

August 24, 2020

To: [bcd.ptsptech@oregon.gov](mailto:bcd.ptsptech@oregon.gov)

**C/O:** Oregon Construction Industry Energy Board and Residential and Manufactured Structures Board

**Re:** Proposed code revision to Oregon's draft modifications to the 2018 IRC, Proposal #2

**From:** Mike Moore, P.E., Newport Partners, submitted on behalf of Broan-NuTone

Dear Committee Members:

Broan-NuTone commends Oregon on its draft modifications to the 2018 IRC that are intended to improve the indoor air quality (IAQ) of dwelling units and the energy performance of dwelling unit ventilation systems. This comment includes proposed code revisions to Oregon's draft language which are intended to align with Executive Order 17-20, the 2021 IRC, and the DOE ZERH specification while providing cost-effective energy savings. Thank you for your consideration of this comment. Please note that this proposed code revision is complementary to the other proposed code revision that I have submitted to this section, and my request is that the committee approve both.

Sincerely,

A handwritten signature in black ink that reads "Mike Moore". The signature is written in a cursive, slightly slanted style.

Mike Moore, P.E.

ASHRAE 62.2 Vice Chair

## Proposed Code Revisions to Oregon’s Draft Modifications to the 2018 IRC

Modify Section N1105.6 as follows:

**N1105.6 Heat recovery ventilator.** Whole house ventilation systems shall include an energy recovery ventilator with a fan efficiency of not less than 1.2 cfm/watt and a heat recovery rating of not less than 66 percent.

**Exception:** Whole house balanced ventilation systems that meet the exception to Section M1505.4.3 for the 30 percent ventilation rate reduction.

Modify Table N1103.6.1 as follows:

TABLE N1103.6.1 WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY PERFORMANCE<sup>a</sup>

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY PERFORMANCE (CFM/WATT) <sup>b</sup>	AIR FLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	1.4 cfm/watt	Any
Bathroom, utility room	10	2.8 cfm/watt	< 90
Bathroom, utility room	90	1.4 cfm/watt	Any
<u>Air handler that is integrated to tested and listed HVAC equipment</u>	Any	<u>1.2 cfm/watt</u>	<u>Any</u>

For SI: 1 cfm = 28.3 L/min.

a. When tested in accordance with HVI Standard 916.

b. Design outdoor airflow rate / watts of fan used

Modify Section M1505.4 as follows:

M1505.4 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1505.4.1 through M1505.4.4.

M1505.4.1 System design. The whole-house ventilation system shall consist of a balanced ventilation system ~~one or more supply or exhaust fans, or a combination of such,~~ and associated ducts and controls. ~~The whole house ventilation system shall provide balanced ventilation.~~ Local exhaust or supply fans are permitted to serve as part of such a system. Outdoor air ventilation provided by a supply fan ducted to the return side of an air handler shall be considered as providing supply ventilation for the balanced system.

Modify Section M1505.4.3 as follows:

**M1505.4.3 Mechanical ventilation rate.** The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate as determined in accordance with Table M1505.4.3(1) or Equation 15-1. Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] Equation 15-1

Exception:

1. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1) is multiplied by the factor determined in accordance with Table M1505.4.3(2).

2. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15- 1 shall be permitted to be reduced by 30 percent, provided that all of the following conditions are met:

2.1 A ducted system supplies ventilation air directly to each sleeping room and to one or more of the following rooms: a. Living room b. Dining room c. Kitchen

2.2. Where ventilation is distributed by a central furnace, the thermostat shall include a ventilation mode for the fan operation to circulate a minimum of 15 minutes per hour.

2.3. The whole-house ventilation system is a balanced ventilation system.

Add the following definition:

BALANCED VENTILATION SYSTEM. A ventilation system consisting of any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10% of the total mechanical supply airflow rate. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

**Rationale:**

Executive Order 17-20 directs Oregon BCD to “require newly constructed residential buildings to achieve at least equivalent performance levels with the 2017 U.S. Department of Energy Zero Energy Ready Standard” (DOE ZERH). DOE ZERH’s *prescriptive* path requires homes in both of Oregon’s climate zones (5 and Marine 4) to be provided with a ventilation system with heat recovery and minimum fan performance. Oregon’s proposed exception to N1105.6 would permit a balanced system that uses a bathroom exhaust fan for the exhaust air and uses a central air handler for the outdoor supply air. Such a ventilation system would use far more energy than a balanced ventilation system with heat recovery (assuming both systems use the 30% airflow reduction permitted by Section M1505.4.3).

If Oregon desires to approve balanced ventilation systems without heat recovery, as an alternative to the N1105.6 prescription for an HRV, then at a minimum, Oregon should set a backstop for the minimum energy performance for the outdoor air delivery rate of the air handler, similar to backstops set for other ventilation systems. Such a backstop was set in the 2021 IECC-R by proposal RE-134 that modified Table N1103.6.1 as shown in this proposed code revision (i.e., establishing a minimum performance of 1.2 cfm of design outdoor air flow rate per watt of air handler fan power used). In this regard, the proposed revision would align with the IECC-R. Without such a backstop, air handlers (*even those with EC motors*) for single family homes would use about 2.5 times the fan energy of an H/ERV when operating at the minimum 15 minutes/hour required by Oregon’s proposed M1505.4.3, without the additional benefit of heat recovery.

This proposed revision would also clarify what is meant by “balanced ventilation system” by:

1. providing a definition that is aligned with the 2021 IMC and 2021 IRC in this regard,
2. retaining bullet #2.3 to Section M1505.4.3 for clarity,
3. specifying “balanced ventilation system” in the exception to N1105.6, and
4. modifying M1505.4.1 to use the term “balanced ventilation system”.

Without such clarifications, practitioners may mistake ventilation system “balancing” (i.e., field modulation and verification of flow rates to achieve design) for “balanced ventilation” (i.e., “A ventilation system consisting of any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10% of the total mechanical supply airflow rate. The balanced ventilation system airflow is the average of the supply and exhaust airflows.”).

Note: This proposed code revision is intended to be considered in addition to the other proposal that I submitted to this same section. That is, the two proposed code revisions are complementary and can be approved in tandem).