

WAC 51-11C-402141 Table C402.1.4—Opaque thermal envelope requirements, *U*-factor method.

**Table C402.1.4**  
**Opaque Thermal Envelope Requirements<sup>a, f</sup>**

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
<b>Roofs</b>		
Insulation entirely above deck	U-0.027	U-0.027
Metal buildings	U-0.031	U-0.031
Attic and other	U-0.021	U-0.021
Joist or single rafter	U-0.027	U-0.027
<b>Walls, Above Grade</b>		
Mass	U-0.104 <sup>d</sup>	U-0.078
Mass transfer deck slab edge	U-0.20	U-0.20
Metal building	U-0.052	U-0.052
Steel framed	U-0.055	U-0.055
Wood framed and other	U-0.054	U-0.054
<b>Walls, Below Grade</b>		
Below-grade wall <sup>b</sup>	Same as above grade	Same as above grade
<b>Floors</b>		
Mass <sup>e</sup>	U-0.031	U-0.031
Joist/framing	U-0.029	U-0.029
<b>Slab-on-Grade Floors</b>		
Unheated slabs	F-0.54	F-0.54
Heated slabs <sup>c</sup>	F-0.55	F-0.55
<b>Opaque Doors</b>		
Swinging	U-0.37	U-0.37
Nonswinging	U-0.34	U-0.34

- <sup>a</sup> Use of opaque assembly *U*-factors, *C*-factors, and *F*-factors from Appendix A is required unless otherwise allowed by Section C402.1.4.
- <sup>b</sup> Where heated slabs are below grade, they shall comply with the *F*-factor requirements for heated slabs.
- <sup>c</sup> Heated slab *F*-factors shall be determined specifically for heated slabs. Unheated slab factors shall not be used.
- <sup>d</sup> 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 building thermal envelope encloses one or more 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. Where additional uses not listed (such as office, retail, etc.) are contained within the building, the exterior walls that enclose these areas may not utilize this exception and must comply with the appropriate mass wall R-value from Table C402.1.3/*U*-factor from Table C402.1.4.
- <sup>e</sup> "Mass floors" shall include floors weighing not less than:
  1. 35 pounds per square foot of floor surface area; or
  2. 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.
- <sup>f</sup> Opaque assembly *U*-factors based on designs tested in accordance with ASTM C1363 shall be permitted. The *R*-value of continuous insulation shall be permitted to be added or subtracted from the original test design.

[Statutory Authority: RCW 19.27A.025, 19.27A.045, 19.27A.160, and 19.27.074. WSR 16-24-070, § 51-11C-402141, filed 12/6/16, effective 5/1/17. Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-402141, filed 1/19/16, effective 7/1/16.]