

JDB CODE SERVICES, INC.

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Subject: Opinion Letter on Florida Building Code–Energy Conservation, 5th Edition (2014) Regarding Replacement Fenestration

This letter constitutes my professional opinion on the following questions:

1. Does the Florida Building Code–Energy Conservation, 5th Edition (2014), require replacement fenestration to meet the current provisions for U-factor and SHGC as for new construction?
2. Does the code provision for exempt buildings include replacement fenestration?

My answer to Question 1 above is yes, when using the prescriptive method of compliance for either residential or commercial applications.

My answer to Question 2 above, is no, replacement fenestration is not included in the buildings exempted by the code.

Following is a discussion of the basis for my opinion.

Discussion

It should be understood at the outset that this opinion letter is based on the use of the prescriptive compliance path. Use of the performance compliance path may lead to different U-factors based on the total building performance.

The code, in both the Residential Provisions and the Commercial Provisions, clearly requires alterations to meet the current provisions of the code:

“Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.” (FBC-EC §R101.4.3; §C101.4.3¹)

¹ All references to FBC-EC are to the Florida Building Code–Energy Conservation, 5th Edition (2014), as approved by the Florida Building Commission and published as Chapter 61G20-1.001 F.A.C.

Clearly, the replacement of fenestration (i.e. windows) is an alteration. The Residential Provisions and the Commercial Provisions of the code define alteration as:

“ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.” (FBC-EC §R202; §C202)

Regarding the requirement for permits, the code provides broad language regarding when permits are required for construction and I believe the inclusion of the words “construct”, “alter”, and “repair” within the provisions delineating where a permit is required mandates the application for a permit for the replacement of fenestration. Further, there are code requirements other than thermal efficiency, such as wind resistance, opening protection, labeling, and other requirements, applicable to fenestration for which compliance must be ascertained. Such compliance is typically ensured through plan review, permitting, and inspection. I am not aware of any jurisdiction that does not require permits for the replacement of fenestration where the entire frame is being replaced.

“105.1 Required.

Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any impact resistant coverings, electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.” [FBC-B, 5th Edition (2014), §105.1]

The code in both the Residential Provisions and the Commercial Provisions specifically states thermal efficiency standards are set for listed systems and components applicable when new products are installed or replaced in existing buildings for which a permit must be obtained. The code identifies replacement fenestration as a building component.

“Building systems and components. Thermal efficiency standards are set for the following building systems and components where new products are installed or replaced in existing buildings, and for which a permit must be obtained. New products shall meet the minimum efficiencies allowed by this code for the following systems and components:

- Heating, ventilating or air conditioning systems.
- Service water or pool heating systems.
- Lighting systems.
- Replacement fenestration.” (FBC-EC §R101.4.7; §C101.4.7)

In addition to the above, the Residential Provisions of the code contains a specific section requiring replacement fenestration to meet the U-factor and Solar Heat Gain Coefficient (SHGC) values specified in Table R402.1.1.

“R402.3.6 Replacement fenestration. 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 R402.1.1.” (FBC-EC §R402.3.6)

It has been opined that replacement fenestration is not required to meet the thermal efficiency standards of the code due to provisions related to exempt buildings. Specifically, some jurisdictions claim the value of replacing fenestration in relation to the assessed value of the structure is the controlling factor due to Sections R101.4.8 and C101.4.8 exempting existing buildings from the Florida Building Code, Energy Conservation, except those considered renovated buildings. To be considered a renovated building the value of the work must exceed thirty-percent of the assessed value of the building structure.

“R101.4.8 Exempt buildings. Buildings exempt from the provisions of the *Florida Building Code, Energy Conservation*, include existing buildings except those considered renovated buildings, changes of occupancy type, or previously unconditioned buildings to which comfort conditioning is added. Exempt buildings include those specified in Sections R101.4.8.1 through R101.4.8.4.” (FBC-EC §R101.4.8; §C101.4.8)

“RENOVATED BUILDING. 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.” (FBC-EC §R202; §C202)

It is my opinion the assertion that replacement fenestration is included in the exemption or in the definition of renovated buildings is incorrect because the code classifies replacement fenestration as a component and specifically requires code compliance. In the case of residential occupancies, in addition to the classification as a component, the Residential Provisions of the code contain a specific statement that replacement fenestration is required to comply. (See Section R 402.3.6 above.) While the Commercial Provisions do not address replacement fenestration separately, fenestration is required to comply with Table C402.3. (FBC-EC §C402.3)

I believe further support for my opinion is found in both the Residential Provisions and Commercial Provisions of the code related to conflicts in different sections of the code and to general versus specific requirements in the code. The code states where there are conflicts in the code, the most stringent provision applies. Where there is a conflict between a general requirement and a specific requirement, the specific requirement the specific requirement prevails.

