

# 140.0 to 140.2 NR General Performance and Prescriptive

## SUBCHAPTER 5

### NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES—PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR ACHIEVING ENERGY EFFICIENCY

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#### SECTION 140.0 – ~~CHOICE OF~~ PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES

Nonresidential, high-rise residential and hotel/motel buildings shall meet all of the following:

1. The requirements of Section 100.0 through and 110.10 applicable to the building project (mandatory measures).
2. The requirements of Section 120.0 through 130.5 (mandatory features/measures).
3. Either the performance compliance approach (energy budgets) in Section 140.1 or the prescriptive compliance approach in Section 140.2 for the climate zone in which the building will be located. Climate zones are shown in FIGURE 100.1-A.

NOTE: The Commission periodically updates, publishes, and makes available to interested persons and local enforcement agencies precise descriptions of the climate zones, which is available by zip codes boundaries depicted in the Reference Joint Appendices along with a list of the communities in each zone.

The envelope and the space conditioning, lighting, and service water heating systems of all nonresidential, high-rise residential, and hotel/motel buildings subject to Title 24, Part 6, shall be designed, constructed, and installed in accordance with either:

- (a) **Performance Approach**—to use no more TDV energy from depletable sources than the energy budget, calculated according to Section 140.1; or
- (b) **Prescriptive Approach**—in accordance with all the applicable requirements of Sections 140.2 through 140.

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#### SECTION 140.1 – PERFORMANCE APPROACH: ENERGY BUDGETS.

A building complies with the performance approach if the energy budget calculated for the Proposed Design Building under Subsection (b) is no greater than the energy budget calculated for the Standard Design Building under Subsection (a).

In order to meet the energy budget, a proposed building's use of TDV energy calculated under Subsection (b) must be no greater than the TDV energy budget calculated under Subsection (a).

- (a) **Energy Budget for the Standard Design Building.** –The energy budget for a proposed building is determined by applying the mandatory and prescriptive requirements to the Proposed Design Building. The energy budget is the sum of the TDV energy for space-conditioning, indoor lighting, mechanical ventilation and service water heating. the sum of the space-conditioning, lighting, and service water heating budgets in Subdivisions 1, 2, and 3 of this subsection, expressed in Btu per square foot of conditioned floor area per year.

1. **Space-conditioning budget.** The space-conditioning budget is the TDV energy used for space conditioning in a standard building in the climate zone in which the proposed building is located, calculated with a method approved by the Commission (expressed in TDV energy per square foot of conditioned floor area per year), and assuming that:

