

CHAPTER 4 [CE]

COMMERCIAL ENERGY EFFICIENCY

SECTION C401 GENERAL

C401.1 Scope. The provisions in this chapter are applicable to commercial *buildings* and their *building sites*.

C401.2 Application. Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1, excluding section 9.4.1.1(g), section 8.4.2 and section 8.4.3 of the standard.
2. The requirements of Sections C402 through C405 and Section C408. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.
3. The requirements of Sections C402.5, C403.2, C404, C405.2, C405.4, C405.5, C407 and C408. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

C401.2.1 Commissioning. Commercial buildings and tenant spaces shall comply with Section C408 as applicable.

C401.2.2 Application to replacement fenestration products. Where some or all of an existing *fenestration* unit is replaced with a new *fenestration* product, including sash and glazing, the replacement *fenestration* unit shall meet the applicable requirements for *U*-factor and *SHGC* in Table C402.4.

Exception: An area-weighted average of the *U*-factor of replacement fenestration products being installed in the building for each fenestration product category listed in Table C402.4 shall be permitted to satisfy the *U*-factor requirements for each fenestration product category listed in Table C402.4. Individual fenestration products from different product categories listed in Table C402.4 shall not be combined in calculating the area-weighted average *U*-factor.

SECTION C402 BUILDING ENVELOPE REQUIREMENTS

C402.1 General (Prescriptive). Building thermal envelope assemblies for buildings that are intended to comply with the code on a prescriptive basis, in accordance with the compliance path described in Item 2 of Section C401.2, shall comply with the following:

1. The opaque portions of the building thermal envelope shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the *R*-value-based method of Section C402.1.3; the *U*-, *C*- and *F*-factor-based method of Section C402.1.4; or the component performance alternative of Section C402.1.5.

2. Roof solar reflectance and thermal emittance shall comply with Section C402.3.
3. Fenestration in building envelope assemblies shall comply with Section C402.4.
4. Air leakage of building envelope assemblies shall comply with Section C402.5.

Alternatively, where buildings have a vertical fenestration area or skylight area exceeding that allowed in Section C402.4, the building and building thermal envelope shall comply with Section C401.2, Item 1 or Section C401.2, Item 3.

Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with Section C403.2.14.

C402.1.1 Low-energy buildings and greenhouses. The following low-energy buildings, or portions thereof separated from the remainder of the building by *building thermal envelope* assemblies complying with this section, shall be exempt from the *building thermal envelope* provisions of Section C402.

1. Those with a peak design rate of energy usage less than 3.4 Btu/h · ft² (10.7 W/m²) or 1.0 watt per square foot (10.7 W/m²) of floor area for space conditioning purposes.
2. Those that do not contain *conditioned space*.

C402.1.1.1 Greenhouses. *Greenhouse* structures or areas that are mechanically heated or cooled and that comply with all of the following shall be exempt from the building envelope requirements of this code:

1. Exterior opaque envelope assemblies comply with Sections C402.2 and C402.4.5.

Exception: Low-energy *greenhouses* that comply with Section C402.1.1.

2. Interior partition *building thermal envelope* assemblies that separate the *greenhouse* from *conditioned space* comply with Sections C402.2, C402.4.3 and C402.4.5.

3. Fenestration assemblies that comply with the thermal envelope requirements in Table C402.1.1.1. The *U*-factor for a roof shall be for the roof assembly or a roof that includes the assembly and an *internal curtain system*.

Exception: Unconditioned *greenhouses*.

**TABLE C402.1.1.1
FENESTRATION THERMAL ENVELOPE
MAXIMUM REQUIREMENTS**

COMPONENT	U-FACTOR (Btu/h · ft ² · °F)
Skylight	0.5
Vertical fenestration	0.7