

**Oregon**  
**Interpretive Ruling No. 93-51**  
**RETROFIT GLAZING REQUIREMENTS FOR NON-RESIDENTIAL BUILDINGS**

**Initiated By:** CLIFF CRAMER, PLANS EXAMINER  
CITY OF CORVALLIS

**RE:** Energy Conservation  
Chapter 53, Energy Conservation, Sections 5303(d) I and 5, and Table 53-C Construction Means and Methods

**QUESTIONS CONSIDERED**

1. What are the code requirements when windows are replaced for maintenance purposes or repaired in non-residential buildings?
2. Is there a different requirement if a significant number of windows are replaced?
3. When a single glazed store-front window is replaced with a single glazed store-front door for increased exiting, is double glazing required?

**APPLICABLE CODE SECTIONS**

Oregon Structural Specialty Code (OSSC) Sections 5303(d)1 and 5, and Table 53-C.

**BACKGROUND**

Windows are frequently replaced due to damage, for cosmetic upgrades or other purposes. An existing building may get a "facelift." The facelift could include a new marquee, building trim and new windows that are tinted for a better cosmetic appeal. This could occur on a single story building where only one of the exterior walls is receiving the facelift. It could be a 100story mixed occupancy building in downtown Portland, where the facelift is occurring only on the street level.

**FINDINGS**

- Glazing requirements are in the code as part of a wall component performance measurement. There are two different methods that allow code compliance for wall assemblies, thermal performance calculations (calculation) or prescriptive compliance packages (prescriptive).
- Windows are not singled out in prescriptive wall or U-of-the-overall-wall performance targets. Since they are not separately singled out, a specific window requirement does not exist.
- A building can comply using either calculation of prescriptive methods to verify compliance with the requirements in the code. These methods are reasonable and acceptable for new construction. These methods do not single out the minimum performance for a given component such as windows or walls.
- Table 53-C allows up to nine percent of the windows as single glazed if the opaque wall has a total R - value (Rt) of 5 or greater. The walls of existing buildings are not likely to have an Rt of 5 or more. This would mean that single pane windows would not be allowed in an alteration unless the wall Rt exceeds 5.

**DISCUSSION**

OSSC Section 104(b) Additions, Alterations or Repairs provides alterations or repairs to an existing building or structure which are non structural and do not adversely affect any structural member or any part of the building or structure having required fire resistance may be made with the same materials of which the building or structure is constructed. The installation or replacement of glass shall be as required for new installations.

The history of the last sentence of the code referenced relates to safety guidelines required by the Consumer Product Safety Commission (CPSC). The current language is intended to apply to "safety glass re-

quirements and method of setting (installation)" for the repair of glass, not the "energy requirements." This sentence is not intended to apply to energy conservation requirements, but the language does not separate the safety and energy requirements.

Replacement of damaged glazing is considered maintenance. Maintenance is considered "repair" in the code. The replacement of a significant number of windows is considered an "alteration." Installing a store-front door is an improvement of exiting (fire, life, safety issue). Oftentimes the area of the door is no greater than the area of the window it is replacing.

The intent of the energy requirements, relative to alterations and remodels, is to improve the energy use of the building (that portion that is undergoing remodel) to at least minimum requirements. The code specifies assembly performance not minimum individual component requirements.

Table 53-B could be the basis to specify minimum window specifications (maximum U-values) as an alternate method of construction for alterations.

**RULING**

1. Windows replaced for repair or maintenance purposes cannot have any lesser energy conservation qualities than the glazing being replaced. This includes glazing shading coefficient. Double pane glazing shall be replaced with double pane. A single pane window could be replaced with a single pane. Replacing single pane glazing with double pane is encouraged.
2. As an alternate method of construction for alterations, the following minimum glazing requirements apply to remodels where a significant number<sup>5</sup> or the majority of windows are being replaced:

OPTION	MAXIMUM V-VALVE	MAXIMUM SHADING COEFFICIENT <sup>1</sup>	MAXIMUM AREA <sup>2</sup>	
			Zone 1 <5500 HDD (percent) <sup>3</sup>	Zone 2 >5500 HDD (Percent) <sup>3</sup>
1	Double glazed <sup>4</sup>	n.a.	9%	5%
2	Double glazed <sup>4</sup>	0.6	18%	15%
3	Double glazed <sup>4</sup>	0.5	31%	25%
4	Double glazed <sup>4</sup>	0.4	>31%	>25%

<sup>1</sup> Shading coefficient is applicable only to cooled buildings.

<sup>2</sup> Sum of altered windows as a percentage of that affected gross exterior wall as determined by the building official. <sup>3</sup>

<sup>3</sup> See Table S3-A for a listing of heating degree days (HDD) by city.

<sup>4</sup> Double glazing shall have a minimum 1 ¼ in. air space.

<sup>5</sup> "Significant number" shall include all of the windows on one exterior wall or all the windows in one wall on the street level of a multi-story building.

3. A single glazed store front window can be replaced with a single pan store front door for exiting purposes.

The Energy Conservation Board and Structural Code Advisory Board make this recommendation as an interpretation to the requirements in Chapter 53, Energy Conservation.

(signed November 22, 1993)

Rodger Bekooy, Chairman  
Energy Conservation Board

(signed November 17, 1993)

John Talbott, Chairman  
Structural Code Advisory Board

The recommendations and findings of the Energy Conservation Board and Structural Code Advisory Board are accepted and the interpretations are adopted as stated above.

(signed November 29, 1993)  
Gary J. Wicks, Administrator  
Building Codes Division

RESCINDED