RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

Setting the **Standards** for
Home Energy Efficiency

Interpretation: Modeling continuous bathroom & kitchen exhaust ventilation

Designation: IR 301-2019-027, 301-2022-022 and 301-2025-022

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Reference:

Standard	ANSI/RESNET/ICC 301-2019 ANSI/RESNET/ICC 301-2022 ANSI/RESNET/ICC 301-2025
Page Number(s):	
Sections(s):	3. Definitions, 4.4.3.2.4
Table(s):	Table 4.5.2(1),
Relating to:	Local mechanical exhaust

Request from:

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Background Statement: *Provided by person requesting the interpretation.*

It is not currently explicit in the Standard how fan energy and airflow associated with local mechanical exhaust serving bathrooms and kitchens is to be treated in the energy rating. It seems clear that where these point source or local exhaust fans operate intermittently/manually, they are excluded since they are not defined or included as Minimum Rated Features.

However, based on the definition of 'dwelling unit mechanical ventilation system', it seems this term could be interpreted by some Raters to include a bathroom or kitchen exhaust system if it was operating 'continuously', even if the purpose of these exhaust fans are to provide local mechanical exhaust.

This does not seem to be the same purpose as a 'dwelling unit mechanical ventilation system', as defined below, which seems to refer to a system that provides a continuous or programmed air exchange rate, which is based on the number of occupants and the size of the dwelling unit, rather than to remove local pollutants (similar to Section 4 of ASHRAE 62.2).

> ***Dwelling Unit Mechanical Ventilation System*** – A Ventilation system, operating continuously or through a programmed intermittent schedule, consisting of powered Ventilation equipment,[15] related mechanical components,[16] and automated control devices[17] that provides Dwelling Unit Ventilation at a known or measured airflow rate.
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> 15 (Informative Note) Such as motor-driven fans and blowers.
> 16 (Informative Note) Such as ducts, inlets, dampers, or filters.
> 17 (Normative Note) A switch or thermostat setting, which enables the occupant to turn a system on and off, is not considered automated, continuous, nor programmed. The presence of a ventilation override control is permitted, if the override control is labeled with text or an icon that clearly indicate its function is to turn off the ventilation system.

Regardless of how they are operated, these bathroom and kitchen local mechanical exhaust systems are not explicitly mentioned as Minimum Rated Features in Table 4.5.2(1) and again the language seems to imply that these systems were not intended to be included in the energy rating, except where they run continuously to contribute to dwelling unit mechanical ventilation (DUMV):

24. Dwelling Unit Mechanical Ventilation System(s)	Ventilation strategy (Supply, Exhaust, or Balanced), equipment type (individual or shared), controls (continuous or programmed intermittent schedule), daily run time, measured exhaust airflow, measured supply airflow, system rated airflow and fan wattage.[1] Where shared systems occur, include percentage of outdoor air in supply air, rated exhaust airflow and rated supply airflow of the shared systems. Fan motor efficiency and horsepower are acceptable substitutes for fan wattage.

Appendix B is similarly not clear but again implies that the intent of DUMV was a system that provides continuous air exchange rather than local mechanical exhaust.

While not directly related to the Minimum Rated Features, the Standard does state the following, in the context of HVAC Sizing of the Rated Home.

> 4.4.3.2.4 Where a Dwelling Unit Mechanical Ventilation System(s) is provided, the combined total air exchange rate (Infiltration rate and mechanical Ventilation fan rate) shall not be less than the total Ventilation rate determined by the product of the value determined by Equations 4.4-1 and 1.4. Flow rates for Bathroom, kitchen and other local exhaust that does not serve as a component of a Dwelling Unit Mechanical Ventilation System shall not be considered for sizing purposes.

This text further supports that the Standard intended for intermittent local exhaust to be excluded from the energy rating, and only the portion of continuous local exhaust that contributes to DUMV should be included.

