



2010 FLORIDA BUILDING CODE, ENERGY CONSERVATION¹

There have been several changes to the energy code of Florida, beginning with its name. Once again it is printed as a separate volume of the Florida Building Code; it will now be referred to as the *Florida Building Code - Energy Conservation (FBC, EC)*. The most noticeable changes are as follows:

- Reorganization of the code. Based on the 2009 International Energy Conservation code (IECC), the document now addresses most residential in Chapter 4 while commercial and high-rise residential are covered in Chapter 5.
 - Code compliance methods previously described as Method A (Performance) or Method B (Prescriptive) are now designated by code section numbers.
 - Prescriptive code compliance (“cookbook” approach):
 - Residential: Section 402, Form 402-2010 or UA Alternative
 - Commercial: Section 502, Form 502-2010
 - Performance code compliance (computer energy simulation approach):
 - Residential: Section 405, Form 405-2010
 - Commercial: Section 506, Form 506-2010
- Florida specific amendments. Efficiencies specific to Florida’s climate and law have been integrated into the new base code, the most notable of which is an increase of 5% in mandated stringency above the 2007 code, making the Florida specific amendments 20% more stringent than the 2006 IECC.

Computer Software. The code no longer requires compliance with a specific program. All code

compliance software has to be approved by the Florida Building Commission.

Reorganization of the Code

Since the current FBC, EC is based on the IECC, all of the previous formatting is gone. Accordingly, all design professionals, building officials, and inspectors alike need to be prepared to learn all new code references for evaluating plans and job inspections for code compliance. Below find the formatting for the FBC, EC and a breakdown of the changes in each chapter.

<i>Chapter</i>	<i>Title</i>
1	Administration
2	Definitions
3	Design Criteria
4	Residential Energy Efficiency
5	Commercial Energy Efficiency
6	Referenced Standards
Appendix A	Jurisdictional Data
Appendix B	Criteria for Computer Modeling
Appendix C	Forms

Chapter 1 – Administration

Chapter 1 contains the applicability criteria of Florida law.

Scope (101.2) – This is primarily a numbering change. As with past editions of the Energy Code, as it applies to residential and commercial buildings, the FBC, EC is a "uniform" code and cannot be changed to make it either more efficient or more lenient.

Existing Buildings (101.4.1): Existing buildings shall meet the criteria in Table 101.4.1.

1 DISCLAIMER – This piece is intended only to give the reader factual information that is current at the time of printing. This piece is not a substitute for professional advice and should not be used for guidance or decisions related to a specific design or construction project. This piece does not reflect the opinion of any of the entities, agencies or organizations identified in the materials and if any opinions appear they are those of the author and should not be relied upon in any event. Applicable to the 2010 Florida Building Code, Building, and Residential.

- Renovations: Meet code for the components being changed where the cost of the work (over a one year period) exceeds 30% of the assessed value of the structure. Example:
 - If the cost of the job is less than 30% of the assessed value of the building, the code is not applicable unless it is an addition, new building system, new conditioned space or change of occupancy type.
- Building systems: Meet code where new products are installed for HVAC, water heating, lighting and motors. New requirements:
 - Equipment sizing required for total replacement of evaporators and condensing units using approved nationally recognized sizing method. Block sizing is okay; no audit required.
 - Accessible ducts (30 inch clearance) inspected and sealed where needed at time of total replacement of evaporators and condensing units. Signed certification by contractor that this was done. No testing or investigation of duct is required.

daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight *zone* depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight *zone* width is assumed to be the width of the window plus 2 feet (610 mm) on each side or the window width plus the distance to an opaque partition or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

F-FACTOR - The perimeter heat loss factor for slab-on-grade floors expressed in (Btu/h x ft. x °F).

HIGH-EFFICACY LAMPS - Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

- 60 lumens per watt for lamps over 40 watts,
- 50 lumens per watt for lamps over 15 watts to 40 watts, and
- 40 lumens per watt for lamps 15 watts or less

MULTI-SCENE CONTROL - A lighting control device or system that allows for two or more pre-defined lighting settings, in addition to all off, for two or more groups of Luminaires to suit multiple activities in the space, and allows the automatic recall of those settings.

NORMATIVE - Made an integral part of a standard or code.

