

**Oregon**  
**Interpretive Ruling No. 92-17**  
**NEW MANUFACTURED WINDOWS WITH STORM WINDOW DEFAULT V-VALUES**

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**REGARDING:** Energy Conservation  
Chapter 53, Energy Conservation, Section 5303(c)2  
Construction Means and Methods (Group R buildings, three stories and less in height)

**QUESTIONS CONSIDERED**

1. What default V-value is assigned to a new manufactured wood frame window that incorporates a storm window and clear glazing in both assemblies for Group R buildings, three stories and less in height?
2. What default U-value is assigned to a new manufactured wood frame window that incorporates a storm window and low-e for Group R buildings, three stories and less in height?

**APPLICABLE CODE SECTION**

Section 5303(c)2 of the Oregon Structural Specialty Code and One and Two Family Dwelling Specialty Code.

2. Windows. Single glazing ...  
Testing shall be in accordance with subsections A, B or C until December 31, 1993, and in accordance with subsection C thereafter ...
- A. The American Architectural Manufacturers Association (AAMA) 1503.1-1988....., or;
- B. The American Society for Testing and Materials (ASTM) C236 test procedure with the following requirements:
- (i).....
- (ii) •.....• or,
- C. The National Fenestration Rating Council (NFRC) Interim Procedure for Determining Fenestration Product Thermal Performance .....
- D. Windows tested according to .....
- E. Site-built windows and certain manufactured windows described below shall be exempt from thermal testing requirements provided:
- (i) The insulated glass is tested and certified under a Sealed Insulated Glass Manufacturers Association (SIGMA) approved certification program as Class A in accordance with the ASTM E 744-81 and this insulated glass is installed in accordance with the SIGMA glazing specifications. The window shall also meet the requirements of section (ii) and (iii) below.
- (ii) Site-built double glazed windows which have a wood frame and a dead air space between the panes of not less than 1/2 inch.  
**Exception:** Windows containing low-e glass may have a dead air space between the panes of not less than 3/8 inch.
- (iii) Manufactured double glazed windows which have a wood frame and a dead air space between the panes of not less than *h* inch.  
**Exception:** Windows containing low-e glass may have a dead air space between the panes of not less than 3/8 inch.
- (iv) Windows exempted from the thermal test requirements in accordance with section (i), (ii) and (iii) above shall be

assigned the default V-values listed below:

- a. Site-built windows with 1/2 inch air gap between the panes 0.65 Btu/hour/sq.ft./°F.
- b. Site-built windows with 3/8 inch air gap between the panes and low-e glass 0.60 Btu/hour/sq.ft./°F.
- c. Wood framed manufactured windows with 1/2 inch air gap between the panes 0.65 Btu/hour/sq.ft./°F.
- d. Wood framed manufactured windows with 3/8 inch air gap between the panes and low-e glass 0.60 Btu/hour/sq.ft./°F.

## BACKGROUND

Default U-values were established with assistance from window manufacturers. The manufacturers wanted a provision to allow the use of products produced by small specialty millworks. Several small specialty mill works in Oregon manufacture single pane wood frame windows which incorporate an interior or exterior mounted, typically sash mounted, storm window. Oftentimes this is done to match existing architectural features to a building that is being added onto or remodeled. The default U-values established in the code for certain manufactured windows are with sealed insulated glazing. These are wood frame windows which incorporate sealed insulated double pane glazing.

There are "tested" single pane wood frame windows which incorporate a storm window. The use of these windows is allowed in the current code. "Untested" windows which incorporate storm windows cannot be used since a default V-value is not established.

Workmanship and thermal performance vary greatly from manufacturer to manufacturer. Default U-values are inherently high to allow for variances. If default V-values are too optimistic, manufacturers may opt to avoid testing their products and use the defaults.

## FINDINGS

### 1. New Manufactured Wood-Framed Windows with Integral Storm Windows and Clear Glazing

- Several double hung windows that incorporate a storm window with clear glazing were tested and are listed on the Seattle Department of Construction and Land Use Glazing U-Value List. The best V-value on the list (U-0.39) is a wood frame single pane window with an exterior mounted vinyl storm (clear glass). The worst U-value on the list (V-0.59) is a wood frame single pane window with an exterior mounted aluminum storm (clear glass). The only wood frame window with a wood frame storm on the list (V-0.54) had exterior aluminum cladding on both frames.
- It is difficult to assign a median default V-value due to the different types of construction and variance in quality control.
- Assigning a default V-value of 0.65 for wood frame manufactured windows that incorporate a storm window with clear glazing is consistent with the value for sealed glass insulated wood frame windows.

### 2. New Manufactured Wood-Framed Windows with Integral Storm Windows and Low-e Glass

- Only one tested double hung window that incorporates a storm window with low-e glass has been tested (V-0.42) and listed on the Washington Building Code Council V-Value List.
- Assigning a default V-value of 0.60 for wood frame manufactured windows that incorporate a storm window with low-e glass is consistent with the value for sealed glass insulated wood frame windows.

## DISCUSSION

Existing default V-values in the code cover a broad range of manufacturing construction detail and operator types. The same variables, if not more, exist for new manufactured wood frame windows which incorporate a storm window. Based on current test data, a default V-value of 0.65 for new

manufactured wood frame windows which incorporates a storm window, with clear glazing appears to be conservative. Based on current data, a default V-value of 0.60 for new manufactured wood frame windows which incorporates a storm window, with *low-e* glazing appears to be conservative.

## **RULING**

### **Default U-value for New Manufactured Wood-Framed Windows with Integral Storm Windows and Clear Glazing**

- A new manufactured wood frame window that incorporates a storm window and clear glazing in both assemblies is assigned a default V-value of 0.65 for Group R buildings, three stories and less in height.

### **Default U-value for New Manufactured Wood-Framed Windows with Integral Storm Windows and *Low-e* Glass**

- A new manufactured wood frame window that incorporates a storm window and *low-e* glazing is assigned a default V-value of 0.60 for Group R buildings, three stories and less in height.

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

(signed August 3, 1992) Rodger Bekooy, Chairman Energy Conservation Board  
Date

(signed July 15, 1992) John Talbott, Chairman Structural Code Advisory Board  
Date

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 August 18, 1992) Gary J. Wicks, Administrator Building Codes Agency  
Date