This interpretation is requested given the number of dwelling units, primarily multifamily, that seek energy ratings but also strive to meet ventilation rates recommended by ASHRAE 62.2. In many multifamily buildings, designers choose continuous exhaust-only ventilation to provide dual-purpose, local mechanical exhaust and dwelling unit air exchange. However, the continuous kitchen exhaust rate (5 ACH based on kitchen volume) often exceeds the minimum air exchange rate. If a Rater interprets the Standard and models the full airflow, it leads to an energy penalty in the rating, since there is no guidance in Standard 301 for modeling local kitchen exhaust the same way in the Rated Home as in the Reference Home.

For ASHRAE 90.1 models, ENERGY STAR Multifamily New Construction Simulation Guidelines addresses this by allowing the Baseline ventilation rate to exceed ASHRAE 62.2 rates, as needed to include the minimum airflow for kitchen exhaust (5 ACH). In this way, the modeling protocols are agnostic regarding whether local mechanical exhaust is provided intermittently or continuously, while including the energy impacts of the latter. A change like this would require an Amendment to the Standard, which would take some time so an interpretation is currently needed.

Proposed Interpretation: *Provided by person requesting the interpretation.*

1. **Bathroom, Laundry and Kitchen exhaust fans that do not operate continuously or on a programmed schedule**: The airflow and fan energy associated with bathroom, laundry or kitchen exhaust fans that do not operate continuously or on a programmed schedule (i.e., on-demand or manually-operated) are not included in the energy rating. For example, a 50 cfm bathroom exhaust fan or 100 cfm kitchen range hood that requires the occupant to turn the fan on and off.

2. **Bathroom, Laundry and Kitchen exhaust fans that do operate continuously or on a programmed schedule:** The airflow and fan energy associated with bathroom, laundry or kitchen exhaust fans that do operate continuously or on a programmed schedule are included in the energy rating only where they are part of the Dwelling Unit Mechanical Ventilation System. For example, a 20 cfm bathroom exhaust fan that operates continuously and provides local exhaust and also contributes to the Dwelling Unit Mechanical Ventilation rate.

3. **Continuous local exhaust rates for the bathroom or kitchen exhaust which exceed the ASHRAE 62.2-2016 Dwelling Unit Mechanical Ventilation rate:** Where the continuous local exhaust rates for the bathroom, laundry and kitchen exhaust exceed the Dwelling Unit Mechanical Ventilation rate defined by ASHRAE 62.2-2016, Equation 4.1a, only the airflow contributing to the Dwelling Unit Mechanical Ventilation System rate shall be required to be included. For example, where a dwelling unit has two continuously operating bathroom exhaust fans and a kitchen exhaust fan, which continuously exhaust a combined 100 cfm (20 cfm per bathroom and 60 cfm in the kitchen), but the DUMV rate per Equation 4.1a is 70 cfm (based on the square footage and number of occupants), only 70 cfm is modeled in the Rated Home and the excess 30 cfm is not modeled, as it is considered local mechanical exhaust which is not a Minimum Rated Feature.

SDC Response:

Is proposed interpretation 1. Correct?__X___ Yes _____ No

Is proposed interpretation 2. Correct?__X___ Yes _____ No

Is proposed interpretation 3. Correct?__X___ Yes _____ No

SDC Comments:

The SDC300 agrees with the Submitter's interpretations of the Standard in the three cases outlined above. The Standard is not currently clear if or how to model the portion of exhaust air that is provided in the Rated Home for 'local mechanical exhaust' purposes. It was not the intent of the Standard to penalize 'local mechanical exhaust' systems that run continuously, rather than intermittently. Given the need for consistency across Raters, this interpretation is needed to ensure all Raters interpret the Standard the same way. An amendment to the Standard will be needed in the future that explicitly defines how the airflow and fan energy for 'local mechanical

exhaust' should be modeled in the Rated Home and Reference Home. In the interim, this interpretation makes it clear that the Standard does not include airflow or fan energy associated with 'local mechanical exhaust' systems in the energy rating, regardless of its operation (continuous or intermittent), where it is not contributing to DUMV. When entering into the rating software, where fan power is entered rather than fan energy, fan power may be reduced by prorating by the CFM/W of the associated fans.