



Code Amendment Proposal Application

Department of Consumer & Business Services

Building Codes Division

1535 Edgewater NW, Salem, Oregon

Mailing address: P.O. Box 14470, Salem, OR 97309-0404

Phone: 503-378-4133, Fax: 503-378-2322

Oregon.gov/bcd

Read the entire code amendment proposal application before completing this form. Please complete all parts before submitting your proposal and refer to the provided checklist.

APPLICANT INFORMATION

Name: Kevin Rose

Date: 8/26/22

Representing (if applicable): Northwest Energy Efficiency Alliance

Work phone: (503)688-5437

Mailing address: 700 NE Multnomah Street, Suite 1300

Cell phone:

City: Portland

State: OR

Zip: 97232

Email address: krose@neea.org

PROPOSAL INFORMATION

Specialty code: ORSC

Code section(s): N1104.8.2

Briefly explain the subject of your proposal: establishes a requirement for blower door testing and a maximum air leakage rate

INSTRUCTIONS AND CHECKLIST

Fill in all the information above and submit this page, signed and dated, with the required supplementary information for Parts I, II, III, and IV described on page 2 of this application. This application may be submitted by mail to the mailing address above, or by email to BCD.PTSPtech@oregon.gov.

Summary checklist for the applicant:

- Part I** Code amendment language is attached in the proper format.
- Part II** Amendment proposal requirements for amending the code have been reviewed.
- Part III** Amendment proposal criteria questions have been answered and are attached.
- Part IV** If applicable, additional ORSC energy efficiency amendment proposal information is attached.

Note: One application is required for each code section you are proposing to amend. If this proposal requires changes in other sections of the code for alignment, include those changes as part of this application.

APPLICANT SIGNATURE

Signature:

Date: 8/26/22

Copyright notice: By signing this Code Amendment Proposal Application, I understand and acknowledge that the work contained in this application is original, or if not original, I have the right to copy the work. By signing this work, I understand that any rights I may have in this work, including any form of derivative works and compilations, are assigned to the Department of Consumer and Business Services Building Codes Division. I also understand that I do not retain or acquire any rights once this work is used in a Department of Consumer and Business Services Building Codes Division publication.

PART I – CODE AMENDMENT LANGUAGE

N1104.8.2 Sealing required. Exterior joints around window and door frames, between wall cavities and window or door frames, between walls and foundation, between walls and roof, between wall panels, at penetrations or utility services through walls, floors and roofs and all other openings in the exterior envelope shall be sealed in a manner approved by the *building official*.

Sealing for the purpose of creating a continuous air barrier shall be in accordance with the applicable requirements of Table N1104.8, ~~or~~ **and** the dwelling shall be tested to demonstrate a blower door result not greater than ~~4.0~~ **3.25** ACH50.

PART II – CODE AMENDMENT PROPOSAL REQUIREMENTS

This proposal is enforceable by ORSC.

Part III – CODE AMENDMENT PROPOSAL CRITERIA

Proposal

Question	Response
1. Describe the concept and purpose of this proposal.	This proposal sets the blower door compliance option in the 2023 ORSC draft as the minimum requirement, thereby establishing a requirement for blower door testing and a maximum air leakage level.
2. What problem in the existing Oregon code or national model code is this proposal solving? How does this amendment address the issue? If you have evidence demonstrating the problem, submit that information.	The minimum target for the 2023 ORSC is DOE ZERH v6, and NEEA’s analysis indicates that additional efficiency is needed beyond the 2023 ORSC draft to achieve this target (see the “2023 ORSC NEEA Proposals Support Document” appended). PNNL’s 2020 Oregon Residential Energy Code Field Study found an average Envelope Tightness of 4.12 ACH50 and test results as high as 8.1 ACH50 for the 66 homes sampled. For comparison, DOE ZERH specifies maximum air leakage levels of 2.5 and 2.0 in Oregon’s Climate Zones 4 and 5, respectively, for detached dwellings. This proposal provides a stepping stone by setting a more modest leakage limit. In addition to saving energy for homes built in the 2023 code cycle, developing the market capacities needed to build tight envelopes will help Oregon to achieve its 2030 goal (60% reduction in energy use from the 2006 baseline) as cost-effectively as possible. Testing homes for leakage provides an important feedback loop and would help build these capacities statewide.