- ~~A. The standard building has space heating, space cooling, and ventilation systems that meet, but do not exceed, the minimum efficiency requirements of Sections 110.1 and 110.2, and the requirements of Section 140.4; and~~
- ~~B. The performance of the roof/ceiling, walls, floors and soffits, windows, and skylights is equal to an applicable value using the same assembly type from TABLE 140.3 A, TABLE 140.3 B, or TABLE 140.3 C, and for nonresidential buildings with low-sloped roofs, the roof aged solar reflectance and thermal emittance is equal to the values specified in Section 118(i)1; and~~
- ~~C. The zoning, the orientation of each building feature, and the gross envelope areas of the standard building are the same as in the proposed building; and~~
- ~~D. The window area of the west-facing wall is the greater of: 1) the window area of the proposed building, excluding the window area in demising walls, or 40 percent of the gross exterior west-facing wall area of the standard building, whichever is less; or 2) 6 feet times the west-facing display perimeter; and the window area of the standard building is the greater of (1) or (2): (1) the window area of the proposed building excluding the window area in demising walls, or 40 percent of the gross exterior wall area of the standard building, whichever is less; or (2) 6 feet times the display perimeter; and~~
- ~~E. For buildings subject to Section 143(c), the skylight area of the standard building shall be the minimum area required by Section 143(c). For all other buildings, the skylight area of the standard building is the same as in the proposed building, or is 5 percent of the gross exterior roof/ceiling area of the standard building, whichever is less.~~
- 2. Lighting budget.** The lighting budget is the TDV energy used for lighting in a standard building calculated with a method approved by the Commission (expressed in Btu per square foot of conditioned floor area per year), and assuming that:
- ~~A. The lighting power density of the standard building, for areas where no lighting plans or specifications are submitted for permit and the occupancy of the building is known, is the maximum allowed lighting power density calculated according to Section 146(e)1; and~~
- ~~B. The lighting power density of the standard building, for areas where no lighting plans or specifications are submitted for permit, and the occupancy of the building is not known, is 1.2 watts per square foot; and~~
- ~~C. The lighting power density of the standard building, for areas where lighting plans and specifications are being submitted for permit, is the maximum allowed lighting power density calculated according to Section 146(e) 1, 2, or 3; and~~
- ~~D. The lighting power density of the standard building is adjusted as described in the Nonresidential ACM Manual for an astronomical timeclock when required by Section 131(c)2 for the presence of automatic daylighting controls in the secondary sidelit zones as required by Section 146(d).~~
- 3. Service water heating budget.** The service water heating budget is the TDV energy used for service water heating in a standard building in the climate zone in which the proposed building is located, calculated with a method approved by the Commission (expressed in Btu per square foot of conditioned floor area per year), and assuming that the standard building has a service water heating system that meets, but does not exceed, the applicable requirements of Sections 111, 113, 123, and 145.
- (b) TDV Energy Use of Budget for the Proposed Design Building.** The energy budget for a Proposed Design Building is determined by calculating the TDV energy for the Proposed Design Building. The energy budget is the sum of the TDV energy for space-conditioning, indoor lighting, mechanical ventilation and service water heating.
- The TDV energy use of a proposed building is the sum of the space-conditioning, lighting, and service water heating TDV energy use calculated in Subdivisions 1, 2, and 3 of this subsection, using the same Compliance software used to calculate the budget under Subsection (a), and expressed in Btu per square foot of conditioned floor area per year. If any feature of the proposed building, including, but not limited to, the envelope or the space-conditioning, lighting, or service water heating system, is not included in the building permit application, the energy performance of the feature shall be assumed to be that of the corresponding feature calculated in Subsection (a).
- 1. Space-conditioning TDV energy use.** The space-conditioning TDV energy use shall be calculated by:
- ~~A. Using a method approved by the Commission; and~~

