STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development

Standard Energy Code Proposal Form

May 2018

Log No. 19-WSEC-R08 Rev

Code being amended: ☐ Commercial Provisions ☒ Residential Provisions

Code Section # ___R401.3_____

Brief Description: Include whole-house mechanical ventilation test results on permanent certificate.

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

R401.3 Certificate (Mandatory). A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room, or an approved location inside the building. When located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label, or other required labels. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, below-grade wall, and/or floor) and ducts outside conditioned spaces; U-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration~~,~~; ~~and~~ the results from any required duct system and building envelope air leakage testing done on the building; and the results from the whole-house mechanical ventilation system flow rate test. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling, whole-house mechanical ventilation, and service water heating appliances ~~equipment~~. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

Informational note: The following text is being submitted to simultaneously amend the WA State residential code:

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air to each dwelling unit at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).
Exception: 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 M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

M1507.3.3.1 Testing. Whole-house mechanical ventilation systems shall be tested and verified to provide a flow rate not less than the minimum required by Section M1507.3.3. Testing shall be performed according to the ventilation equipment manufacturer's instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation fan's inlet terminals or grilles, outlet terminals or grilles or in the connected ventilation ducts. Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official.

Purpose of code change:

If installed incorrectly, whole-house mechanical ventilation systems can fail to deliver the minimum

outdoor air needed to provide acceptable indoor air quality. A recent study in Florida* found that only three of 21 whole house mechanical ventilation systems had a flow rate near the design level. Because these systems perform a vital function in supporting building durability and occupant health, these systems should be verified for flow when installed. This requirement and text are aligned with ASHRAE 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings. Finally, because the whole-house mechanical ventilation system is a critical component of the build-tight/ventilate-right approach to energy efficient, durable, and healthy construction, the verified ventilation rate should be listed on the home's permanent certificate, along side other performance metrics and values for critical appliances and assemblies.

* Sonne et al. (2015). Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida. FSEC-CR-2002-15. http://w w w .fsec.ucf.edu/en/publications/pdf/FSECCR-2002-15.pdf.

Your amendment must meet one of the following criteria. Select at least one:

- [X] Addresses a critical life/safety need.
- [ ] The amendment clarifies the intent or application of the code.
- [ ] Addresses a specific state policy or statute. (Note that energy conservation is a state policy)
- [ ] Consistency with state or federal regulations.
- [ ] Addresses a unique character of the state.
- [ ] Corrects errors and omissions.

Check the building types that would be impacted by your code change:

- [X] Single family/duplex/townhome
- [X] Multi-family 1 – 3 stories
- [ ] Multi-family 4 + stories
- [ ] Commercial / Retail
- [ ] Institutional
- [ ] Industrial

Your name	Mike Moore	Email address	mmoore@newportventures.net
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Other contact name Click here to enter text.

Economic Impact Data Sheet

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants and businesses.

Presumably, a component of this inspection is flow rate verification. If this is not the case, and IECC R104.2.4 does not trigger a requirement for whole-house flow rate verification, then the cost associated with flow rate verification can be estimated as $9-$12, assuming a time requirement of 15-20 minutes for a skilled laborer with a labor rate of $35/hour to test the airflow of a whole house mechanical ventilation system. The test can be completed by the same technician performing the blower door test. Also, there is no requirement for a third party to conduct the test, which can help moderate costs. Further, any increase in cost is expected to be offset by the health benefits expected from properly commissioned whole-house mechanical ventilation systems. Research suggests that the costs associated with poor indoor air quality in the U.S. is around $500 annually per person.[1,2,3,4,5]

References:

1. Logue JM, Price PN, Sherman MH, & Singer BC. 2012. A Method to Estimate the Chronic Health I mpact of Air Pollutants in U.S. Residences. Environmental Health Perspectives 120(2): 216-222.
2. Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A C ombined Assessment of Energy and Air Quality Potential Values. LBNL969E.
3. Brown DW. 2008. Economic value of disabilityadjusted life years lost to violence: estimates for WH O Member States. Rev. Panam Salud Publica, 24, 203to209.
4. Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels : a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Envir onment Department.
5. Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of T hirty Chronic Conditions in the U.S. from 1987to2010. U.S. Department of Commerce Bureau of Ec onomic Analysis WP 2014-9.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost **Analysis tool** and **Instructions;** use these **Inputs**. **Webinars on the tool can be found Here and Here**)

$0-0.006/square foot ($0-12/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

$35/hour*(1/3 hour) = $11.67/2000 ft2 = $0.006/ft2

Provide your best estimate of the annual energy savings (or additional energy use) for your code change proposal?

Energy costs or savings will be dependent on the design and actual, unadjusted whole-house ventilation system flow rate. In the case that the design flow rate was not achieved prior to commissioning, the energy costs will increase to what is expected for minimally code-compliant dwelling units. In the case that the targeted flow rate is exceeded prior to commissioning, there is an opportunity to harvest energy savings by reducing the flow rate to the code-minimum requirement. Fan energy use for minimally code compliant WHMV systems can range from 188 kWh to 438 kWh for a typical home (2000 ft2, 3 bedroom) with a whole-house mechanical ventilation flow rate of 100 cfm. A commissioning procedure that produces a 30% reduction in flow rate would result in up to 219 kWh in annual fan savings alone (not to mention commensurate heating and cooling energy savings).

0.1 KWH/ square foot (or) Click here to enter text.KBTU/ square foot

(219 KWH/ dwelling unit)

Show calculations here, and list sources for energy savings estimates, or attach backup data pages

= 100 cfm/(0.0012 – 0.0028 cfm/kW)*8760 hours = 93 – 219 kWh

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: ~5-10 minutes to verify that the targeted WHMV flow rate has been field verified.

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.