<p>3. Has this been proposed at the national model code level? If so, explain when it was proposed, what happened, and why it was not adopted. Provide all associated national model code hearing information and background.</p>	<p>The IECC has required blower door testing nationwide since the 2012 version. A limit of 3.0 ACH-50 has been required for CZs 4&5 since 2012 IECC. A proposed code change for 2024 IECC, REPI-64-21, lowered this limit to 2.0 for these Climate Zones. After several discussions across a wide variety of stakeholders through ICC’s consensus process, REPI-64 was approved by the IECC-R committee.</p> <p><i>It is also worth noting is that an alternative test metric for attached dwellings – cfm/sq of enclosure surface area – was incorporated into the 2021 IECC (with further adjustments proposed and approved for 2024). This metric was not included in this proposal for simplicity, but NEEA would support inclusion of this metric as well to better serve detached dwellings (e.g., multifamily) if the general concept of this proposal is adopted.</i></p>
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Implementation and fiscal impact

Question	Response
<p>1. Explain how the proposed provisions would be enforced? Are additional inspections or permits required? Describe any necessary equipment, training, tests or special certifications.</p>	<p>Changing blower door testing from optional to required would require significantly more testing than is currently done in Oregon. Implicit in more testing is a need to: (1) increase the amount of blower door equipment and the number of individuals capable of performing this test; and (2) ensure sufficient geographic distribution of this capacity to provide coverage for the entire state. For the workforce piece, a potential barrier to growth is the cost of certification. However, this proposal does not require the tester to be certified. This proposal also does not require the tester to be a third party, and the ability for self-testing can help reduce supply concerns (as well as reducing costs). For code enforcers, the only anticipated added effort would be checking project documentation that the test result does not exceed the threshold.</p>
<p>2. What is the fiscal impact of this proposal? Provide a cost benefit analysis and include the resources or methods you used to determine the fiscal impact.</p>	<p>For the 2,376 sq ft home, annual energy savings and incremental construction costs are \$20.75 and \$772.20, respectively, after applying the 2023 ORSC assumptions and weighting factors (see Part IV). This yields a statewide simple payback of 37 years, which is within the useful life of the building envelope. A LCCA would provide a more appropriate lens for this measure given its long life; this analysis was not completed in time for submittal but could be developed later if needed.</p>

Impacted stakeholders and other specialty codes

Question	Response
<p>1. Was this proposal developed with people or organizations likely to be affected by it? Has it been reviewed or shared with people or organizations likely to be affected by it? If so, who, and if not, why not?</p>	<p>As mentioned above, a more stringent version of this proposed code change has been in the national code for a decade. Even further reduction of the leakage limit has been discussed at several meetings earlier this year by the wide range of stakeholders engaged by ICC’s consensus</p>

	process and was ultimately voted for approval (see REPI-64-21 As Amended).
2. Does this proposal impact other specialty codes or statewide programs?	No.