STOREFRONT - A nonresidential system of doors and windows mullied as a composite fenestration structure that has been designed to resist heavy use. *Storefront* systems include, but are not limited to, exterior fenestration systems that span from the floor level or above to the ceiling of the same story on commercial buildings.

Compliance (101.5) - Residential buildings not more than three stories above grade in height shall meet the provisions of Chapter 4. Commercial buildings and residential buildings greater than three stories shall meet the provisions of Chapter 5.

Chapter 2 – Definitions

The new edition of the code introduced some new terminology into the base code with which users of the Energy Code should become familiar.

ABSORPTANCE - The ratio of the total absorbed radiation to the total incident radiation; equal to 1 (unity) minus the transmittance.

C-FACTOR (THERMAL CONDUCTANCE) - The coefficient of heat transmission (surface to surface) through a building component or assembly, equal to the time rate of heat flow per unit area and the unit temperature difference between the warm side and cold side surfaces.

DAYLIGHT ZONE

1. **Under skylights.** The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to-ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.
2. **Adjacent to vertical fenestration.** The area adjacent to vertical fenestration which receives

Chapter 3 - Design Criteria

General (301.1) - While the table indicates that only three counties (Broward, Miami-Dade and Monroe) are in climate Zone 1, and all other counties are in Climate Zone 2, there is no difference in the prescriptive envelope compliance criteria by climate zone. The performance-based code compliance methods are based on climate data from weather data collection stations nearest the building's location.

General (301.2) - All Florida counties are considered **warm humid counties**.

Insulation product rating (303.1.4) - The *R*-value (thermal resistance) of insulation shall be determined in accordance with the U.S. Federal Trade Commission *R*-value rule, CFR Title 16, Part 460, May 31, 2005.

Insulation Installation (303.2) - Insulation materials shall comply with the requirements of their respective ASTM standard specification and shall be installed in accordance with their respective ASTM installation practice in Table 303.2 in such a manner as to achieve rated R-value of insulation. Open-blown or poured loose-fill insulation shall not be used in attic roof spaces when the slope of the ceiling is more than three in twelve. When eave vents are installed, baffling of the vent openings shall be provided to deflect the incoming air above the surface of the insulation.

Exception: Where metal building roof and metal building wall insulation is compressed between the roof or wall skin and the structure.

Compressed insulation (303.2.1) - Insulation that has been compressed to 85% or less of the manufacturer's rated thickness for the product shall use the R-values given in Table 303.2.1. These values are to be used except where data was developed by an independent testing laboratory.

Substantial Contact (303.2.2) - Insulation shall be installed in a permanent manner in substantial contact with the inside surface. Flexible batt insulation installed in floor cavities shall be supported by supports no greater than 24 inches on center.

Exception: Insulation materials that rely on airspaces adjacent to reflective surfaces for their rated performance.

Recessed Equipment (303.2.3) - Lighting fixtures; heating, ventilating, and air conditioning equipment, including wall heaters, ducts, and plenums; and other equipment shall not be recessed as to affect the insulation thickness unless:

1. The total combined area affected is less than one percent of the opaque area of the assembly, or
2. The entire roof, wall, or floor is covered with insulation to the full depth required, or
3. The effects of reduced insulation are included in calculations using an area weighted average method and compressed insulation values obtained from Table 303.2.1.1.

In all cases, air leakage through or around the recessed equipment to the conditioned space shall be limited in accordance with Section 404.2.5 or 502.3.8, as applicable.

Insulation Protection (303.2.4) - Exterior insulation shall be covered with a protective material to prevent damage from sunlight, moisture, landscaping operations, equipment maintenance, and wind. In attics and mechanical rooms, a way to access equipment that prevents damaging or compressing the insulation shall

be provided. Foundation vents shall not interfere with the insulation. Insulation materials in ground contact shall have a water absorption rate no greater than .3 percent when tested in accordance with ASTM C272.

