

WASHINGTON STATE BUILDING CODE COUNCIL
APPLICATION FOR REVIEW OF A PROPOSED STATEWIDE AMENDMENT
TO THE WASHINGTON STATE BUILDING CODE
2012 Code Adoption Cycle

Log # _____
(office use only)

PLEASE FOLLOW INSTRUCTIONS ON PAGE FIVE

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> State Energy Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> Uniform Plumbing Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |

Section 502.1.4.8 Slab-On-Grade Page 20

2. Applicant Name (Specific local government, organization or individual):

Passive House NW

3. Signed:

_____ Proponent	_____ Title	_____ Date
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4. Designated Contact Person:

<u>Joe Giampietro</u> Name	_____ Title
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Address: 15200 52nd Ave S, Seattle WA 98188

Office Phone: (206)766-8300 **Cell:** (206)618-1545 **Fax:** () _____

E-Mail address: joeg@johnsonbraund.com

5. Proposed Code Amendment. Use 'legislative format' including both old and new language. **See instructions on page five for specific details.** Please use a separate sheet for each separate proposal.

Code: State Energy Code_____

Section 502.1.4.8_____

Page 20 _____

Amend section to read as follows:

502.1.4.8 Slab-On-Grade: Slab-on-grade insulation shall be placed on the outside of the foundation or on the inside of the foundation wall. The insulation shall extend downward from the top of the slab ~~for a minimum distance of 24 inches or downward~~ to at least the bottom of the slab and then horizontally to the interior ~~or exterior for a total distance of 24 inches~~ for the full extent of the slab. Above grade insulation shall be protected. A two-inch by 2-inch (maximum) nailer may be placed at the finished floor elevation for attachment of interior finish materials. The insulation shall be an approved product for its intended use. If a soil gas control system is present below the slab, which results in increased convective flow below the slab, the slab shall be thermally isolated from the sub-slab gravel layer. R-10 slab insulation is required for all compliance paths.

(This proposed change affects also Section 602.4 Slab-on-Grade Floors: as well as Table 6-1 and 6-2)

Are additional pages attached?

Yes **XX**

No

Please note number of additional pages:

One (1)

Supporting Data for Statewide Amendment Proposals. This information is required for all statewide amendment proposals. **Attach supporting documentation, as necessary; incomplete proposals will not be accepted.**

The SBCC requires supporting data on any amendment proposal to show:

1. That it meets basic criteria – See Part I to specify how this proposal meets the criteria for code amendment.
2. The intended effect—See Part II to describe the purpose of the proposed amendment, including the benefits and the problems addressed.
3. The potential impacts or benefits to business—See Part III/Types of Construction, to explain how methods in construction businesses, industries and services would be affected.
4. The potential impact on enforcement procedures, See Part III/Types of Services Required, to provide some analysis of the impacts on code enforcement in local jurisdictions.
5. Economic costs and benefits – Use the Table in Part IV of this form to estimate the costs and benefits of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance.

Part I ❖ Background information on amendment.

Code References: _____ Title: _____

Related codes: none _____ (Does this amendment change other related codes?)

Proponent: Joe Giampietro, Johnson Braund, Inc. Phone: (206)76-8300 __ Date: March 20, 2012 _____

NOTE: State-wide and emergency state-wide amendments to the state building code must be based on one of the following criteria; please indicate the pertinent rationale for the proposed amendment by selecting from the list below:

- (1) The amendment is needed to address a critical life/safety need.
- (2) The amendment is needed to address a specific state policy or statute.
- (3) The amendment is needed for consistency with state or federal regulations.
- (4) The amendment is needed to address a unique character of the state.
- (5) The amendment corrects errors and omissions.

Part II ❖ Amendment Benefit:

PROBLEM(S) ADDRESSED (Describe the intended effect of the proposed code amendment): _____

The proposed amendment is intended to address the problems of energy loss, discomfort associated with cold floors and the condensation of moisture on cold surfaces leading to mold and mildew problems.

PRIMARY REASON FOR AMENDMENT: (Describe how the amendment meets one of the criteria listed above) _____

(1) Reduction of energy use in buildings addresses a life/safety need related to energy independence and depletion of energy resources available to the people of the State of Washington.

(2) By reducing energy use in buildings in an affordable “pay as you go” fashion, the state policy of moving toward a carbon-neutral energy condition is furthered without increased cost to the homeowner. The analysis sheet included with this proposed amendment indicates that a thorough analysis program such as the Passive House Planning Package can accurately estimate the real energy loss through an un-insulated slab even when the perimeter of the slab is insulated to the current existing Washington State Energy Code. Additionally, the existing analysis method of Chapter 10 suggests a minimum of R-10 under slab insulation. See attached sheet.