Part IV – ORSC ENERGY EFFICIENCY CODE AMENDMENT PROPOSAL CRITERIA

1. Modeled estimated energy savings

2,376 sq ft		Gas Consumption (Therms/yr)		Electricity Consumption (kWh/yr)		Total Energy Use (MMBtu/yr)	
Prototype	Weights	Baseline	Proposed	Baseline	Proposed	Baseline	Proposed
4C, Gas, Crawl	23.9%	515.48	498.41	6,432.73	6,447.29	73.48	71.82
4C, Gas, Crawl, NO A/C	12.7%	515.54	498.46	5,139.98	5,136.30	69.08	67.36
4C, Electric, Crawl	3.8%	-	-	13,069.86	12,931.59	44.59	44.12
4C, Electric, Crawl, Zonal	3.8%	-	-	12,808.53	12,666.71	43.70	43.22
4C, Gas, SOG	8.2%	538.74	521.55	6,377.06	6,389.58	75.62	73.94
4C, Gas, SOG, NO A/C	4.3%	538.79	521.61	5,143.52	5,139.84	71.41	69.68
4C, Electric, SOG	1.3%	-	-	13,223.47	13,082.04	45.12	44.64
4C, Electric, SOG, Zonal	1.3%	-	-	12,975.56	12,830.62	44.27	43.78
5B, Gas, Crawl	16.5%	645.62	624.05	6,453.94	6,468.24	86.56	84.46
5B, Gas, Crawl, NO A/C	8.7%	645.67	624.10	5,179.16	5,174.18	82.22	80.05
5B, Electric, Crawl	2.6%	-	-	15,573.33	15,335.20	53.14	52.32
5B, Electric, Crawl, Zonal	2.6%	-	-	15,316.12	15,073.89	52.26	51.43
5B, Gas, SOG	5.6%	677.47	655.73	6,383.00	6,397.29	89.51	87.38
5B, Gas, SOG, NO A/C	3.0%	677.52	655.77	5,184.22	5,179.23	85.42	83.23
5B, Electric, SOG	0.9%	-	-	15,869.54	15,628.45	54.15	53.32
5B, Electric, SOG, Zonal	0.9%	-	-	15,629.98	15,384.80	53.33	52.49
Weighted Totals:		477	461	7,358	7,334	72.79	71.14

This proposal has statewide annual savings of 16 therms and 25 kWh (1.65 MMBtu total) for the 2,376 sq ft home. Note that this proposal was modeled against an adjusted baseline which set air leakage to 4 ACH50. Reverting to this 2021 ORSC assumption better measures the energy use of homes built to code minimums, which should be the basis for comparison to DOE ZERH (see appended Support Document).

2. Increased construction costs

Testing:

	2,376 sq ft	1,200 sq ft	Source/Assumption
c. Cost of labor	\$70.85/hr	\$70.85/hr	RS Means
d. Quantity of labor	4 hours	3 hours	TRC New Construction program judgement
e. Cost of materials	0	0	Blower door equipment is already owned or is a one-time expense that can be assumed negligible when apportioned across many homes
f. Quantity of materials	-	-	
g. Overhead costs	\$88.20	\$66.15	RS Means labor rate of \$48.80 was used to deduce \$22.05 OP per labor hr
h. Profit			
i. Factors or conditions that would make an alteration, repair, change of use, or change of occupancy, or other code upgrade triggering event in an existing building more expensive to comply with	-	-	Only applies to new construction
Total Incremental Cost:	\$371.60	\$278.70	

Improving from 4 ACH50 to 3.25 ACH50:

	2,376 sq ft	1,200 sq ft	Source/Assumption
c. Cost of labor	\$70.85/hr	\$70.85/hr	RS Means
d. Quantity of labor	4 hours	3 hours	TRC New Construction program judgement
e. Cost of materials	\$5	\$5	Tubes of caulk at \$5/tube
f. Quantity of materials	5	4	
g. Overhead costs	\$92.20	\$69.15	RS Means labor rate of \$70.85 was used to deduce \$22.05 OP per labor hr
h. Profit			
i. Factors or conditions that would make an alteration, repair, change of use, or change of occupancy, or other code upgrade triggering event in an existing building more expensive to comply with	-	-	Only applies to new construction
Total Incremental Cost:	\$400.60	\$301.70	

The total incremental costs are \$772.20 for the 2,376 sq ft home and \$580.40 for the 1,200 sq ft home.
