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20 September 2012

Mr. Ray Allshouse
Chair-State Building Code Council
State of Washington
P. O. Box 41449
Olympia, WA 98504-1449

Re: Adoption of amendment of the 2012 International Energy Conservation code (Commercial), WAC 51-11C
Envelope Requirements, Tables in Sections C402.1.2 and C402.2

Dear Mr. Allshouse, and members of the State Building Code Council:

I am the Regional Director for the American Iron and Steel Institute, an institute which represents the steel producers of Canada, Mexico and the United States. I am writing today on behalf of some of our member associations, who are the Steel Framing Alliance, Steel Framing Industry Association, and the Steel Stud Manufacturers Association.

We are taking the opportunity to forward our observations and recommendations as it relates to the proposed modifications to the envelope requirements. We support the need to design, build, and operate efficient buildings, but we are also concerned about the direction that the energy code continues to follow. In the past, increases in insulation requirements have provided obvious benefits. However, beginning with the Washington State 2009 Energy Code, we believe that is no longer the case. It appears to us that the State continues to support a focus of higher insulation requirements which raises the question if energy savings is worth the cost (e.g. Energy conservation versus long term cost benefit). The incremental energy savings from additional insulation requirements at this point are within the noise level of simulation tools, but are dwarfed by the potential savings elsewhere in the building, and will require years of service just to recapture the embodied energy for the insulation and other materials required to adjust wall thicknesses. Such additional materials include the support materials and fasteners necessary to attach various sidings or veneers, window extensions and other accessories, etc.

We have specific comments that should be considered if the current proposals are adopted. However, another solution to consider is a whole-building simulation for all commercial buildings covered by the code.

Under a whole-building simulation, or performance approach, there would be no need to force inadequate solutions on designers and owners as in the current prescriptive options. This approach will be beneficial to the State in the future as well by allowing a simple adjustment to the compliance criteria. If the goal of higher-performing or even net-zero buildings is ever to become a reality, performance design is a superior mechanism to reach this goal.

Our thought would be to suggest that the prescriptive options of the energy code be deleted, and substituted with performance provisions. The performance provisions could include one or more of the following existing examples, as follows:

- IECC-2012, Section C407 "Total Building Performance"
- ASHRAE Standard 90.1-2010, Chapter 11 "Energy Cost Budget Method"
- ASHRAE Standard 90.1-2010, Informative Appendix G "Performance Rating Method"

As for the specific comments, our concerns are related to the proposed U-factor values, and related R-value values, shown in Tables C402.1.2 Option #1, C402.1.2 Option #2, C404.2 Option #1 and C402.2 Option #2.

In the CR-102 document "Proposed Rule Making," we find that it states:

> ***"Envelope Requirements****. Two options are provided for the prescriptive envelope and assembly tables (C402.1.2, C402.2). <u>The first includes the unamended IECC requirements for mass walls (U-0.078);</u> the second includes a median value (U-0.104) between the current WSEC mass wall requirement (U-0.32) and the IECC requirement in climate zone 5/Marine 4 as well as clarification on where it may be used. The remaining values are the same in both options. <u>Due to the shift in climate zones, some values were increased from requirements in WSEC CZ 1 and decreased in some of WSEC CZ2 (see walls, metal building, steel-frame and wood frame).</u> Footnote f was added to Table C402.2, providing guidance on clips or other attachments for insulation not considered continuous."*

We are concerned that the proposed modifications are based on subjective judgment rather than on an objective evaluation based on energy conservation and cost effectiveness. Our objection is related to the initial choice to not amend Tables C402.1.2 Option #1, C402.1.2 Option #2, C402.2 Option #1 and C402.2 Option #2 for mass walls. We find that the "walls-mass" U-factor values are identical to the values in the 2012 IECC, whereas the other wall assembly

categories have increased in stringency. We find that the increases are similar to that of either ASHRAE Standard 90.1-2010 with Addenda “bb” or ASHRAE Standard 189.1-2011 (See attachments A and B).

It is our view that this is not justified and that any shift in climate zone demarcation, as stated in the proposal, would yield a change for all material categories, and not just for select categories of materials. As a result, our recommendation would be to have the “walls-Mass” U-factor values modified to reflect ASHRAE Standard 189.1-2001 U-factor values for mass walls (See attachments A and B) so that the energy compliance field is made level for all.

Further, Table C402.1.2 Option #2 contains “note – d.” Since there was no explanation in the proposed rule making for this exception we do not see a basis of need for this exception. If one examines the categories carefully (See table below) we find that the type of occupancies and their related typical conditioning is not consistent. This also brings into question why only these select few group occupancies are under consideration since in the Washington State Building Code a number of other specific group occupancies could also be included (e.g. WAC 51-50-0300 Chapter 3 and IBC Chapter 3). These inconsistencies suggests to us that the exemption should be deleted without substitution, and that the U-factor and related R-value in Tables C402.1.2 Option #2 and C402.2 Option #2 should be modified to reflect more stringent values.