- ~~B. Using the proposed building's space heating, space cooling, lighting, and ventilation systems, roof and ceiling, walls, floors and soffits, opaque envelope areas, windows, skylights, zoning, and orientation, as shown on the plans and specifications submitted in the building permit application under Section 10-103 of Title 24, Part 1.~~
- ~~2. **Lighting TDV energy use.** The lighting TDV energy use shall be calculated using a method approved by the Commission, and using the actual lighting power density calculated under Section 146(e), including reduction of wattage by the applicable lighting power adjustment factors specified in Section 146(a)2. The lighting power density shall also be adjusted as described in the Nonresidential ACM Manual for an astronomical timeclock when required by Section 131(c)2 the presence of automatic daylighting controls in the secondary sidelite zones as required by Section 146(d).~~
- ~~3. **Service water heating TDV energy use.** The service water heating TDV energy use shall be calculated using a method approved by the Commission, and using the proposed building's actual service water heating system.~~
- ~~(c) **Calculation of Energy Budget and Energy Use.** When calculating the energy budget under Subsection (a) and the TDV energy use under Subsection (b), all of the following rules shall apply: The TDV energy for both the Standard Design Building and the Proposed Design Building shall be computed by Compliance Software certified for this use by the Commission. The methods, assumptions and required inputs for Compliance Software are approved by the Commission and documented in the Nonresidential ACM Reference-Approval Manual.~~
- ~~1. **Methodology.** The methodology, computer programs, inputs, and assumptions approved by the Commission shall be used.~~
- ~~2. **Energy included.** All energy, from depletable sources and recovered from space conditioning equipment, used for space conditioning, lighting, and service water heating shall be included.~~
- ~~3. **Energy excluded.** The following energy shall be excluded:~~
- ~~A. Exempt processProcess loads; and~~
- ~~B. Loads of redundant or backup equipment, if the plans submitted under Section 10-103 of Title 24, Part 1, show controls that will allow the redundant or backup equipment to operate only when the primary equipment is not operating, and if such controls are installed; and~~
- ~~C. Recovered energy other than from space conditioning equipment; and~~
- ~~D. Additional energy use caused solely by outside air filtration and treatment for the reduction and treatment of unusual outdoor contaminants with final pressure drops more than 245 pascals or 1 inch water column. Only the energy accounted for by the amount of the pressure drop that is over 1 inch may be excluded.~~
- ~~4. **U factors.** U factors shall be calculated as follows:~~
- ~~A. All building components. The U factor of all building components shall be calculated to three decimal places; the calculations shall assume still inside air and a 15 miles per hour outside air velocity, or other assumptions approved by the Commission.~~
- ~~B. Wood-framed assemblies. U factors for wood-framed assemblies shall be calculated using the parallel path method listed in ASHRAE Handbook, Fundamentals Volume, Chapter 23, with framing factors approved by the Commission.~~
- ~~C. Metal-framed assemblies. U factors for metal-framed assemblies shall be calculated using the zone method listed in ASHRAE Handbook, Fundamentals Volume, Chapter 23, or a method approved by the Commission.~~
- ~~D. Fenestration. U factors for fenestration shall be determined using NFRC 100 as specified in Section 116.~~
- ~~E. Masonry assemblies. U factors for masonry assemblies shall be calculated using the transverse isothermal planes method listed in ASHRAE Handbook, Fundamentals Volume, Chapter 23, or a method approved by the Commission.~~
- ~~F. Other. U factors for components not listed in this subsection shall be calculated using a method approved by the Commission.~~
- ~~5. **Solar heat gain coefficients.** Solar heat gain coefficients shall be determined using NFRC 200 as specified in Section 116, and shall not be adjusted for the effects of interior or exterior shading devices.~~

~~6. **Visible light transmittance.** Visible light transmittance shall be determined using the values listed in ASHRAE Handbook, Fundamentals Volume, Chapter 30, or manufacturers literature, and shall be adjusted for the effects of framing and interior or exterior shading devices.~~

~~(d) **Relocatable Public School Buildings.** When the manufacturer/builder certifies the relocatable public school building for use in any climate zone, the energy budget shall be met in the most severe climate zones as specified in the Nonresidential ACM Manual, assuming the prescriptive envelope criteria in TABLE 143-C. When the manufacturer/builder certifies that the relocatable building is manufactured for use in specific climate zones and that the relocatable building can not be lawfully used in other climate zones, the energy budget shall be met in each climate zone that the manufacturer/building certifies, assuming the prescriptive envelope criteria in TABLE 143-A, including the non-north window RSHG and skylight SHGC requirements for each climate zone. The energy budget and the energy use of the proposed building shall be determined using the multiple orientation approach specified in the Nonresidential ACM Manual. The manufacturer/builder shall meet the requirements for identification labels specified in Section 143(a)8.~~

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## **SECTION 140.2 – PRESCRIPTIVE APPROACH**

In order to comply with the prescriptive approach under this section, a building shall be designed with and shall have constructed and installed:

- (a) A building envelope that complies with Section 140.3(a) or 140.3(b), and for applicable buildings Section 140.3(c);
- (b) A space-conditioning system that complies with Section 140.4;
- (c) A service water-heating system that complies with Section 140.5;
- (d) A lighting system that complies with Section 140.6;
- (e) An outdoor lighting system that complies with Section 140.7; ~~and~~
- (f) Interior and exterior signs that comply with Section 140.8; ~~and~~
- (g) Covered processes that comply with Section 140.9.

