verification to confirm duct leakage less than or equal to 10% using total pressurization protocol in NA2.1.

- Staff does not agree with the proposed multifamily building central exhaust shaft requirements, and has not included this proposed change in the Express Terms.

Staff determined that this proposal was not viable in the absence of the appropriate method of test. ASHRAE Standard 215P Method of Test to Determine Leakage of Operating HVAC Air Distribution Systems is in the final phase of public review, and when published will be available for performing the leakage measurements required for determining compliance with a leakage criterion. Staff recommends this measure be considered for the 2022 update to Part 6.

11. Central exhaust balancing. For multifamily building central exhaust systems, specify the dwelling unit airflows shall be balanced to  $\pm 10\%$  of the ventilation airflow required by section 4 of ASHRAE 62.2 as verified by a HERS Rater.

- Staff does not agree with all aspects of the proposed central exhaust system balancing requirement, and have instead proposed to make the following changes to Section(s) 150.0(o) and 120.1(b)2 in the Express Terms:

Staff proposes to specify a balancing tolerance of +20% and - 0.0% of the ventilation airflow required by section 4.1 of ASHRAE 62.2-2016 in order to ensure the minimum airflow rate is provided to each dwelling.

12. Kitchen range hood verification. Require HERS verification of kitchen hoods in all dwelling unit types to confirm the installed hoods are certified by Home Ventilating Institute (HVI) and that the certified performance values meet ASHRAE 62.2 requirements for airflow ratings, and sound ratings, and that they are externally vented.

- Staff does not agree with all aspects of the proposed kitchen range hood verification requirement, and have instead proposed to make the following changes to Section(s) 150.0(o)2 and 120.1(b)2B in the Express Terms:

Staff proposes to verify the installed model number is rated to provide the minimum ventilation airflow rate specified in Section 5 of ASHRAE 62.2, and does not exceed maximum sound rating specified in section 7.2.2 of ASHRAE 62.2. Staff is not proposing HERS verification of the duct system for the kitchen range hood.

13. Combustion Air: Prohibit the use of indoor air as combustion air for space thermal conditioning, water heating, and pool heating equipment.

- Staff does not agree with the proposed combustion air requirements, and have not included the proposed requirements in the Express Terms.

This proposal was submitted to Staff for consideration very late in the pre-rulemaking process, after all of the stakeholder meetings and pre-rulemaking workshops were

concluded, thus staff determined the proposal could not be included in the proposed Express Terms since it has not been vetted by stakeholders.

### STAFF ANALYSIS AND CONCLUSION

Staff has analyzed the submitted CASE report and reached the following conclusions for the measures included in the Express Terms:

- Measure costs premiums presented in the CASE Report appear reasonable and appropriate for the measure proposed.
- Measure energy use estimates presented in the CASE Report appear to have been appropriately modeled and appear credible.