TYPE OF BENEFITS PROJECTED: The proposed amendment will reduce energy use in buildings that have slab-on-grade construction and result in lower Life Cycle cost of ownership. Additionally, the warming affect of an insulated slab will allow occupants to be more comfortable at a lower air temperature set-point, further reducing energy use. Warmer floor slabs also reduce the risk of condensation of moisture on floors, especially when carpeted, and therefore reduce the risk of mold and mildew formation.

Part III ❖ Amendment Impacts or Benefits:

TYPES OF CONSTRUCTION: ☒ New Construction ☐ Alteration/Tenant Improvement/Repair
☒ Residential-Single Family ☒ Residential-Multi Family ☒ Commercial ☒ Industrial

List businesses/industries affected by amendment:

Manufacturers: Insulation Manufacturers
 Specific Construction Contractors & Trades: Insulation installers and Concrete floor slab installers.
 Construction Supply Industry: Insulation Supply Business
 Specialty Trades: Insulation Installers and Concrete Workers
 Types of Buildings: All buildings employing Slab-on-Grade construction.
 Fire Protection Industry: _____

TYPES OF SERVICES REQUIRED:

- ☐ **Reporting.** Brief Description _____
- ☐ **Record Keeping.** Brief Description _____
- ☐ **Other.** Brief Description _____
- ☐ **Indirect Cost to Industry.** Indicate whether there are multiple sources to obtain the equipment, material or service required by this proposal. If not, provide a justification of the benefit versus small business impact.

Part IV ❖ Amendment Costs and Benefits

Building Type	Construction ¹			Enforcement ²			Operations & Maintenance ³		
	Costs	% impact ⁴	Benefits ⁵	Costs	% impact	Benefits	Costs	% impact	Benefits
Residential			energy						
Single family	\$1/sf	1%	\$.05/psf/y						
Multi-family	\$1/sf	1%	\$.05/psf/y						
Commercial/Retail	\$1/sf	0.75%	\$.05/psf/y						
Industrial	\$1/sf	0.75%	\$.05/psf/y						
Institutional	\$1/sf	0.75%	\$.05/psf/y						

¹ \$ / square foot of floor area or other cost. Attach data. **Construction** costs are costs prior to occupancy, and include both design and direct construction costs that impact the total cost of the construction to the owner/consumer.

² Cost per project plan. Attach data. **Enforcement** costs include governmental review of plans, field inspection, and mediated litigation required for enforcement.

³ Cost to building owner/tenants over the life of the project.

⁴ Cost differential over a specific size project or range of projects as determined by the proponent. Provide sufficient cost and benefit detail to clarify the impact to the Council. All data should be created and referenced to third party reputable sources for verification.

⁵ Note sectors with measurable benefit from Part II, including benefits to a) the user, b) the public, c) the industry, and/or d) the economy; use e) for all of the above.

GENERAL INSTRUCTIONS FOR MAKING A CODE CHANGE PROPOSAL:

1. Check the boxes for the code or codes for which amendments are being proposed.
2. Provide the name of the local government, organization, or individual proposing the code change.
3. Proponent must sign and date the proposal as noted.
4. Provide contact information for the person designated to work with the Council and staff to supply information on the proposed changes as needed; please include name, address, phone number and e-mail address.
5. The specific section for which an amendment is proposed should be listed. The **entire section** should be reproduced, including the existing and the proposed amendatory language.

This must be prepared in legislative style formatting. Specifically, all added words should be underlined; all deleted words should be struck through. Any separate new sections added should be inserted in the appropriate place in the existing code language in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

6. **SUPPORTING DATA REQUIREMENTS FOR ALL STATEWIDE AMENDMENT PROPOSALS:** You must attach background information with all statewide amendment proposals. The attached worksheet provides requirements for supporting data. All information will be forwarded to the Council as part of the amendment's documentation. TAG findings and projections from the worksheet will be tabulated to summarize projected benefits and impacts and will be included with TAG comments and recommendations. SBCC staff may request additional information as needed to clarify any potential impacts, and may perform additional research and analysis as needed when requested by the Council or the Standing Committee.
7. Please send an electronic copy of your completed proposal to SBCC staff at:
sbcc@ga.wa.gov

NOTE: YOU MAY REPRODUCE THIS FORM AND ADD ADDITIONAL PAGES AS NEEDED.