“R101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.”(FBC-EC §R101.4; §C101.4)

In the first case, it is obvious there are conflicts between different sections of the code in that two sections address replacement fenestration and require replacement fenestration to meet the requirements of the code as for new construction. (§R101.4.7 and §R402.3.6) One section of the code appears to exempt existing buildings, unless the building is considered a renovated building. In this conflict, in my opinion, the most restrictive provisions are those requiring the replacement fenestration to meet the code requirements for new construction and those sections govern.

Regarding the determination of general requirements versus specific requirements, I believe the provisions identifying replacement fenestration are specific in that they can be applied to no other situation or subject other than the replacement of fenestration. The exemption for existing buildings is a general requirement. Where there is a conflict between a general requirement and a specific requirement, the specific requirement governs. Clearly, the specific identification of replacement

fenestration in two locations constitutes specific requirements and therefore governs.

Regarding the replacement of fenestration in residential buildings four stories or greater, the code classifies such buildings as commercial and requires compliance with the Commercial Provisions of the code.

“R101.5.1.2 Commercial and residential buildings greater than 3 stories. See *Florida Building Code, Energy Conservation: Commercial Provisions.*” (FBC-EC §R101.5.1.2; §C202)

C101.5 Compliance. *Residential buildings* shall meet the Residential Provisions of this code. *Commercial buildings* shall meet the Commercial Provisions. (FBC-EC §C101.5)

COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of “Residential buildings.” (FBC-EC §R202; §C202)

RESIDENTIAL BUILDING. For the purpose of this code, includes Group R-3 buildings, as well as Group R-2 and R-4 buildings three stories or less in height above grade plane. (FBC-EC §R202; §C202)

As stated earlier, replacement fenestration is identified as a building component and as such replacement with new products in existing buildings are required to comply with the minimum thermal efficiency standards set by the code.

“C101.4.7 Building systems and components. Thermal efficiency standards are set for the following building systems and components where new products are installed or replaced in existing buildings, and for which a permit must be obtained. New products shall meet the minimum efficiencies allowed by this code for the following systems and components:

- Heating, ventilating or air conditioning systems.
- Service water or pool heating systems.
- Lighting systems.
- Replacement fenestration.” (FBC-EC §C101.4.7; §R101.4.7)

In the case of commercial occupancies, (e.g. residential four or more stories) the code specifically states alterations are to comply with Sections C402, C403, C404, and C405 or ANSI/ASHRAE/IESNA 90.1 (ASHRAE 90.1 hereinafter). When demonstrating compliance via the prescriptive compliance path, the code requires fenestration to comply with Table C402.3. The table contains maximum U-factor and SHGC values which may be adjusted for window projection factors (i.e. overhangs and permanent shade devices) provided by the code.

“C402.3 Fenestration (Prescriptive). Fenestration shall comply with Table C402.3. Automatic daylighting controls specified by this section shall comply with Section C405.2.2.3.2.” (FBC-EC §C402.3)

**TABLE C402.3
BUILDING ENVELOPE REQUIREMENTS: FENESTRATION**

CLIMATE ZONE	1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7	8
Vertical fenestration								
<i>U-factor</i>								
Fixed fenestration	0.50	0.50	0.46	0.38	0.38	0.36	0.29	0.29
Operable fenestration	0.65	0.65	0.60	0.45	0.45	0.43	0.37	0.37
Entrance doors	1.10	0.83	0.77	0.77	0.77	0.77	0.77	0.77
<i>SHGC</i>								
SHGC	0.25	0.25	0.25	0.40	0.40	0.40	0.45	0.45
Skylights								
<i>U-factor</i>								
U-factor	0.75	0.65	0.55	0.50	0.50	0.50	0.50	0.50
<i>SHGC</i>								
SHGC	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

NR = No requirement.

In addition, the code allows the use of ASHRAE 90.1 for commercial buildings. The standard is adopted by reference and contains less stringent provisions for U-factors for replacement fenestration. In my opinion, the reduced U-factors of ASHRAE 90.1 are not applicable due to the specific statement of the code requiring compliance with Table C402.3.

Regarding differences between referenced standards and code requirements, the code stipulates that when a referenced standard includes subject matter that is within the scope of the code, the provisions of the code take precedence over the provisions of the referenced standard. Further the code states where conflicts between the code and referenced standards occur, the provisions of the code apply.

“C106.1 Referenced codes and standards. The codes and standards referenced in this code shall be those listed in Chapter 5, and such codes and standards shall be considered as part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections C106.1.1 and C106.1.2.

C106.1.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

C106.1.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

C106.2 Conflicting requirements. Where the provisions of this code and the referenced standards conflict, the provisions of this code shall take precedence.” (FBC-EC §106)

Conclusion

I believe the Florida Building Code-Energy Conservation, 5th Edition (2014), requires replacement fenestration in both residential and commercial structures to comply with the U-factors and Solar Heat Gain Coefficients given for new construction when using prescriptive compliance methods. This is due to the identification of replacement fenestration as components by the code in both the Residential Provisions and Commercial Provisions. In addition, for residential buildings, the code specifically states replacement fenestration is required to meet the U-factor and SHGC values stipulated in Table R402.1.1. While the commercial provisions do not specify replacement fenestration, fenestration is required to meet the maximum values stipulated in Table C402.3.

