



STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

2018 Washington State Energy Code Development Energy Code Proposal Short Form

For editorial Coordination, Clarifications & Corrections only,
without substantive energy or cost impacts

May 2018

Log No. _____

Code being amended: [Commercial](#) Provisions [Residential](#) Provisions
(A MS Word version of the code is linked to the name)

Code Section #: C303

Brief Description:

We understand that there is a proposal for the 2018 Washington State Energy Code to incorporate the default U-factor tables and equations for opaque spandrel panels from the 2015 Seattle Energy Code. The U-factor equations in this section appear to be incorrect. See below for complete description on the recommended revisions to the U-factor equations.

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.)

Proposed revisions to the current U-factor equations from C303.1.5 from the 2015 Seattle Energy Code (existing underlines in the text have been removed for clarity):

Aluminum without thermal break (Equation 1)

$$U_{\text{gypsum}} = \frac{1}{(R_{\text{Gypsum}} + R_{\text{AirGap}}) + \left[\frac{1}{\left(0.2798 + 0.8929 \left(\frac{1}{R_{\text{AddedInsulation}}} + U_{\text{centerofGlass}} \right) \right)} \right]}$$

$$\underline{U_{Overall}} = \frac{1}{(R_{Gypsum} + R_{AirGap}) + \left[\frac{1}{0.2798 + \frac{0.8929}{\left(R_{AddedInsulation} + \left(\frac{1}{U_{CenterofGlass}} \right) \right)}} \right]}$$

Aluminum with thermal break (Equation 2)

~~$$U_{Overall} = \frac{1}{(R_{Gypsum} + R_{AirGap}) + \left[\frac{1}{\left(0.1808 + 0.8874 \left(\frac{1}{R_{AddedInsulation}} \right) + U_{CenterofGlass} \right)} \right]}$$~~

$$\underline{U_{Overall}} = \frac{1}{(R_{Gypsum} + R_{AirGap}) + \left[\frac{1}{\left(0.1808 + \frac{0.8874}{\left(R_{AddedInsulation} + \left(\frac{1}{U_{CenterofGlass}} \right) \right)} \right)} \right]}$$

Structural glazing (Equation 3)

~~$$U_{Overall} = \frac{1}{(R_{Gypsum} + R_{AirGap}) + \left[\frac{1}{\left(0.1151 + 0.9487 \left(\frac{1}{R_{AddedInsulation}} \right) + U_{CenterofGlass} \right)} \right]}$$~~

$$\begin{array}{c}
 1 \\
 \left[\left(R_{Gypsum} + R_{AirGap} \right) + \frac{1}{\left(0.1151 + \frac{0.9487}{\left(R_{AddedInsulation} + \left(\frac{1}{U_{CenterofGlass}} \right) \right)} \right)} \right]
 \end{array}$$

Proposed revisions to the current U-factor assumptions from C303.1.5.2 of the 2015 Seattle Energy Code:

C303.1.5.2 Table value assumptions. In addition to the spandrel panel assembly, the construction assembly U-factors assume an air gap between the spandrel panel (with an R-value of 1.39) and one layer of 5/8-inch gypsum board (with an R-value of 0.56) that provides the interior finish. The gypsum board is assumed to span between the window sill and a channel at the floor. For assemblies that differ from these assumptions, custom U-factors can be calculated to account for any amount of continuous insulation or for unusual construction assemblies using Equations 1, 2 or 3 where appropriate. Spandrel panel U-factors for assemblies other than those covered by this table or Equations 1-3 may be determined using an alternate approved methodology. Equations 1-3 do not calculate the value of any insulation inboard of the curtain wall assembly.

Purpose of code change:

The current spandrel panel U-factor calculations in section C303.1.5 of the 2015 Seattle Energy Code appear to be incorrect as the U-factors in Table C303.1.5 cannot be replicated using the listed equations. The current equations appear to show $R_{AddedInsulation}$ and $U_{CenterofGlass}$ as elements in parallel; the proposed equations revise this to assume they are in series. The proposed U-factor calculations can replicate the U-factors in the table. JRS understands that these equations originally came from the California Energy Code (Title 24, Part 6), which also prints these equations incorrectly.

We have also proposed adding a couple clarifications to the assumptions section to ensure these equations are used consistently. In particular, we propose including the air gap R-value, which was taken from the source material in the California Energy Code.

Additionally, Equation 1 uses U_{gypsum} rather than $U_{Overall}$.

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Instructions: For use with Coordination, Clarifications & Corrections ONLY. Send this form as an email attachment, along with any other documentation available, to: sbcc@ga.wa.gov. For further information, call the State Building Code Council at 360-407-9277.