Method #1 - Heat Loss Comparison of Floor Slab Assemblies - PHPP analysis:

3/20/2012

(kBTU/yr results taken from PHPP 2007 calculations on a simple 600sf box)
prepared by Joe Giampietro on behalf of Passive House NW

Seattle Box w Slab on Grade							\$/sf/yr @		Ins cost @
	EPS In*	R-value	Area	kBTU/yr	kBTU/sf	kWh/sf	\$0.8/kWh	30 yr cost**	0.10/R
	0	1.4	600	8,066	13.44	3.94	\$0.32	\$9.46	\$0.00
	1	5.5	600	4,721	7.87	2.31	\$0.18	\$5.53	\$0.41
	2	9.7	600	3,322	5.54	1.62	\$0.13	\$3.89	\$0.83
	3	13.8	600	2,609	4.35	1.27	\$0.10	\$3.06	\$1.24
	4	17.9	600	2,152	3.59	1.05	\$0.08	\$2.52	\$1.65
	5	22.1	600	1,831	3.05	0.89	\$0.07	\$2.15	\$2.07
	6	26.2	600	1,592	2.65	0.78	\$0.06	\$1.87	\$2.48
	7	30.3	600	1,407	2.35	0.69	\$0.05	\$1.65	\$2.89
	8	34.4	600	1,259	2.10	0.61	\$0.05	\$1.48	\$3.30

Spokane Box w Slab on Grade							\$/sf/yr @	30 yr cost**	Ins cost @
	EPS In*	R-value	Area	kBTU/yr	kBTU/sf	kWh/sf	\$0.8/kWh	per sf	0.10/R
	0	1.4	600	10651	17.75	5.20	\$0.42	\$12.49	\$0.00
	1	5.5	600	6045	10.08	2.95	\$0.24	\$7.09	\$0.41
	2	9.7	600	4227	7.05	2.06	\$0.17	\$4.96	\$0.83
	3	13.8	600	3304	5.51	1.61	\$0.13	\$3.87	\$1.24
	4	17.9	600	2717	4.53	1.33	\$0.11	\$3.19	\$1.65
	5	22.1	600	2306	3.84	1.13	\$0.09	\$2.70	\$2.07
	6	26.2	600	2000	3.33	0.98	\$0.08	\$2.34	\$2.48
	7	30.3	600	1764	2.94	0.86	\$0.07	\$2.07	\$2.89
	8	34.4	600	1576	2.63	0.77	\$0.06	\$1.85	\$3.30

Result indicates that 5 inches of rigid EPS under slab insulation throughout slab(R-22.1) will be less costly than the energy cost over 30 years

* this variable in the spreadsheet indicates the thickness of EPS insulation at R-value equal to 4.13 per inch

**30 year energy cost horizon was used as equivalent to mortgage period financed with assumption that the mortgage interest rate is approximately equal to the rising cost of electrical energy

Method #2 - Wa State Energy Code - Chapter 10 - Table 10-2 - Energy basis for Slab-on-Grade comparison:

3/20/2012

(F-Factor number is the same as from IECC 2012 - Table A103.1 Default F-Factors for On-Grade Slabs)

test case is a 1008sf first floor with 28 ft by 36 ft perimeter totaling 128 LF

	condition	F-Factor	Hours in 6 months	Delta dF In/Out	Heat Loss in kBTU/LF	Perimeter in LF	Area of Floor slab	Heat Loss per sq ft	Equivalent kWh	Cost per kWh	Cost per sq ft	Cost for total slab
Test A	Un-Insul. Slab	0.73	4320	18	56.76	128	1008	7.21	2.11	\$0.08	\$0.17	\$170.36
Test B	Perimeter Insul 2' vert	0.54	4320	18	41.99	128	1008	5.33	1.56	\$0.08	\$0.13	\$126.02
Test C	Fully Insul. Slab	0.36	4320	18	27.99	128	1008	3.55	1.04	\$0.08	\$0.08	\$84.01

				cost of energy loss								
Test B	Perimeter Slab Insulation to R-10	1008sf	\$126.02	per year	Perimeter insul. area	256 sf						
Test C	Fully Insulated Slab to R-10	1008sf	\$84.01	per year	Remainder Slab area	752 sf						
	Cost Delta in Energy use in kWh		\$42.01	per year								
	Cost of Energy use in 30 year mortgage period		\$1,260.20						\$1,260.20	energy cost over 30 years		
	cost to purchase and install R-10 EPS rigid insulation /R/sf		\$0.10	psf	752				\$752.00	added insulation cost		
Alternate:	Annual cash flow of \$42.01 at 5% cap rate		\$840.14						\$840.14	value of cash flow saved		