Occupancy Name	Group Type	Conditioned Space
Warehouse	S-Storage	Conditioned or Semi-heated depending on stored contents
Gymnasium	A-Assembly	Conditioned, but may set back when not occupied
Auditorium	A-Assembly	Conditioned, but may set back when not occupied
Church Chapel	A-Assembly	Conditioned, but may set back when not occupied
Arena	A-Assembly	Conditioned, but may set back when not occupied
Manufacturing Plant	F-Factory	Conditioned and Semi-heated depending on conditions needed to mfg. or comply with OSHA
Indoor Swimming Pool	A-Assembly	Conditioned
Pump Stations	U-Utility	Semi-heated to OSHA regulations
Water and Waste Treatment	U-Utility	Semi-heated
Storage Facility	S-Storage	Semi-heated in most cases, conditioned depending on items stored
Motor vehicle service facility	S-Storage	Semi-heated in most cases, but may be set back when not occupied.

Recommendations:

(Modify Walls-Mass only row, no proposed modification to the other cell values)

Table C402.1.2 Option #1
Opaque Thermal Envelope Assembly Requirements

Climate Zone	5 and Marine 4		6	
	All Other	Group R	All Other	Group R
Walls, Above Grade				
Mass	~~U-0.078~~ **U-0.080**	~~U-0.078~~ **U-0.071**	~~U-0.078~~ **U-0.071**	~~U-0.078~~ **U-0.060**

(Modify Walls-Mass only row and note "d", no proposed modification to the other cell values)

Table C402.1.2 Option #2
Opaque Thermal Envelope Assembly Requirements

Climate Zone	5 and Marine 4		6	
	All Other	Group R	All Other	Group R
Walls, Above Grade				
Mass	~~U-104(d)~~ **U-0.080**	~~U-0.078~~ **U-0.071**	~~U-0.078~~ **U-0.071**	~~U-0.071~~ **U-0.060**

(Notes a through c, no proposed modifications)

~~Note d: Exception: Integral insulated concrete block walls complying with ASTM C90 with all cores filled and meeting both of the following:~~

~~1. At least 50 percent of cores must be filled with vermiculite or equivalent fill insulation; and~~

~~2. The structure encloses one of the following uses: Warehouse (storage and retail), gymnasium, auditorium, church chapel, arena, kennel, manufacturing plant, indoor swimming pool, pump station, water and waste water treatment facility, storage facility, storage area, motor vehicle service facility.~~

(Modify Walls-Mass only row, no proposed modification to the other cell values)

Table C402.2 Option #1

Opaque Thermal Envelope Requirements

Climate Zone	5 and Marine 4		6	
	All Other	Group R	All Other	Group R
Walls, Above Grade				
Mass	~~R-11.4ci~~ **R-13.3ci**	~~R-13.3ci~~ **R-15.2ci**	~~R-13.3ci~~ **R-15.2ci**	~~R-15.2ci~~ **R-20ci**

(Modify Walls-Mass only row, no proposed modification to the other cell values)

Table C402.2 Option #2

Opaque Thermal Envelope Requirements

Climate Zone	5 and Marine 4		6	
	All Other	Group R	All Other	Group R
Walls, Above Grade				
Mass	~~R-9.5ci~~ **R-13.3ci**	~~R-13.3ci~~ **R-15.2ci**	~~R-11.4ci~~ **R-15.2ci**	~~R-15.2ci~~ **R-20ci**

Thank you for your consideration on this subject. If there are any questions please feel free to contact me. We will look forward to receiving the committee's decision on this subject.

Sincerely,

Jonathan Humble, AIA, NCARB, LEED AP-BD&C
Regional Director

CC: M. Nowak, Steel Framing Alliance
L. Williams, Steel Framing Industry Association
R. Zedah, Steel Stud Manufacturers Association

ATTACHMENT – A

U-factor Comparison of Proposed Tables C402.1.2 (Both Options)

			CZ5 and 4 Marine All	CZ5 and 4 Marine Group R	CZ6 All	CZ6 Group R
WALLS	WA State TC402.1.2 Option #1	Mass	0.078	0.078	0.078	0.071
	WA State TC402.1.2 Option #2	Mass	0.104(d)	0.078	0.078	0.078
	IECC-2012	Mass	0.078	0.078	0.078	0.071
	ASHRAE Standard 90.1-2010	Mass	0.090	0.080	0.080	0.071
	ASHRAE Standard 90.1-w/ bb	Mass	0.090	0.080	0.080	0.071
	ASHRAE Standard 189.1-2011	Mass	0.080	0.071	0.071	0.060
	Note (d): Integral insulated concrete block walls with all cores filled, at least 50% cores filled, wall encloses Storage, Gymnasium, Church, Mfg.					
	WA State TC402.1.2 Option #1	Metal Buldings	0.052	0.052	0.052	0.044
	WA State TC402.1.2 Option #2	Metal Buldings	0.052	0.052	0.052	0.044
	IECC-2012	Metal Buldings	0.052	0.052	0.052	0.052
	ASHRAE Standard 90.1-2010	Metal Buldings	0.069	0.069	0.069	0.069
	ASHRAE Standard 90.1-w/ bb	Metal Buldings	0.050	0.050	0.050	0.050
	ASHRAE Standard 189.1-2011	Metal Buldings	0.052	0.052	0.052	0.052
	WA State TC402.1.2 Option #1	Steel Framed	0.055	0.055	0.049	0.044
	WA State TC402.1.2 Option #2	Steel Framed	0.055	0.055	0.049	0.044
	IECC-2012	Steel Framed	0.064	0.064	0.064	0.057
	ASHRAE Standard 90.1-2010	Steel Framed	0.064	0.064	0.064	0.064
	ASHRAE Standard 90.1-w/ bb	Steel Framed	0.055	0.055	0.049	0.049
	ASHRAE Standard 189.1-2011	Steel Framed	0.055	0.055	0.055	0.055
	WA State TC402.1.2 Option #1	Wood frame and other	0.054	0.054	0.051	0.044
	WA State TC402.1.2 Option #2	Wood frame and other	0.054	0.054	0.051	0.044
	IECC-2012	Wood frame and other	0.064	0.064	0.051	0.051
	ASHRAE Standard 90.1-2010	Wood frame and other	0.064	0.051	0.051	0.051
	ASHRAE Standard 90.1-w/ bb	Wood frame and other	0.051	0.051	0.051	0.051
	ASHRAE Standard 189.1-2011	Wood frame and other	0.051	0.045	0.045	0.045