Materials Testing and Thermal Properties (304)

- 304.1 Building material thermal properties, general
- 304.1.1 Commercial and residential high rise
- 304.1.2 Residential one- and two-family
- 304.2 Testing of Building Materials Thermal Properties
 - 304.2.1 Single materials
 - 304.2.2 Assembly U-factors
 - 304.3 Calculation procedures and assumptions

Chapter 4 - Residential Energy Efficiency

With the new changes to mirror the IECC, it also applies to the individual chapters. Previously known as Chapter 13-6, the new Chapter 4 of the FBC, EC has a new format. The new format is as follows:

Section	Title
401	General
402	Building Thermal Envelope
403	Systems
404	Electrical Power & Lighting Systems
405	Simulated Performance Alternative

RESIDENTIAL - What's NEW

- **Air infiltration (402.4.2.1)** Blower door test to ≤ 7 ACH or checklist for inspection
- **Recessed lights (402.4.5)** Shall be IC-rated and labeled to meet ASTM E 283
- **Window limits (402.5)**
 - Prescriptive compliance: Maximum 20% of conditioned floor area; U-factor ≤ 0.65 ; SHGC ≤ 0.30
 - Performance compliance: Maximum weighted average SHGC 0.50 except if 4 ft. overhang
- **Heating, Ventilating and Air-Conditioning:**
 - **Equipment efficiencies and duct construction:** Referenced to Chapter 5
 - **Programmable thermostat:** Required for forced air furnaces. (403.1.1)
 - **Ducts.**
 - **Prescriptive compliance method:** Ducts must be in conditioned space, must be an R-6 (402.1.1), and tested by a Class 1 BERS Rater (403.2.2.1) to be substantially leak-free ($Q_n=0.03$).
 - **Performance compliance method:** All supply and return

ducts not completely inside the building envelope shall be insulated to a minimum of R-6 (405.2).

- Supply ducts located in attics or on roofs shall be insulated to R-8 (403.2.1). Not applicable under prescriptive or performance method for new buildings.

• **Lighting:**

- A minimum of 50% of the lamps in permanently installed lighting fixtures shall be high efficacy lamps (404.1).

Examples of high efficacy lamps include:

- Compact fluorescent lamps, T-8 or smaller diameter
- Linear fluorescent lamps or lamps with a minimum efficacy of:
 - 60 lumens per watt for lamps over 40 watts,
 - 50 lumens per watt for lamps over 15 watts to 40 watts, and
 - 40 lumens per watt for lamps 15 watts or less

• **Residential Swimming Pools (403.9):**

- Shall have an accessible on-off switch outside the heater to allow shut off without adjusting thermostat. (403.9.1)
- Shall have time switches to allow for heaters and pumps to turn off on a preset schedule. (403.9.1.2)
- Gas pool heaters will have to meet a new national standard of 82% thermal efficiency on April 16, 2013.
- Heated pools shall have a vapor-retardant cover or a liquid cover or some other means to reduce heat loss.
- Pool filtration pump motors shall:
 - Not be split-phase, shaded-pole or capacitor start-induction
 - Motors with ≥ 1 hp shall have capability of operating at two or more speeds; low speed no more than $\frac{1}{2}$ the motor's maximum rotation rate
 - Motor controls shall have capability to operate at ≥ 2 speeds; default residential filtration speed with higher speed override capability--except can be higher for not to exceed 24 hours

Exception: Solar pool heating systems during periods of usable solar heat gain.

- In addition to the requirements contained in 403.9 the energy requirements for residential pools and inground spas shall be as specified in ANSI/APSP-15. The energy requirements for portable spas shall be in accordance with ANSI/APSP-14.

Residential - What's NOT New

- Florida "Standard Reference Design" (baselines) for mechanical equipment did NOT go to "same as Proposed Design" as in the IECC. The IECC does not give credit for higher efficiency systems. Florida follows federal law, which requires state codes with baselines to have equipment baselines at federal minimums.
- Florida's increase in overall stringency comes from a multiplier of 0.80 applied to the entire Standard Reference Design budget...which makes the code 20% more stringent overall than the baseline features.
- The requirements of Florida's prescriptive compliance method reflect a building that would minimally comply with Florida's performance-based code.
- Credits may be claimed as per previous performance-based code.

Chapter 5 - Commercial Energy Efficiency

With the new changes to mirror the IECC, it also applies to the individual chapters. Previously known as Chapter 13-4, the new Chapter 5 of the FBC, EC has a new format. The new format is as follows:

<i>Section</i>	<i>Title</i>
501	General
502	Building Envelope Requirements
503	Building Mechanical Systems
504	Service Water Heating
505	Electrical Power and Lighting Systems
506	Total Building Performance

COMMERCIAL - What's NEW

No prescriptive compliance method provided as an option to the performance compliance method. Performance compliance method must be used in all cases with exception to shell buildings, renovations and additions (see below).

