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Setting the **Standards** for
Home Energy Efficiency

Interpretation: Modeling Balanced HRV/ERV Systems

Designation IR 301-2019-038, IR 301-2022-025 & IR 301-2025-001

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Request from:

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Reference: This interpretation refers to the requirements presented in:

Standard:	ANSI/RESNET/ICC 301-2019 ANSI/RESNET/ICC 301-2022 ANSI/RESNET/ICC 301-2025
Page Number(s):	
Section(s):	3.2: (301-2019, 301-2022 & 301-2025) 4.4.3.2.4: (301-2019 & 301-2022) 404.1.3.2.4: (301-2025)
Table(s):	Table 4.2.2(1) Air Exchange Rate; Rated Home: (301-2019, 301-2022 & 301-2025)
Relating to:	Continuous Mechanical Ventilation

Excerpt of text:

See the end of this interpretation.

Background:

In *IR 301-2019-027*, the modeling of exhaust systems was clearly addressed, but continuous balanced ventilation systems was not clearly addressed. There is a need to address the same concern when exhaust airflow is provided with continuous ERV's that also provide continuous outdoor air per ASHRAE 62.2.

When modelling dwelling unit continuous ventilation airflow rates which exceed the minimum outdoor air rates determined via ASHRAE 62.2-2016, this negatively impacts the HERS model when comparing the rated home against the reference home.

As an example, a 1000 SF 2-bed 2-bath dwelling unit in a multifamily building has a minimum flow rate of 52.5 CFM per ASHRAE 62.2-2016, while the design rate may be 65 CFM to meet minimum local exhaust air flow specified by code or programs such as Energy Star Multifamily New Construction. For an optimal design that can be reliably balanced, we would then recommend additional flow be accounted for in design up to 80 CFM. This allows the balancer and Rater a buffer in the field testing/review portion of Energy Star certification.

Per *IR 301-2019-027*, when continuous local exhaust rates for the bathroom and/or kitchen exceeds the ASHRAE 62.2-2016 ventilation rates, only the ventilation that contributes to ASHRAE may be modeled. From the example above, the Rated Home will be modeled with 52.5 CFM of mechanical ventilation and any excess ventilation remains unmodeled.

Interpretation: *(Proposed by the petitioner)*

Whenever the same ventilation system is meeting minimum outdoor airflow requirements and the minimum local exhaust air flow requirements of the relevant ASHRAE and/or Mechanical Codes with the continuous ventilation rate, the HERS Rating software airflow input of the Rated Home ventilation system shall be reduced to the airflow rate of the HERS Reference Home [this can be found in the HERS Reference Home Summary]. In this case, the following input adjustments shall also be made.

- The power consumption for the ventilation system at the total verified air flow rate shall be determined in CFM/watt. This power consumption rate shall be used to prorate the power consumption at the modelled ASHRAE Outdoor minimum airflow rate. An example being if the system power consumption is 0.825 CFM/watt and the ASHRAE minimum flow rate is 50 CFM, the model input will be 41.25 watts.

- The recovery efficiency of an ERV or HRV at the verified total airflow rate shall be used for the modeled recover efficiency. An example being if the system efficiency is 80% at the total verified airflow the model input will be 80% even though the flow rate and power consumption inputs are based on the lower ASHRAE minimum rates.

Question: Is the Interpretation of our Rated Home mechanical ventilation air flow rate input correct?
Is the Interpretation of our Rated Home mechanical ventilation power consumption input correct?
Is the Interpretation of our Rated Home mechanical ventilation recovery efficiency input correct?

SDC Answer: (Yes/No)
With respect to Q1, the answer is Yes.
With respect to Q2, the answer would be Yes if the calculation were done correctly. However, the proposed interpretation does the calculation incorrectly – it should be 50 CFM / 0.825 CFM/watt = 60.6 watts.
With respect to Q3, the answer is Yes.

SDC Comments:	For consistency with the prior referenced interpretation (IR 301-2019-027), the SDC300 agrees with these submitted interpretations as they relate to balanced ventilation systems. To fully resolve this issue in the future, the 301 Task Group will consider changes to the standard that will explicitly address continuous dwelling unit mechanical ventilation systems that simultaneously provide continuous local exhaust ventilation.

Excerpt of text: 301-2019, 301-2022 and 301-2025:

Standards 301-2019, 301-2022 and 301-2025
(The section numbers and text are the same in Standard 301-2019 and Standard 301-2022.)

3.2 Definitions (2019)

Dwelling Unit Mechanical Ventilation System – A Ventilation system consisting of powered Ventilation equipment such as motor-driven fans and blowers and related mechanical components such as ducts, inlets, dampers, filters and associated control devices that provides Dwelling Unit Ventilation at a known or measured airflow rate.

3.2 Definitions (2022, 2025)

Dwelling Unit Mechanical Ventilation System – A Ventilation system, operating continuously or through a programmed intermittent schedule, consisting of powered Ventilation equipment,[i] related mechanical components[ii], and automated control devices[iii] that provides Dwelling Unit Ventilation at a known or measured airflow rate.

Bathroom - A room with at least one sink and at least one toilet.

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.

From Table 4.2.2.(1) (2019) For residences with Dwelling Unit Mechanical Ventilation Systems, the total air exchange rate shall be the Infiltration rate[j] as determined above, in combination[h] with the time-averaged Dwelling Unit Mechanical Ventilation System rate,[g, k] which shall be the value measured in accordance with Standard ANSI/RESNET/ICC 380. The Dwelling Unit Mechanical Ventilation System rate shall be increased as needed to ensure that the total air exchange rate is no less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm.

From Table 4.2.2.(1) (2022) For residences with Dwelling Unit Mechanical Ventilation Systems, the total air exchange rate shall be the

Infiltration rate[j] as determined above, in combination[h] with the time-averaged Dwelling Unit Mechanical Ventilation System rate,[g, **k**] which shall be the value measured in accordance with Standard ANSI/RESNET/ICC 380. To ensure that the total air exchange rate is no less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm, the Dwelling Unit Mechanical Ventilation System runtime operation shall first be increased, if possible, followed by increasing the airflow rate as needed.

From Table 4.2.2.(1) (2025) For residences with Dwelling Unit Mechanical Ventilation Systems, the total air exchange rate shall be the Infiltration rate[i] as determined above, in combination[g] with the time-averaged Dwelling Unit Mechanical Ventilation System rate,[j, **dd**] which shall be the value measured in accordance with Standard ANSI/RESNET/ICC 380. The dwelling unit total air exchange rate shall be no less than Qtot = 0.03 x CFA + 7.5 x (Nbr+1) cfm. To ensure the total air exchange rate is sufficient, if needed, the Dwelling Unit Mechanical Ventilation System runtime operation shall first be increased, if possible, followed by increasing the airflow rate as needed. Supply and exhaust ventilation shall increase proportionally to the Rated Home's entered value(s), or if no mechanical ventilation system was specified a balanced ventilation system shall be modeled.