ATTACHMENT – B

R-value Comparison of Proposed Tables C402.2 (Both Options)

			CZ5 and 4 Marine All	CZ5 and 4 Marine Group R	CZ6 All	CZ6 Group R
WALLS	WA State TC402.2 Option #1	Mass	11.4ci	13.3ci	13.3ci	15.2ci
	WA State TC402.2 Option #2	Mass	9.5ci	13.3ci	11.4ci	15.2ci
	WA State Energy 2009	Mass	5,7ci	11.4ci	7.6ci	13.3ci
	IECC-2012	Mass	11.4ci	13.3ci	13.3ci	15.2ci
	ASHRAE Standard 90.1-2010	Mass	11.4ci	13.3ci	13.3ci	15.2ci
	ASHRAE Standard 90.1-w/ bb	Mass	11.4ci	13.3ci	13.3ci	15.2ci
	ASHRAE Standard 189.1-2011	Mass	13.3ci	15.2ci	15.2ci	20ci
	WA State TC402.2 Option #1	Metal Buildings	13+13ci	13+13ci	13+13ci	19+16ci
	WA State TC402.2 Option #2	Metal Buildings	13+13ci	13+13ci	13+13ci	19+16ci
	WA State Energy 2009	Metal Buildings	13+7.5ci	19+8.5ci	13+7.5ci	19+16ci
	IECC-2012	Metal Buildings	13+13ci	13+13ci	13+13ci	13+13ci
	ASHRAE Standard 90.1-2010	Metal Buildings	13+5.6ci	13+5.6ci	13+5.6ci	13+5.6ci
	ASHRAE Standard 90.1-w/ bb	Metal Buildings	19ci	19ci	19ci	19ci
	ASHRAE Standard 189.1-2011	Metal Buildings	13+13ci	13+13ci	13+13ci	13+13ci
	WA State TC402.2 Option #1	Steel Framed	13+10ci	19+18.5ci	13+12.5ci	19+14ci
	WA State TC402.2 Option #2	Steel Framed	13+10ci	19+8.5ci	13+12.5ci	19+14ci
	WA State Energy 2009	Steel Framed	13+7.5ci	19+8.5ci	13+7.5ci	19+14ci
	IECC-2012	Steel Framed	13+7.5ci	13+7.5ci	13+7.5ci	13+7.5ci
	ASHRAE Standard 90.1-2010	Steel Framed	13+7.5ci	13+7.5ci	13+7.5ci	13+7.5ci
	ASHRAE Standard 90.1-w/ bb	Steel Framed	13+10ci	13+10ci	13+12.5ci	13+12.5ci
	ASHRAE Standard 189.1-2011	Steel Framed	13+10ci	13+10ci	13+10ci	13+10ci
	WA State TC402.2 Option #1	Wood frame and other	21 int	21 int	13+7.5ci or 20+3.8ci	21+5ci
	WA State TC402.2 Option #2	Wood frame and other	21int	21 int	13+7.5ci or 20+3.8ci	21+5ci
	WA State Energy 2009	Wood frame and other	21	13+6ci	13+7.5ci or 21+2.5ci	21+5ci
	IECC-2012	Wood frame and other	13+3.8 or 20	13+7.5ci or 20+3.8ci	13+7.5ci or 20+3.8ci	13+7.5ci or 20+3.8ci
	ASHRAE Standard 90.1-2010	Wood frame and other	13+3.8ci	13+7.5ci	13+7.5ci	13+7.5ci
	ASHRAE Standard 90.1-w/ bb	Wood frame and other	13+7.5ci or 19+5ci	13+7.5ci or 19+5ci	13+7.5ci or 19+5ci	13+7.5ci or 19+5ci
	ASHRAE Standard 189.1-2011	Wood frame and other	13+7.5ci	13+7.5ci	13+10ci	13+10ci