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Subject: Public Comment - 2018 WSEC - Carbon Emissions Factors

Please consider the following editorial comments for clarifications to the 2018 WSEC-C.

Based on public testimony received today recommend adding the following editorial footnotes shown in red below to Tables C407.3(1), C407.3(2), and Appendix D of 2018 WSEC.

C407.3 Performance-based compliance. Compliance with this section requires compliance with ASHRAE Standard 90.1 Appendix G, Performance Rating Method, in accordance with Standard 90.1 Section 4.2.1 with the following modifications..

1. The mandatory requirements of Section G1.2.1a of Standard 90.1 are not required to be met.
2. The reduction in annual carbon emissions of the proposed building design associated with on-site renewable energy shall not be more than 3 percent of the total carbon emissions of the baseline building design.
3. References to energy cost in Section 4.2.1.1 and Appendix G shall be replaced by carbon emissions calculated by multiplying site energy consumption by the carbon emission factor from Table C407.3(1).
4. The building performance factors in Table C4.2.1.1 shall be replaced with those in Table C407.3(2).

TABLE C407.3(1)
CARBON EMISSIONS FACTORS

| Type | CO ₂ e (lb/unit) | Unit |
|--------------------------|-----------------------------|--------|
| Electricity b | 0.70 | kWh |
| Natural Gas b | 11.7 | Therm |
| Oil b | 19.2 | Gallon |
| Propane b | 10.5 | Gallon |
| Other ^a | 195.00 | mmBtu |
| On-site renewable energy | 0.00 | |

a.

code official.

- b. Carbon emissions factors are for Washington State and are used to determine the building performance factors listed in Table C407.3(2). If these factors are modified by any local jurisdiction the Building Performance Factors in Table C407.3(2) will need to be modified to provide equivalent building energy performance as mandated by the code minimum energy code requirements of RCW 19.27A.015.

TABLE C407.3(2)
BUILDING PERFORMANCE FACTORS (BPF) TO BE USED
FOR COMPLIANCE WITH SECTION C407.3

| Building Area Type | Building Performance Factor a |
|---------------------|--------------------------------------|
| Multifamily | 0.56 |
| Healthcare/hospital | 0.54 |
| Hotel/motel | 0.64 |
| Office | 0.54 |
| Restaurant | 0.73 |
| Retail | 0.46 |
| School | 0.33 |
| Warehouse | 0.49 |
| All Others | 0.54 |

a. Building performance factors listed are dependent on the carbon emission factors listed in Table C407.3(2). These factors will need to be modified if the carbon emissions factors of Table C403.3(2) are modified by a local jurisdiction. Additionally, these factors may need to be modified if the local jurisdiction adopts changes to any of the mandatory energy code compliance measures listed in Table C407.2.

Note: Table c407.3(2) Footnote b for TSPR is different that footnote b for C407 TBP.

APPENDIX D

CALCULATION OF HVAC TOTAL SYSTEM PERFORMANCE RATIO

D101 Scope. This appendix establishes criteria for demonstrating compliance using the *HVAC total system performance ratio* (HVAC TSPR) for office, retail, library, and education occupancies. For those occupancies, HVAC systems shall comply with Section C403 and this appendix as required by Section C403.1.1.

D201 Compliance. Compliance based on *HVAC total system performance ratio* requires that the provisions of Section C403.3 are met and the *HVAC total system performance ratio* of the *proposed design* is more than or equal to the *HVAC total system performance ratio* of the *standard reference design*. The *HVAC TSPR* is calculated according to the following formula:

HVAC TSPR = annual heating and cooling load /annual carbon emissions from energy consumption of the building HVAC systems

Where:

| | | |
|--|---|--|
| Annual carbon emissions from energy consumption of the building HVAC systems | = | sum of the annual carbon emissions in pounds for heating, cooling, fans, energy recovery, pumps, and heat rejection calculated by multiplying site energy consumption by the carbon emission factors from Table C407.1 |
| Annual heating and cooling load | = | sum of the annual heating and cooling loads met by the building HVAC system in thousands of Btus. |

TABLE ~~C407.1~~ C407.3(2) (Reprinted from Chapter 4)
CARBON EMISSIONS FACTORS

| Type | CO2e (lb/unit) | Unit |
|--------------------------|----------------|--------|
| Electricity b | 0.70 | kWh |
| Natural Gas b | 11.7 | Therm |
| Oil b | 19.2 | Gallon |
| Propane b | 10.5 | Gallon |
| Other ^a | 195.00 | mmBtu |
| On-site renewable energy | 0.00 | |

a.

code official.

- b. Carbon emissions factors are for Washington State and are used to determine compliance with HVAC TSPR for the proposed HVAC system. If these factors are modified by any local jurisdiction the HVAC TSPR software will need to be modified to provide equivalent building energy performance as mandated by the code minimum energy code requirements of RCW 19.27A.015.

Thanks,

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