Florida Statute:

This opinion is based solely upon the provisions of the Florida Building Code-Energy Conservation. However, some opine that the provisions of the code requiring replacement fenestration to meet the thermal efficiency provisions required for new construction contravenes and changes provisions of Florida Statute. I do not believe this is the case and while I do not believe this is relevant to the interpretation of the code, to provide a full opinion, a discussion of the relevant statutory provisions follows.

Thermal efficiency standards are established by Florida Statute at Chapter 553, Part V, Florida Statute, specifically ss. 553.900 – 553.912. In short, the statute requires the Florida Building Commission to adopt the Florida Building Code-Energy Conservation and maintain and update it.

Regarding applicability of energy provisions throughout the state, including the Florida Building Code-Energy Conservation, the statute states:

“553.903 Applicability.—This part applies 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 Building Code-Energy Conservation.** The provisions of this part shall constitute a statewide uniform code.” (Ch. 553.109, F.S. **Emphasis** provided.)
History.—s. 1, ch. 77-128; s. 1, ch. 78-625; s. 2, ch. 80-193; s. 6, ch. 93-249; s. 95, ch. 2000-141; s. 20, ch. 2013-193.

A review of the §553.109 reveals that the statute and the code are applicable to three situations:

1. New buildings;
2. Renovated buildings for which permits are obtained after March 15, 1979; and
3. The installation or replacement of building systems and components with new products for which thermal efficiency standards are set by the Florida Building Code-Energy Conservation.

The code mirrors the definition contained in Florida Statute for Renovated Buildings. In my opinion those claiming the replacement of fenestration is within the purview of renovated buildings fail to read beyond and recognize the “and” that occurs after “March 15, 1979,” that makes the provisions applicable to the replacement of building systems and components.

“... and to the installation or replacement of building systems and components with new products for which thermal efficiency standards are set by the Florida Building Code-Energy Conservation.”

Finally, there is one more section of Florida Statute cited as placing the replacement of fenestration within the purview of renovated buildings, Ch. 553.906.

553.906 Thermal efficiency standards for renovated buildings.—Thermal designs and operations for renovated buildings for which building permits are obtained after March 15, 1979, must take into account insulation; windows; infiltration; and HVAC, service water heating, energy distribution, lighting, energy managing, and auxiliary systems design and equipment selection and performance. Such buildings are not required to meet standards more stringent than the provisions of the Florida Building Code-Energy Conservation. These standards apply only to those

portions of the structure which are actually renovated.

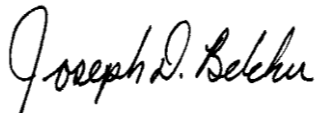
History.—s. 1, ch. 77-128; s. 1, ch. 78-625; s. 3, ch. 79-267; s. 2, ch. 80-193; s. 6, ch. 84-273; s. 4, ch. 88-213; s. 23, ch. 2013-193

The section takes into account many items such as insulation, HVAC, service water heating, and lighting to name a few. Following the logic that the inclusion of the word windows in the section means it is a renovated building; the same logic would apply to the other items listed in the section. If so replacement of any of the items listed would be required to have a value exceeding thirty-percent of the assessed value of the structure before code compliance is required. The limitation would apply to all of the items identified as systems and components within the code. For example, unless the cost exceeded thirty-percent of the assessed value of the structure, extensions or updates of the duct or HVAC system, changes or extensions to service water or pool heating systems, electrical motors, and lighting systems would not be required to meet the code provisions. It is hard to imagine the work on, or complete replacement of, any of these systems exceeding thirty-percent of the assessed value of the structure. This is clearly not the case in areas where the Commission has set thermal efficiency standards within the Florida Building Code-Energy Conservation.

Some ask if that is the case, why is there a definition for renovated buildings and where does it apply? An example of where the logic definition of renovated building would apply is in a stand-alone reroofing project for a commercial building. Since reroofing or roof insulation are not included identified as systems and components if the re-roofing project did not exceed thirty-percent of the assessed value of the structure, then the roof insulation would not be required to be upgraded to comply with the roof insulation provisions for new construction. with thermal efficiency standards set by the Commission at Section 101.4.7, the stand-alone reroofing project would not be considered a renovated building, unless the re-roofing project exceeded thirty-percent of the assessed value of the structure. Where the reroof project costs are less than thirty-percent of the assessed value of the structure, the roof insulation would not be required to be upgraded to comply with the roof insulation provisions for new construction, but could not make the roof less energy efficient than it was before the reroof project. In the case where reroofing is part of a larger project with total costs exceeding thirty-percent of the assessed value of the structure, the roof would be required to meet the provisions of the energy code for new construction.

In closing, Mr. Dudley, I hope this assists in your endeavor. Should you wish to discuss this or any other matter, please do not hesitate to contact me at your earliest convenience.

Sincerely yours,



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