Envelope Prescriptive Measures for Shell buildings (101.4.9)

- The building envelope shall meet the requirements of Table 502.1.1.1(1)
 - Roof: Absorptance ≤ 0.22 , R-40

- Walls: Absorptance ≤ 0.3 , R-30
- Windows: $U \leq 0.45$; SHGC ≤ 0.25 (0-40%WWR), ≤ 0.19 (40-50%WWR)
- OR Sec. 506, list all assumptions made about features not installed until later
- Either way, Sec. 506 must be submitted upon completion of the building

Envelope Prescriptive Measures for Renovations and Alterations (502.1.1.1(2))

- Changes to window SHGC to 0.25
- Roof: Absorptance ≤ 0.22 , R-value (U-value) to $\geq R-38$ ($\leq U-0.027$)
- Above Grade Exterior Wall R-value to $\geq R-19$ ($\leq U-0.052$)
- Below Grade Exterior Wall - No Requirement
- Raised Floor Insulation - R-value (U-value) $\geq R-19$ ($\leq U-0.052$)

Fan Power Limitation 2 (503.2.10.1(1)) - Added to clarify the intent of ASHRAE 90.1 Energy Cost Budget Method (ECBM) code compliance in case of fan power suggests this methodology to be the correct approach.

Pools (504.7)

- **Pool Heaters:** All pool heaters shall meet the minimum efficiency listed for that type of pool heater in Table 504.2 and shall have a readily accessible on-off switch that is mounted outside the heater to allow shutoff without adjusting thermostat (504.7.1).
Additional Exception: Where pumps are powered exclusively from on-site renewable generation.
- **Pool Covers** - Heated swimming pools and inground permanently installed spas shall be equipped with a vapor retardant cover on or at the water surface or a liquid over or other means to reduce heat loss (504.7.3).
Exception: Outdoor pools deriving over 70% of the energy for heating from site recovered energy or solar energy source computed over an operating season.

Calculation Software Tools (505.6 B-2.3) - Provision given to the FBC to approve additional software tools that can meet the provisions laid out in this chapter.

Requirements specific to credit options (506.3.3) - Credit claimed in the compliance calculation for technologies that meet the criteria for various options below.

- **Vegetative Roofs (506.3.3.1)** - Credit may be claimed in whole building performance method

calculations for the area of a proposed building's roof that is covered with a vegetative roof that is designed and installed in accordance with ANSI/SPRI VF-1, with a minimum growth media depth of 4 inches. The credit shall provide a 45% reduction in the heating and cooling roof heat flux rates for the roof area covered with the vegetative roof. Minimum roof/ceiling insulation levels shall be code minimums as per Section 506.2.1.

- **Enthalpy Recovery Ventilation System Credit (ERVs) (506.3.3.2)** - Credit may be claimed in whole building performance method calculations for Enthalpy Recovery Ventilation systems used in the proposed building. The credit for buildings in Climate Zone 1 is 6%; Climate Zone 2 gets 4% if:
 - Every HVAC system has a design supply air flow $< 5,000$ cfm, or
 - One or more HVAC systems have a design supply flow $\geq 5,000$ cfm but outdoor air $< 70\%$ of design air flow for the system.

Resources:

2010 *Florida Building Code*, International Code Council, Inc. Accessible online at: www.FloridaBuilding.org

Information on all aspects of the updated 2010 Florida Building Code is available at: <http://www.floridabuilding.org/fbc/thecode/resources.htm>

Energy Code Software:

Residential UA Alternative, US Department of Energy: RESNET <http://www.energycodes.gov/rescheck/>

Florida Building Commission approved Energy Code Compliance Software: http://www.floridabuilding.org/fbc/committees/energy/Energy_Code_Compliance_Software.html

Florida Solar Energy Center
Residential (405): <http://www.energygauge.com/usares/default.htm>
Commercial (506): <http://www.energygauge.com/flacom/default.htm>

Building Codes and Standards Office/Florida Building Commission: 850-487-1824 or www.FloridaBuilding.org

