(Effective July 1, 2020)

WAC 51-11R-40215 Target/Proposed UA equations.

**EQUATION 1 - GROUP R OCCUPANCY**

**TARGET UA**

\[
U_{AT} = U_W A_W + U_{BGW} A_{BGW} + U_{VG} A_{VG} + U_{OG} A_{OG} + U_F A_F + U_{RC} A_{RC} + U_D A_D + F_S P_S + F_{BGS} P_{BGS}
\]

Where:

- **\( U_{AT} \)** = The target combined thermal transmittance of the gross exterior wall, floor and roof/ceiling area.
- **\( U_W \)** = The thermal transmittance value of the opaque above grade wall found in Table R402.1.3.
- **\( A_W \)** = Opaque above grade wall area.
- **\( U_{BGW} \)** = The thermal transmittance value of the below grade opaque wall found in Table R402.1.3.
- **\( A_{BGW} \)** = Opaque below grade wall area.
- **\( U_{VG} \)** = The thermal transmittance value of the fenestration found in Table R402.1.3.
- **\( A_{VG} \)** =
  - (a) The proposed glazing area; where proposed fenestration glazing area is less than 15 percent of the conditioned floor area, minus \( A_{OG} \).
  - (b) 15 percent of the conditioned floor area; where the proposed fenestration glazing area is 15 percent or more of the conditioned floor area, minus \( A_{OG} \).
- **\( U_{OG} \)** = The thermal transmittance value of the skylight glazing found in Table R402.1.3.
- **\( A_{OG} \)** = Skylight glazing area (if the proposed \( A_{OG} \) exceeds 15 percent, the target \( A_{OG} \) shall be 15 percent of the total floor area of the conditioned space).
- **\( U_F \)** = The thermal transmittance value of the floor found in Table R402.1.3.
- **\( A_F \)** = Floor area over unconditioned space.
- **\( U_{RC} \)** = The thermal transmittance value of the ceiling found in Table R402.1.3.
- **\( A_{RC} \)** = Roof/ceiling area.
- **\( U_D \)** = The thermal transmittance value of the fenestration found in Table R402.1.3.
- **\( A_D \)** = Opaque door area.
- **\( F_S \)** = Concrete slab on grade component F-factor found in Table R402.1.3.
- **\( P_S \)** = Lineal ft. of concrete slab on grade perimeter.
- **\( F_{BGS} \)** = Concrete below grade slab component F-factor found in Table R402.1.3.
- **\( P_{BGS} \)** = Lineal ft. of concrete below grade slab perimeter.

**EQUATION 2 - GROUP R OCCUPANCY**

**PROPOSED UA**

\[
U_A = U_W A_W + U_{BGW} A_{BGW} + U_{VG} A_{VG} + U_{OG} A_{OG} + U_F A_F + U_{RC} A_{RC} + U_D A_D + F_S P_S + F_{BGS} P_{BGS}
\]

Where:

- **\( U_A \)** = The combined thermal transmittance of the gross exterior wall, floor and roof/ceiling assembly area.
- **\( U_W \)** = The thermal transmittance of the opaque above grade wall area.
- **\( A_W \)** = Opaque above grade wall area.
- **\( U_{BGW} \)** = The thermal transmittance value of the below grade opaque wall.
- **\( A_{BGW} \)** = Opaque below grade wall area.
- **\( U_{VG} \)** = The thermal transmittance value of the fenestration.
- **\( A_{VG} \)** = Fenestration glazing area, including windows in exterior doors.
- **\( U_{OG} \)** = The thermal transmittance value of the skylight glazing.
- **\( A_{OG} \)** = Skylight glazing area.
- **\( U_F \)** = The thermal transmittance of the floor.
- **\( A_F \)** = Floor area over unconditioned space.
U_{RC} = \text{The thermal transmittance of the ceiling.}

A_{RC} = \text{Ceiling area.}

U_{D} = \text{The thermal transmittance value of the opaque door area.}

A_{D} = \text{Opaque door area.}

F_{S} = \text{Concrete slab on grade component } F\text{-factor.}

P_{S} = \text{Lineal ft. of concrete slab on grade perimeter.}

F_{BGS} = \text{Concrete below grade slab component } F\text{-factor.}

P_{BGS} = \text{Lineal ft. of concrete below grade slab perimeter.}

\text{NOTE: Where more than one type of wall, window, roof/ceiling, door and skylight is used, the } U \text{ and } A \text{ terms for those items shall be expanded into subelements as:}

U_{W1}A_{W1} + U_{W2}A_{W2} + U_{W3}A_{W3} + \ldots \text{etc.}

\text{NOTE: Below grade walls: The wall is assumed to extend from the slab upward to the top of the mud sill for the distance specified in Table A104.1, with 6 inches of concrete wall extending above grade. This will be calculated separately from above grade walls using the wall height that best describes the system.}