January 2012

ENERGY CODE GUIDELINES FOR EXISTING BUILDING REPLACEMENT SYSTEMS

SUBJECT	RENOVATION ³ /ALTERATION
BUILDING SYSTEMS^{1,2,3}	
HVAC equipment replacement	
Duct sealing	<p>RESIDENTIAL: At the time of total replacement of HVAC evaporators and condensing units, all accessible (min. 30" clearance) joints and seams in the air distribution system shall be inspected and sealed where needed; certified by contractor.</p> <ol style="list-style-type: none"> 1. Inspection through observation. 2. Not an inspection through investigation or testing 3. Only joints and seams that are observed to need sealing (i.e. loose joints) should be sealed. <p>COMMERCIAL/RESIDENTIAL: This provision does not apply to partial replacement of equipment (i.e. where the air distribution system is not unique to the partial replacement of equipment)</p>
Sizing calculation	<p>An a/c contractor or licensed Florida PE shall submit a nationally recognized method based sizing calculation to the code official at the time of permit application for total replacement of the condensing and evaporator components of HVAC systems in accordance with Florida law and the provisions of Sec. 403.6.2.2 or 403.6.2.3.</p> <p>RESIDENTIAL:</p> <ol style="list-style-type: none"> 1. Several "recognized" sizing calculation methods for existing buildings are available from HVAC equipment manufacturers and ACCA accredited software that are subject to approval by the code official. 2. Per Section 101.5⁴ of the <i>FBC-EB</i>, original systems installed on buildings constructed under the 1993 Energy Code or later have already been sized for the building and, without changes to the building, may be assumed to have been sized per code. 3. If a copy of a previous sizing calculation is provided, it is deemed to meet code. <p>COMMERCIAL/RESIDENTIAL: This provision does not apply to partial replacement of equipment (i.e. where the air distribution system is not unique to the partial replacement of equipment)</p>
Duct testing ⁸	RESIDENTIAL: Replacement or extension of an existing air distribution system is not required to be tested.
RENOVATIONS^{1,5,7}	
Windows	<p>If cost of job exceeds 30% of assessed value of structure, meet Sec. 402 requirements. If cost of job does not exceed 30% of assessed value of structure, don't have to meet Energy Code requirements.</p>
Pool filtration pumps ⁶	<p>If cost of job exceeds 30% of assessed value of pool structure, meet Sec. 403.9.4 requirements If cost of job does not exceed 30% of assessed value of pool structure, don't have to meet Energy Code requirements.</p>

In general, Florida law trumps what's in the code. Florida law has been incorporated into the *FBC-Energy Conservation* in Table 101.4.1.

1. Section 553.903, *Florida Statutes*, Applicability, states: "This part shall apply to all **new and renovated buildings in the state, except exempted buildings**, for which building permits are obtained after March 15, 1979, **and to the installation or replacement of building systems and components with new products** for which thermal efficiency standards are set by the Florida Energy Efficiency Code for Building Construction." [NOTE: 2 clauses]
2. Section 101.4.7 of the *FBC-Energy Conservation*, states: "Thermal efficiency standards are set for the following building systems **where new products are installed or replaced in existing building** and for which a permit must be obtained. New products shall meet the minimum efficiencies allowed by this code for the following systems: Heating, ventilating or air conditioning systems; Service water or pool heating systems; Electrical systems and motors; Lighting systems."
3. Section 202 of the *FBC-EC* defines HVAC SYSTEM as "The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building." It further defines a SYSTEM as "A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting". **Commercial buildings where the system is comprised of multiple air handlers, chillers, evaporators and/or condensers do not constitute "replacement of the building system with new products" unless the whole system is replaced.**
4. Sec.101.5, *FBC-Existing Building*, provides the following exception for repairs and alterations: "Subject to the approval of the code official, alterations complying with the laws in existence at the time building or the affected portion of the building was built shall be considered in compliance with the provisions of this code unless the building is undergoing more than a limited structural alteration.
5. Sec. 553.902, *Florida Statutes*, defines RENOVATED BUILDING as "a residential or nonresidential building undergoing alteration that varies or changes insulation, HVAC systems, water heating systems, or exterior envelope conditions, **provided the estimated cost of renovation exceeds 30 percent of the assessed value of the structure.**" Section 202 of the *FBC-Energy Conservation*, further clarifies that the cost shall be cumulative **over a 1 year period.**
6. Pool filtration pumps are not a pool heating system.
7. An existing building or portion thereof may not be altered such that the building becomes less energy efficient than its existing condition.
8. FORM 402 - 2010
 Ducts & AHU installed substantially leak free per Section 403.2.2.1. Test by Class 1 BERS rater required.
Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation; duct must be R-6 installed per Sec. 503.2.7.2